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Study to support the fitness check of the Polluter Pays Principle

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ABSTRACT

This study examines the implementation of the Polluter Pays Principle (PPP) in EU environmental policy and selected funding programmes between 2014 and 2023. The PPP is applied where polluters bear the costs of their pollution, including of measures to prevent, control and remedy it, of policy administration and enforcement and the wider societal costs of environmental damage. Current application of the PPP varies, both in the types of costs addressed and the policy area concerned. Some differences in application between Member States have been observed. It is generally well implemented in policies addressing the costs of pollution prevention and control, whilst application for administration and enforcement and for addressing wider costs of environmental damage could be strengthened. Opportunities are identified to simplify and increase efficiency of application, including via use of Market Based Instruments (MBI). Whilst national differences exist, action to apply the PPP at EU level facilitates market stability and greater harmonisation of measures. Addressing the substantial costs of environmental pollution via the use of the PPP as part of a policy framework remains highly relevant to current and future needs of the European Union.

RÉSUMÉ

Cette étude examine la mise en œuvre du principe du pollueur-payeur (PPP) au sein de la politique environnementale de l'UE et dans certains programmes de financement entre 2014 et 2023. Ce PPP s'applique dans les cas où les pollueurs prennent en charge les coûts liés à la pollution qu'ils ont engendrée, y compris les mesures de prévention, de contrôle et de réparation, l'administration et l'application des politiques, ainsi que les coûts sociétaux plus larges des dommages causés à l'environnement. L'application actuelle du PPP varie tant en ce qui concerne les types de coûts traités que le domaine politique concerné. Certaines différences d'application ont été observées entre les États membres. Le PPP est généralement bien mis en œuvre dans les politiques relatives aux coûts de la prévention et du contrôle de la pollution, tandis que son application administrative et juridique ainsi que celle liée aux coûts plus larges des dommages causés à l'environnement pourrait être renforcée. On a identifié des possibilités de simplifier et d'améliorer l'efficacité de l'application, notamment en utilisant des instruments fondés sur le marché (IFM). Malgré l'existence de différences nationales, l'application du PPP au niveau de l'UE facilite la stabilité du marché et favorise l'harmonisation des mesures. La prise en compte des coûts substantiels de la pollution de l'environnement par l'utilisation du PPP dans le cadre d'une politique reste très pertinente pour les besoins actuels et futurs de l'Union européenne.

KURZFASSUNG

Diese Studie untersucht die Umsetzung des Verursacherprinzips (VP) in der EU-Umweltpolitik und ausgewählten Förderprogrammen im Zeitraum von 2014 bis 2023. Das VP wird angewandt, wenn die Verursacher die Kosten für ihre Umweltbelastung tragen. Dies umfasst Kosten für Präventions-, Kontroll- und Sanierungsmaßnahmen für die Verwaltung und Durchsetzung politischer Maßnahmen sowie für die allgemeinen gesellschaftlichen Kosten von Umweltschäden. Die derzeitige Anwendung des VP variiert sowohl hinsichtlich der zu deckenden Kostenarten als auch bezüglich des betroffenen Politikbereichs. Bei der Anwendung wurden einige Unterschiede zwischen den Mitgliedstaaten festgestellt. Das Konzept wird im Allgemeinen gut in den Bestimmungen umgesetzt, die sich mit den Kosten für die Vermeidung und Verminderung der Umweltbelastung befassen, während die Anwendung für die Verwaltung und Durchsetzung sowie für die Deckung weitergehender Kosten von Umweltschäden noch verbessert werden könnte. Außerdem werden Möglichkeiten zur Vereinfachung und Effizienzsteigerung der Anwendung aufgezeigt, u. a. durch den Einsatz von marktbasierten Instrumenten (MBI). Wenngleich es nationale Unterschiede gibt, erleichtert die Anwendung der KKP auf EU-Ebene die Marktstabilität und ermöglicht so eine verstärkte Harmonisierung der Maßnahmen. Die Berücksichtigung der erheblichen Kosten der Umweltverschmutzung durch den Einsatz des VP als Teil eines strategischen Rahmens ist nach wie vor von großer Bedeutung für die derzeitigen und künftigen Bedürfnisse der Europäischen Union.

EXECUTIVE SUMMARY

Introduction

This report presents the findings of the supporting study to the fitness check of the implementation of the Polluter Pays Principle (PPP) in EU environmental policy and selected EU funding programs. The supporting study followed the EU Better Regulation Guidelines and examined the effectiveness, efficiency, relevance, coherence, and EU added value of the PPP application. It covers the period from 2014 to 2023. Policy revisions made in 2024 are noted but not included in the analysis. The report informs the planned Commission Staff Working Document on PPP implementation.

Policies within the scope of the study were identified based on their relevance to the European Green Deal and 8th Environment Action Programme (8th EAP). The assessment is structured around the 8th EAP priority objectives and a number of associated policy areas: climate change; waste and recycling; water; air quality; noise; chemicals risk management; nature, biodiversity, soil and land; horizontal (environmental liability, environmental crime, built environment); EU funding and State aid.

The PPP is applied where polluters bear the costs of their pollution, including the costs of measures taken to prevent, control, and remedy pollution and the costs imposed on society. As such the assessment focusses on who incurs those costs; the polluter(s), user(s), or wider society? For the purposes of this analysis, costs were defined as:

- Costs of pollution prevention and control, in the form of investments and expenses which stem from provisions to prevent or control pollution (including accidental pollution).
- Costs of administrative and enforcement measures needed to implement measures taken to prevent, control or remedy pollution, including labelling, reporting, registration, monitoring, and assessment needed to provide information.
- Costs of environmental damage. These are the costs of pollution borne by wider society that involve costs to remedy environmental damage caused by pollution, or to address externalities resulting from allowable residual pollution or accidental pollution.

Evidence gathering involved desk research, public consultation, targeted interviews, and stakeholder workshops. Desk research encompassed legal review of policy provisions, qualitative literature/evidence assessment, and quantitative assessment for selected indicators relating to costs and pollution trends. Legal texts, impact assessments, policy evaluations, and implementation assessments were reviewed, along with data from Eurostat, the EEA, and the OECD. Consultation activities comprised: a public consultation, conducted over twelve week with 268 respondents from 27 countries; targeted interviews with 30 expert stakeholders; two stakeholder workshops in 2023, with stakeholders from competent authorities, industry associations, NGOs, and research organisations. Thematic analysis was then applied to analyse qualitative data, identifying themes and patterns across responses. This was then triangulated with quantitative data obtained via desk research. Findings are presented below, by the five evaluation criteria.

Effectiveness

Application of the PPP varies both by type of cost and policy area. While it is generally well implemented in policies addressing pollution prevention and control, opportunities exist to strengthen its application, in particular concerning administrative and enforcement measures and the costs of environmental damage and policies related to zero pollution to water and natural capital and biodiversity. In terms of how the PPP is applied, “command and control”

mechanisms are predominantly used to regulate polluters in the EU, but Market Based Instruments (MBIs) such as tradeable permit and extended producer responsibility schemes also play a role. Member State differences in the PPP implementation have occurred, especially regarding MBIs.

A high level analysis shows corporations and households, rather than national governments, are bearing the majority of national expenditure on environmental protection. Such expenditure has remained stable as a proportion of GDP during the evaluation period. There is no clear correlation and many confounding factors between pollution trends and expenditure on environmental protection, making it challenging to assess the PPP's effectiveness – in isolation - in delivering environmental improvements.

Nevertheless, evidence suggests the PPP is contributing to environmental improvement without significantly impacting market competitiveness. Co-benefits, such as innovation and technological advances spurred by the PPP implementation, further support its effectiveness. However, challenges persist, including varied effectiveness in addressing pollution costs between Member States and sectors, conflict with use of environmentally harmful subsidies, and gaps in implementation leaving ongoing pollution costs borne by society instead of polluters.

Efficiency

While the type and design of legal instruments applying the PPP impact efficiency, there is a lack of systematic monitoring to assess efficiency gains and measure progress comprehensively.

The PPP shifts the costs of pollution away from society and towards the polluters, yet there is a risk of regressive distributional effects, i.e. negatively impacting lower-income households. Such effects depend on the way costs are recovered and can be mitigated via policy design and compensation mechanisms. Whilst this can only be considered in detail on a case by case basis, overall the magnitude of such effects appear to be minor and mitigated by revenue recycling.

Assessment of specific MBI indicate they can deliver efficient environmental improvement via price signals that spur private investment and innovation. High efficiency gains have been observed via auction of pollution rights and charges, with case study evidence suggesting a combination of MBIs and command and control measures can enhance efficiency of outcomes. Conversely, administrative burdens associated with the PPP can negatively impact efficiency for example where there are challenges in establishing who the polluter is, enforcing the principle as well as monitoring and reporting the costs of pollution. These examples reflect partial application of the PPP and implies scope for improvement to ensure costs of implementation are more fully addressed by the polluter rather than society. At present there is insufficient data to quantify these costs at EU level.

Opportunities to simplify the PPP application and reduce administrative costs were identified for several policies. Further, a more systematic approach to enforcing application, using horizontal policy mechanisms to address consistent shortcomings in addressing the costs of pollution and use of insurance schemes to address accidental pollution costs also offer opportunity for greater efficiency.

Coherence

No discernible issues in coherence of application of the PPP across policy areas contributing the 8th EAP were identified. A limitation arises in the way the ELD addresses environmental damage costs, based on differences in interpretation of and thresholds for "significant

damage" for certain environmental effects among Member States. Recent publication of Commission guidelines, and ongoing efforts in raising awareness and training stakeholders aim to mitigate these challenges.

Further challenges affect the consistency of the PPP application across different policy areas and costs of pollution prevention and control, costs of administrative and enforcement measures and costs of environmental damage. PPP application is generally lower in mechanisms intended to internalise costs for environmental damage, compared to pollution prevention and control, with mixed application for administrative measures. Variations in implementation across policy areas were also noted, for example generally higher in climate change and waste policies and generally lower in water, air, noise, soil, biodiversity, and nature policies.

In terms of the application of the PPP beyond the European Union (EU), measures like the Waste Shipments Regulation restrict exports of harmful wastes to third countries. Flagship initiatives intended to reduce the EU's external pollution footprint remain partially implemented. This primarily concerns restrictions on the export of certain products which are no longer allowed in the EU market and wastes that have harmful environmental impacts to third countries (such as subjecting plastic waste and electrical and electronic waste to the controls and restrictions of the UN Basel Convention).

EU added value

EU action to apply the PPP facilitates market stability and harmonisation across Member States. Minimal variation between Member States in addressing pollution costs, relative to national GDP has been identified. Examples of added value include:

- Providing clear signals for industry for how the costs of pollution are to be addressed, for example adoption of Best Available Techniques (BAT) under the Industrial Emissions Directive (IED).
- Greater harmonization of PPP implementation at the national level, for example common provisions for EPR schemes facilitating a more uniform approach to environmental taxes or charges in waste management policies.
- Minimising risks of market distortion by applying a common “Do No Significant Harm Principle” across EU funding initiatives.

While current competencies and legal bases support the PPP implementation, some tension appears to exist between the subsidiarity principle and the PPP, influencing its implementation. EU-level action may strengthen PPP implementation by establishing a minimum standard for the costs polluters pay.

Relevance

The external costs of pollution are considerable. Internalising these costs through the use of the PPP as part of a policy framework remains highly relevant current and future needs. While the objectives of the PPP are relevant to the needs of the EU as put forward in the European Green Deal, its just and fair implementation is complex. The internalisation of pollution costs may result in higher commodity prices which may disproportionally affect low-income households requiring the careful design of policies. Despite these challenges, the objectives of the PPP align with the goals of the European Green Deal, particularly in reducing pollution levels through price signals.

RÉSUMÉ ANALYTIQUE

Introduction

Ce rapport présente les résultats de l'étude de soutien à l'évaluation de la mise en œuvre du principe du pollueur-payeur (PPP) dans la politique environnementale de l'UE et dans certains programmes de financement de l'UE. L'étude de soutien a suivi les lignes directrices de l'UE pour l'amélioration de la réglementation et a examiné l'efficacité, l'efficience, la pertinence, la cohérence et la valeur ajoutée de l'UE dans l'application des PPP. Elle couvre la période allant de 2014 à 2023. Les révisions politiques effectuées en 2024 sont notées mais ne sont pas incluses dans l'analyse. Le rapport alimente le document de travail des services de la Commission sur la mise en œuvre des PPP.

Les politiques appartenant au champ de l'étude ont été identifiées en fonction de leur pertinence pour le Pacte vert pour l'Europe et le 8^{e}e programme d'action pour l'environnement (8^{e} PAE). L'évaluation est structurée autour des objectifs prioritaires du 8^{e} PAE et d'un certain nombre de domaines stratégiques associés : changement climatique ; déchets et recyclage ; eau ; qualité de l'air ; bruit ; gestion des risques chimiques ; nature, biodiversité, sols et terres ; thèmes horizontaux (responsabilité environnementale, criminalité environnementale, environnement bâti) ; financement de l'UE et aides d'État.

Le PPP s'applique dans les cas où les pollueurs prennent en charge les coûts liés à la pollution qu'ils ont engendrée, y compris les mesures de prévention, de contrôle et de réparation, ainsi que les coûts imposés à la société. En tant que telle, l'évaluation se focalise sur la question de qui prend ces coûts en charge : le(s) pollueur(s), le(s) utilisateur(s) ou la société dans son ensemble ? Pour les besoins de cette analyse, les coûts ont été définis comme suit :

- Coûts de la prévention et du contrôle de la pollution, sous la forme d'investissements et de dépenses découlant de dispositions visant à prévenir ou à contrôler la pollution (pollution accidentelle comprise).
- Coûts des mesures administratives et d'exécution nécessaires à la mise en œuvre des mesures prises pour empêcher, contrôler ou réparer la pollution, y compris l'étiquetage, la déclaration, l'enregistrement, la surveillance et l'évaluation nécessaires pour fournir des informations.
- Coûts des dommages environnementaux. Il s'agit des coûts de la pollution supportés par l'ensemble de la société, qui comprennent les coûts de réparation des dommages environnementaux causés par la pollution, ou les coûts liés aux externalités résultant de la pollution résiduelle autorisée ou de la pollution accidentelle.

La collecte de preuves s'est faite par le biais de recherches documentaires, de consultations publiques, d'entretiens ciblés et d'ateliers avec les parties prenantes. Les recherches documentaires ont porté sur l'examen juridique des dispositions politiques, l'évaluation qualitative de la littérature et des preuves, et l'évaluation quantitative d'indicateurs sélectionnés relatifs aux coûts et aux tendances en matière de pollution. Des textes juridiques, des études d'impact, des évaluations de politiques et des estimations de mise en œuvre ont été vérifiés, tout comme des données provenant d'Eurostat, de l'EEE et de l'OCDE. Sont comprises dans les activités de consultation : une consultation publique, menée pendant douze semaines auprès de 268 répondants de 27 pays ; des entretiens ciblés avec 30 parties prenantes spécialistes ; deux ateliers pour les parties prenantes en 2023, avec des représentants des autorités compétentes, des associations industrielles, des ONG et des organismes de recherche. Une analyse thématique a ensuite été appliquée pour analyser les données qualitatives, en identifiant les thèmes et les modèles dans les réponses. Ces données ont ensuite été triangulées avec les données quantitatives obtenues par le biais de

recherches documentaires. Les résultats sont présentés ci-dessous, en fonction des cinq critères d'évaluation.

Efficacité

L'application du PPP varie, tant en ce qui concerne les types de coûts que le domaine politique. S'il est généralement bien mis en œuvre dans les politiques de prévention et de contrôle de la pollution, il est possible de renforcer son application, notamment en ce qui concerne les mesures administratives et d'exécution, les coûts des dommages environnementaux et les politiques liées à la pollution zéro de l'eau, du capital naturel et de la biodiversité. En ce qui concerne la manière dont le PPP est appliqué, les mécanismes de « commande et de contrôle » sont principalement utilisés pour réglementer les pollueurs dans l'UE, mais les instruments fondés sur le marché (IFM) tels que les permis négociables et les systèmes à responsabilité élargie des producteurs jouent également un rôle. La mise en œuvre du PPP varie d'un État membre à l'autre, notamment pour ce qui est des instruments fondés sur le marché.

Une analyse de haut niveau montre que ce sont les entreprises et les ménages, plutôt que les gouvernements nationaux, qui supportent la majorité des dépenses nationales en matière de protection de l'environnement. Ces dépenses sont restées stables en proportion du PIB au cours de la période d'évaluation. Il n'existe pas de corrélation claire mais de nombreux facteurs de confusion entre les tendances de la pollution et les dépenses de protection de l'environnement, ce qui rend difficile l'évaluation de l'efficacité du PPP - de manière isolée - pour ce qui est de l'amélioration de l'environnement.

Néanmoins, les données disponibles suggèrent que le PPP contribue à l'amélioration de l'environnement sans avoir d'impact significatif sur la compétitivité du marché. Les avantages connexes, tels que l'innovation et les avancées technologiques stimulées par la mise en œuvre du PPP, renforcent encore son efficacité. Toutefois, des problèmes persistent, notamment l'efficacité variable de la prise en charge des coûts de pollution selon les États membres et les secteurs, les conflits liés à l'utilisation de subventions préjudiciables à l'environnement et les lacunes dans la mise en œuvre, qui font que les coûts de pollution actuels sont supportés par la société plutôt que par les pollueurs.

Efficience

Si le type et la conception des instruments juridiques appliquant le PPP ont une incidence sur l'efficacité, il n'existe pas de suivi systématique permettant d'évaluer les gains d'efficacité et de mesurer les progrès de manière globale.

Le PPP transfère les coûts de la pollution de la société vers les pollueurs, mais il existe un risque d'effets distributifs régressifs, c'est-à-dire d'impact négatif sur les ménages à faible revenu. Ces effets dépendent de la manière dont les coûts sont recouvrés et peuvent être atténués par la conception des politiques et les mécanismes de compensation. Bien que cela ne puisse être examiné en détail qu'au cas par cas, dans l'ensemble, l'ampleur de ces effets semble être mineure et atténuée par le recyclage des recettes.

L'évaluation de certains instruments fondés sur le marché montre qu'ils peuvent contribuer efficacement à une amélioration de l'environnement grâce à des signaux de prix qui stimulent l'investissement privé et l'innovation. On a pu observer d'importants gains d'efficacité grâce à la mise aux enchères des droits et redevances de pollution, les études de cas montrant qu'une combinaison d'instruments fondés sur le marché et de mesures de commandement et de contrôle peut améliorer l'efficacité des résultats. Inversement, les charges administratives associées au PPP peuvent avoir un impact négatif sur l'efficacité, par exemple lorsqu'il est difficile d'établir qui est le pollueur, de faire respecter le principe ainsi que de surveiller et de

notifier les coûts de la pollution. Ces exemples reflètent une application partielle du PPP et laissent entrevoir des possibilités d'amélioration pour faire en sorte que les coûts de mise en œuvre soient davantage pris en charge par le pollueur que par la société. À l'heure actuelle, on ne dispose pas de données suffisantes pour quantifier ces coûts au niveau de l'UE.

Des possibilités de simplification de l'application du PPP et de réduction des coûts administratifs ont été identifiées pour plusieurs politiques. En outre, une approche plus systématique de la mise en œuvre de l'application, l'utilisation de mécanismes politiques horizontaux pour remédier aux lacunes constantes dans la prise en charge des coûts de la pollution et le recours à des régimes d'assurance pour faire face aux coûts de la pollution accidentelle offrent également des possibilités d'une plus grande efficacité.

Cohérence

Aucun problème perceptible n'a été identifié en ce qui concerne la cohérence de l'application du PPP dans les domaines politiques contribuant au 8e PAE. La manière dont la directive sur la responsabilité environnementale traite les coûts des dommages environnementaux présente une limite, en raison des différences d'interprétation et des seuils de « dommages significatifs » pour certains effets environnementaux entre les États membres. La publication récente de lignes directrices de la Commission et les efforts continus de sensibilisation et de formation des parties prenantes visent à atténuer ces difficultés.

D'autres défis concernent la cohérence de l'application du PPP dans les différents domaines politiques et les coûts de la prévention et du contrôle de la pollution, les coûts des mesures administratives et d'exécution et les coûts des dommages environnementaux. L'application du PPP est généralement moins marquée dans les mécanismes destinés à internaliser les coûts des dommages environnementaux, que dans la prévention et le contrôle de la pollution, avec une application mitigée pour les mesures administratives. Ont été aussi observées, des divergences dans la mise en œuvre entre les domaines politiques, par exemple, une application généralement plus élevée dans les politiques relatives au changement climatique et aux déchets et généralement plus faible dans les politiques relatives à l'eau, à l'air, au bruit, au sol, à la biodiversité et à la nature.

En ce qui concerne l'application du PPP au-delà de l'Union européenne (UE), des mesures telles que le règlement sur les transferts de déchets limitent les exportations de déchets nocifs vers les pays tiers. Les initiatives phares visant à réduire l'empreinte écologique externe de l'UE restent partiellement mises en œuvre. Il s'agit principalement de restrictions à l'exportation de certains produits qui ne sont plus autorisés sur le marché de l'UE et de déchets qui ont des effets néfastes sur l'environnement dans les pays tiers (telle que la soumission des déchets plastiques et des déchets électriques et électroniques aux contrôles et aux restrictions de la convention de Bâle des Nations unies).

Valeur ajoutée de l'UE

L'action de l'UE dans l'application du PPP facilite la stabilité du marché et l'harmonisation entre les États membres. Des divergences minimes ont été constatées entre les États membres dans la prise en charge des coûts de la pollution par rapport au PIB national. Voici quelques exemples de valeur ajoutée :

- L'émission de signaux clairs à l'industrie sur la manière dont les coûts de la pollution doivent être traités, par exemple l'adoption des meilleures techniques disponibles (MTD) dans le cadre de la directive sur les émissions industrielles (IED).

- Une plus grande harmonisation de la mise en œuvre du PPP au niveau national, par exemple des dispositions communes pour les systèmes de REP facilitant une approche plus uniforme des taxes ou redevances environnementales dans les politiques de gestion des déchets.
- Minimiser les risques de distorsion du marché en appliquant le principe d'« absence de préjudice important » commun à toutes les initiatives de financement de l'UE.

Si les compétences et les bases juridiques actuelles soutiennent la mise en œuvre du PPP, il semble qu'une certaine tension existe entre le principe de subsidiarité et le PPP, ce qui influe sur sa mise en œuvre. Une action au niveau de l'UE pourrait renforcer la mise en œuvre du PPP en établissant une norme minimale pour les coûts que les pollueurs doivent payer.

Pertinence

Les coûts externes liés à la pollution sont considérables. L'internalisation de ces coûts à l'aide du PPP en tant qu'élément d'un cadre politique reste très pertinente pour les besoins actuels et futurs. Si les objectifs du PPP correspondent aux besoins de l'UE tels qu'ils sont présentés dans le Pacte vert pour l'Europe, sa mise en œuvre juste et équitable est complexe. L'internalisation des coûts de la pollution peut entraîner une hausse des prix des produits de base qui pourrait affecter de manière disproportionnée les ménages à faibles revenus, ce qui nécessite une conception minutieuse des politiques. Malgré ces difficultés, les objectifs du PPP sont conformes à ceux du Pacte vert pour l'Europe, notamment en ce qui concerne la réduction des niveaux de pollution par le biais de signaux de prix.

ZUSAMMENFASSUNG

Einleitung

Der vorliegende Bericht legt die Ergebnisse der Begleitstudie zum Fitness-Check der Umsetzung des Verursacherprinzips (VP) in der EU-Umweltpolitik und ausgewählten EU-Förderprogrammen dar. Die Begleitstudie folgte den EU-Leitlinien für bessere Rechtsetzung und untersuchte die Wirksamkeit, Effizienz, Relevanz, Kohärenz und den EU-Mehrwert der ÖPP-Anwendung. Sie deckt den Zeitraum von 2014 bis 2023 ab. Die Richtlinienänderungen aus dem Jahr 2024 sind vermerkt, aber nicht in der Analyse enthalten. Der Bericht dient als Grundlage für das geplante Arbeitsdokument der Kommissionsdienststellen über die Umsetzung des VP.

Die in der Studie untersuchten Maßnahmen wurden aufgrund ihrer Relevanz für den Europäischen Green Deal und das 8. Umweltaktionsprogramm (8. UAP) ausgewählt. Die Bewertung orientiert sich an den vorrangigen Zielen des 8. UAP und einer Reihe damit verbundener Politikbereiche: Klimawandel, Abfall und Recycling, Wasser, Luftqualität, Lärm, Risikomanagement für Chemikalien, Natur, Biodiversität, Boden und Land, horizontale Aspekte (Umwelthaftung, Umweltkriminalität, bebaute Umwelt), EU-Finanzierung und staatliche Beihilfen.

Das VP wird angewandt, wenn die Verursacher die Kosten ihrer Umweltbelastung tragen, einschließlich der Kosten für Maßnahmen zur Vermeidung, Kontrolle und Behebung der Umweltbelastung und die der Gesellschaft auferlegten Kosten. Der Schwerpunkt der Bewertung liegt daher auf der Frage, wer diese Kosten trägt: der/die Verursacher, der/die Nutzer oder die Gesellschaft? In dieser Analyse wurden die Kosten wie folgt definiert:

- Kosten für die Vermeidung und Verminderung der Umweltbelastung in Form von Investitionen und Ausgaben, die sich aus Maßnahmen zur Vermeidung oder Verminderung der Umweltbelastung (einschließlich unfallbedingter Umweltbelastung) ergeben.
- Die Kosten für Verwaltungs- und Durchsetzungsmaßnahmen, die zur Umsetzung von Maßnahmen zur Vermeidung, Kontrolle oder Behebung von Umweltbelastung erforderlich sind, einschließlich Kennzeichnung, Berichterstattung, Registrierung, Überwachung und Bewertung, die zur Bereitstellung von Informationen erforderlich sind.
- Kosten für Umweltschäden. Dabei handelt es sich um die Kosten der Umweltverschmutzung, die von der Allgemeinheit getragen werden müssen, d. h. Kosten für die Beseitigung von Umweltschäden, die durch die Verschmutzung verursacht wurden, oder für externe Effekte, die sich aus der zulässigen Restverschmutzung oder unfallbedingten Verschmutzung ergeben.

Die Datenerhebung umfasste Sekundärforschung, öffentliche Konsultationen, gezielte Interviews und Workshops mit Interessenvertretern. Die Sekundärforschung umfasste eine rechtliche Überprüfung der politischen Bestimmungen, eine qualitative Bewertung der Literatur/Nachweise und eine quantitative Bewertung ausgewählter Indikatoren in Bezug auf Kosten und Verschmutzungstrends. Es wurden Rechtstexte, Folgenabschätzungen, Bestimmungsevaluierungen und Umsetzungsbewertungen sowie Daten von Eurostat, des EWR und der OECD geprüft. Die Konsultationsmaßnahmen bestanden aus einer zwölfwöchigen öffentlichen Konsultation, an der 268 Personen aus 27 Ländern teilnahmen, gezielten Interviews mit 30 Sachverständigen und zwei Workshops im Jahr 2023 mit Vertretern der zuständigen Behörden, Industrieverbänden, Nichtregierungsorganisationen und Forschungseinrichtungen. Zur Analyse der qualitativen Daten wurde dann eine thematische Analyse durchgeführt, um Themen und Muster in den Antworten zu identifizieren. Diese Daten wurden dann mit quantitativen Daten aus der Sekundärforschung abgeglichen. Die Ergebnisse werden im Folgenden nach den fünf Bewertungskriterien dargestellt.

Wirkung

Die Anwendung des VP variiert sowohl nach Kostenart als auch nach Politikbereich. Auch wenn es im Allgemeinen in den Bestimmungen zur Vermeidung und Verminderung der Umweltbelastung gut umgesetzt wird, gibt es Möglichkeiten, seine Anwendung zu verstärken, insbesondere in Bezug auf Verwaltungs- und Durchsetzungsmaßnahmen, die Kosten von Umweltschäden und die Bestimmungen im Zusammenhang mit der Nullverschmutzung von Wasser, Naturkapital und Biodiversität. Hinsichtlich der Anwendung des VP werden in der EU überwiegend „Befehls- und Kontrollmechanismen“ zur Regulierung der Verursacher eingesetzt, aber auch marktbasierte Instrumente wie handelbare Genehmigungen und erweiterte Herstellerverantwortung finden ihren Platz. In den Mitgliedstaaten kann man Unterschiede bei der Umsetzung des VP beobachten, insbesondere bei den marktwirtschaftlichen Instrumenten.

Eine umfassende Analyse hat ergeben, dass der Großteil der nationalen Umweltschutzausgaben von Unternehmen und Haushalten und nicht von den Regierungen getragen wird. Ihr Anteil am BIP ist während des Bewertungszeitraums stabil geblieben. Zwischen den Trends bei der Umweltverschmutzung und den Ausgaben für den Umweltschutz gibt es keine eindeutige Korrelation und eine Vielzahl von Störfaktoren, so dass es schwierig ist, die Wirksamkeit der VP - isoliert betrachtet - für das Erreichen von Umweltverbesserungen zu beurteilen.

Dennoch gibt es Hinweise darauf, dass die VP zur Verbesserung der Umweltbedingungen beiträgt, ohne die Wettbewerbsfähigkeit auf dem Markt wesentlich zu beeinträchtigen. Nebeneffekte wie Innovation und technologischer Fortschritt, die durch die Implementierung des VP angestoßen werden, unterstützen die Wirkung zusätzlich. Es gibt jedoch nach wie vor Probleme, wie z. B. die unterschiedliche Wirkung bei der Deckung der Kosten der Umweltbelastung in den einzelnen Mitgliedstaaten und Sektoren, Konflikte bei der Verwendung umweltschädlicher Subventionen und Lücken bei der Umsetzung, die dazu führen, dass die laufenden Kosten der Umweltbelastung von der Gesellschaft statt von den Verursachern getragen werden.

Effizienz

Die Art und Gestaltung der Rechtsinstrumente, die das VP anwenden, wirken sich zwar auf die Effizienz aus, aber es fehlt an einer systematischen Überwachung, um die Effizienzgewinne zu bewerten und die Fortschritte umfassend zu messen.

Das Verursacherprinzip verlagert die Kosten für Umweltschäden von der Allgemeinheit auf die Verursacher. Es besteht allerdings das Risiko regressiver Verteilungseffekte, das heißt, Haushalte mit niedrigerem Einkommen könnten negativ beeinflusst werden. Die Auswirkungen variieren je nachdem, wie die Kosten aufgebracht werden, und lassen sich durch politische Maßnahmen und Kompensationsmechanismen abschwächen. Obwohl dies nur im Einzelfall genau geprüft werden kann, scheinen die Auswirkungen insgesamt gering zu sein und könnten durch das Recycling von Einnahmen abgeschwächt werden.

Die Analyse bestimmter MWI legt nahe, dass sie durch Preissignale, welche private Investitionen und Innovationen fördern, zu effektiven Umweltverbesserungen führen können. Bei der Versteigerung von Verschmutzungsrechten und -gebühren wurden hohe Effizienzgewinne festgestellt. Fallstudien zeigen, dass die Kombination aus marktwirtschaftlichen Instrumenten und regulativen Maßnahmen die Effizienz der Ergebnisse verbessern kann. Im Gegenzug kann der administrative Aufwand, der mit dem Verursacherprinzip verbunden ist, die Effizienz beeinträchtigen. Dies ist insbesondere dann der Fall, wenn es schwierig wird, den Verursacher ausfindig zu machen, das Prinzip durchzusetzen sowie die Kosten für Umweltschäden zu überwachen und zu berichten. Diese

Beispiele zeigen eine teilweise Anwendung des Verursacherprinzips auf und weisen auf Verbesserungsmöglichkeiten hin, um zu gewährleisten, dass die Kosten für die Implementierung überwiegend vom Verursacher und nicht von der Gesellschaft übernommen werden. Es fehlt derzeit an genügend Daten, um diese Kosten auf EU-Ebene zu quantifizieren.

In verschiedenen Politikfeldern wurden Ansätze identifiziert, um die Anwendung des Verwaltungsprinzips zu vereinfachen und die Verwaltungskosten zu senken. Zudem eröffnen ein systematischer Ansatz zur Anwendungsdurchsetzung, der Einsatz horizontaler politischer Mechanismen zur Adressierung von Defiziten in der Handhabung von Umweltbelastungskosten und die Verwendung von Versicherungssystemen zur Deckung der Kosten umweltbedingter Unfallschäden weitere Möglichkeiten zur Steigerung der Effizienz.

Kohärenz

Es wurden keine erkennbaren Probleme bei der kohärenten Anwendung des VP in allen Politikbereichen, die zum 8. UAP beitrugen, festgestellt. Eine Einschränkung ergibt sich aus der Art und Weise, wie die UHRL die Kosten für Umweltschäden behandelt, die auf den unterschiedlichen Auslegungen und Schwellenwerten für "erhebliche Schäden" bei bestimmten Umweltauswirkungen in den Mitgliedstaaten beruht. Die neuesten Leitlinien der Kommission und die fortlaufenden Anstrengungen, Bewusstsein zu schaffen und Stakeholder zu schulen, zielen darauf ab, diese Herausforderungen zu mildern.

Weitere Herausforderungen umfassen die Kohärenz der Anwendung des Vorsorgeprinzips in verschiedenen Politikbereichen sowie die Kosten für die Vermeidung und Kontrolle von Umweltbelastungen, die Kosten für Verwaltungs- und Durchsetzungsmaßnahmen und die Kosten für Umweltschäden. Generell findet der Verursacherprinzip (VP) weniger Anwendung bei Mechanismen, die auf die Internalisierung der Kosten von Umweltschäden ausgerichtet sind, verglichen mit Maßnahmen zur Vermeidung und Reduzierung von Umweltbelastungen, und zeigt eine gemischte Anwendung bei administrativen Maßnahmen. Es zeigten sich Unterschiede in der Umsetzung über die verschiedenen Politikfelder hinweg, beispielsweise eine generell stärkere Umsetzung in den Bereichen Klimawandel und Abfallpolitik und eine geringere in den Bereichen Wasser, Luft, Lärm, Boden, Biodiversität und Naturschutz.

Was die Anwendung des Verpackungsgesetzes über die Europäische Union (EU) hinaus angeht, so begrenzen Regelungen wie die Abfallverbringungsverordnung die Ausfuhr gefährlicher Abfälle in Drittländer. Die Leitinitiativen zur Verringerung der externen Umweltbelastung durch die EU werden nur teilweise umgesetzt. Dies betrifft in erster Linie Beschränkungen für die Ausfuhr bestimmter Produkte, die auf dem EU-Markt nicht mehr zugelassen sind, und Abfälle, die schädliche Auswirkungen auf die Umwelt in Drittländern haben (z. B. die Anwendung der Kontrollen und Beschränkungen des Basler UN-Übereinkommens auf Kunststoffabfälle sowie Elektro- und Elektronikschrott).

EU-Mehrwert

Maßnahmen der EU zur Anwendung des VP erleichtern die Marktstabilität und die Harmonisierung in den Mitgliedstaaten. Es wurden minimale Unterschiede zwischen den Mitgliedstaaten bei der Bewältigung der Kosten für die Umweltbelastung im Verhältnis zum nationalen BIP festgestellt. Beispiele für einen Mehrwert sind:

- Klare Signale für die Industrie, wie mit den Kosten der Umweltbelastung umzugehen ist, z. B. die Übernahme der besten verfügbaren Techniken (BVT) im Rahmen der Industrieemissionsrichtlinie (IE-RL).

- Stärkere Harmonisierung der Umsetzung des VP auf nationaler Ebene, z. B. gemeinsame Bestimmungen für die erweiterte Herstellerverantwortung, die einen einheitlicheren Ansatz für Umweltsteuern oder -abgaben in der Abfallwirtschaftspolitik ermöglichen.
- Minimierung des Risikos von Marktverzerrungen durch die Anwendung eines gemeinsamen "Grundsatzes zur Vermeidung erheblicher Beeinträchtigungen" bei allen EU-Finanzierungsinitiativen.

Während die derzeitigen Zuständigkeiten und Rechtsgrundlagen die Umsetzung des VP unterstützen, scheint es ein gewisses Spannungsverhältnis zwischen dem Subsidiaritätsprinzip und des VP zu geben, das seine Umsetzung beeinflusst. Maßnahmen auf EU-Ebene können die Umsetzung des VP stärken, indem sie einen Mindeststandard für die von den Verursachern zu zahlenden Kosten festlegen.

Relevanz

Die externen Kosten der Umweltbelastung sind beträchtlich. Die Internalisierung dieser Kosten mit Hilfe des VP als Teil eines politischen Rahmens ist nach wie vor von großer Bedeutung für aktuelle und zukünftige Bedürfnisse. Während die Ziele des VP den Bedürfnissen der EU entsprechen, wie sie im Europäischen Grünen Deal dargelegt sind, ist ihre gerechte und faire Umsetzung komplex. Die Internalisierung der Kosten der Umweltbelastung kann zu höheren Rohstoffpreisen führen, die einkommensschwache Haushalte unverhältnismäßig stark treffen können, was eine sorgfältige Gestaltung der Bestimmungen erfordert. Trotz dieser Herausforderungen stimmen die Ziele des VP mit den Zielen des europäischen Grünen Deals überein, insbesondere bei der Reduzierung der Umweltbelastung durch Preissignale.

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List of abbreviations

AAQD	Ambient Air Quality Directives
BAR	Balanced Approach Regulation
BAT	Best Available Techniques
CAD	Chemical Agents Directive
CAP	Common Agricultural Policy
CEAP	Circular Economy Action plan
CEPA	Classification of Environmental Protection Activities and Expenditure
CF	Cohesion Fund
CIS	Common Implementation Strategy
CLP	Classification, Labelling and Packaging Regulation
CMD	Carcinogens and Mutagens Directive
CoGAP	Code of Good Agricultural Practice
DNSH	Do No Significant Harm Principle
DWD	Drinking Water Directive
ECA	European Court of Auditors
EAP	Environment Action Programme
EAFRD	European Agricultural Fund for Rural Development
ECD	Environmental Crime Directive
EED	Energy Efficiency Directive
EHS	Environmentally Harmful Subsidies
EIA	Environmental Impact Assessment
EIE	European Innovation Ecosystems
EIT	European Institute of Innovation and Technology
ELD	Environmental Liability Directive
ELVs	Emission Limit Values
END	Environmental Noise Directive
EPBD	Energy Performance of Buildings Directive
EPR	Extended Producer Responsibility
E-PRTR	European Pollutant Release and Transfer Register
EQSD	Environmental Quality Standards Directive
ERDF	European Regional Development Fund
ESF+	European Social Fund Plus
ESR	Effort Sharing Regulation
ETS	Emissions Trading System
GBER	General Block Exemption Regulation
GHG	Greenhouse Gas
GMO	Genetically Modified Organisms
IAS	International Accounting Standards Regulation
IED	Industrial Emissions Directive
JTF	Just Transition Fund
MCPD	Medium Combustion Plant Directive (MCPD)
MMR	Monitoring Mechanism Regulation
MRVA	Monitoring, reporting, verification and accreditation
MSFD	Marine Strategy Framework Directive

NAPCP	National Air Pollution Control Programmes
ND	Nitrates Directive
NEC	National Emissions reduction Commitment
NEC Directive	Directive on the reduction of national emissions
NVZ	Nitrate Vulnerable Zones
ODS	Ozone Depleting Substances
OELs	Occupational Exposure Limits
PoMs	Policies or measures
POPs	Persistent Organic Pollutants
PPP	Polluter Pays Principle
RBMPs	River Basin Management Plans
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation
RRF	Recovery and Resilience Facility
SVHC	Substances of very high concern
TFEU	Treaty on the Functioning of the European Union
UN SDG	United Nations Sustainable Development Goals
UNEP	United Nations Environment Programme
UWWTD	Urban Waste Water Treatment Directive
WEEE	Waste Electrical and Electronic Equipment
Waste FD	Waste Framework Directive
Water FD	Water Framework Directive
WHO	World Health Organisation

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1. Introduction

1.1. This report

This is the report for Specific Contract ENV.F.1/FRA/2019/0001: **Study on the Polluter Pays Principle (PPP) and Environmentally Harmful Subsidies (EHS)**. The PPP is that polluters bear the costs of their pollution including the cost of measures taken to prevent, control and remedy pollution and the costs it imposes on society.

This Service Request sits within the framework contract ENV.F.1/FRA/2019/0001. It comprises: support to the fitness check of the application of the PPP in European Environmental Policy and support to the development of a guidance document for the identification and reporting of non-energy Environmental Harmful Subsidies (EHS). This report provides findings for the fitness check component of the Service Request. The support to the EHS component included the review of the existing definitions of "subsidy" and "environmentally harmful subsidy", a comparison of the definitions, the analysis of the inconsistencies and complementarities of the Taxonomy Regulation[1] and the "Do No Significant Harm" principle and criteria with the EHS definition. These elements, which were provided to the European Commission as an input into its work on non-energy EHS guidance, are not published. This is because the EHS definition and the processes to identify and report EHS evolved during the project and therefore the data used to support the development of the guidance are not aligned with its final version and so could be misleading.

The report is structured as follows:

- **Purpose and scope of the fitness check** (Section 1.2): Context for why the fitness check is being undertaken and establishing a definition of the PPP, the appraisal period, and the scope in terms of geographic coverage, costs and policies.
- **Methodological approach** (Section 2): Overview of the evaluation criteria applied and a description of the methodology, including assessment of its robustness and limitations. The evaluation question matrix is in Appendix 1 (A1).
- **Expected outcome of the intervention** (Section 3): Includes the intervention logic which frames the fitness check and a description of the "points of comparison" approach which enables changes in the application of the PPP over the appraisal period to be assessed.
- **How the situation has evolved over the evaluation period** (Section 4): Description of how the PPP is applied in each of the policies in scope of the fitness check and identifying the policy provisions that address costs of pollution.
- **Evaluation analysis** (Section 5): Findings for each evaluation question.
- **Conclusions and lessons learned** (section 6): Operational conclusions on the overall successes of the PPP, key changes enabled by the PPP and its relevance in view of costs of pollution and wider policy context.

Alongside the report, technical evidence used to inform the analysis is included in appendices which are listed at the end of the report.

1.2. Purpose and scope of the fitness check

The fitness check assesses the state of play with regards to the implementation of the PPP in EU environmental policy, including selected EU funding programmes. It was conducted in line

[1] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088. Available at: https://eur-lex.europa.eu/eli/reg/2020/852/oj

with the EU Better Regulation Guidelines and so assesses the effectiveness, efficiency, relevance, coherence and EU added value of the application of the PPP.

Findings will be used for the planned Commission Staff Working Document on the implementation of the PPP, with particular reference to:

- The extent to which the PPP has been integrated into environmental legislation via policy provisions and how it has been applied to address the costs of pollution.
- The *effectiveness* of its application and the extent these policy provisions address costs of pollution, and the extent to which EU funds are being used to finance projects that should be funded by the polluter.

The *efficiency* of its application, in terms of whether the way the PPP has been applied is fair and consistent with a just transition, and whether EU policy could be made more efficient via recourse to the PPP.

- The *relevance* of how the PPP has been implemented in the context of current and future European pollution and its contribution toward the European Green Deal and the 8th EAP objectives.
- The coherence of the application of the PPP, in terms of how well or not EU policies work together to apply the PPP to address costs of pollution in and outside the EU.
- The *EU added value* of the application of the PPP and the extent to which Member States would have been able to apply the PPP in national policies without EU action.

The fitness check unavoidably has a broad scope, reflecting the PPP. As such the assessment of the application of the PPP in policy was conducted thematically, based on the 8th Environment Action Programme (8th EAP) priority objectives[2]. Under each priority objective, a larger number of specific policies are examined. These, in turn, are grouped into policy areas (section 1.2.4). This is in line with the BR Toolbox that says that:

'A broad fitness check can provide a helicopter view on related policy interventions, assessing in particular coherence and opportunities for streamlining. However, it may prove to be challenging to establish and investigate the intervention logic, to identify good evaluation questions for certain evaluation criteria and find the appropriate point(s) of comparison. All fitness checks should pay particular attention to identifying and quantifying (to the extent possible) synergies (e.g. improved performance, lower costs, reduced burdens, simplification, automation/digitalisation) or inefficiencies (e.g. excessive burdens, overlaps, gaps, inconsistencies, implementation problems or obsolete measures) within the group of measures and help to identify the cumulative impact of the group of interventions, covering both costs and benefits'[3].

The appraisal period covers 2014 to 2023. The focus of the evaluation is on the current state of play for implementing the PPP (i.e. to what extent is it implemented as of 2023), looking back to review how the situation has evolved throughout the appraisal period. The start year of 2014 was selected as it aligns with the 7th Environmental Action Programme entering into force. The period is also considered sufficient to allow for an identification of trends and considerable changes in policy that have taken place during this time. The fitness check can only evaluate how the PPP is applied in current legislation. Adopted revisions to policy for the

2 Communication on the monitoring framework for the 8th Environment Action Programme: Measuring progress towards the attainment of the Programme's 2030 and 2050 priority objectives. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A357%3AFIN

3 European Commission, Better Regulation Toolbox Tool #45, Page 345 https://commission.europa.eu/system/files/2023-09/BRT-2023-Chapter%206-How%20to%20carry%20out%20an%20evaluation%20and%20a%20fitness%20check_0.pdf

year 2024 are noted but are not included within the evaluation analysis, given the uncertainties in policy implementation and potential effects.

1.2.1. ECA special report on the PPP

The fitness check builds on findings from the European Court of Auditors (ECA) special report on the PPP (12/2021)[4]. The definition used in the ECA special report on the PPP, as implemented in EU legislation by Article 174 of the Treaty establishing the European Community (TEC), and the subsequent 2007 Treaty on the Functioning of the European Union (TFEU) (Article 191.2)[5] is set out, in full, below:

'*Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay. In this context, harmonisation measures answering environmental protection requirements shall include, where appropriate, a safeguard clause allowing Member States to take provisional measures, for non-economic environmental reasons, subject to a procedure of inspection by the Union.'*

The above definition as per Article 191.2 is used for the current fitness check. The types of costs to which it applies are described in Box 1-1.

Box 1-1 Types of costs to which the PPP applies

Costs of pollution prevention and control which are investments and expenses that stem from the requirements set out in environmental policy. These may be required to prevent (i.e. stop pollution occurring) or control that pollution (i.e. limit pollution to defined levels and/or mitigate the effects). For example, pollution prevention would include restriction of a substance under REACH, where the use of an environmentally harmful substance is prohibited (or reduced). An example of pollution control would be compliance with emission limit values by medium combustion plant (MCP) operators to reduce/control emissions to air under the MCP Directive.

Costs of administrative measures which are costs borne by businesses, citizens, civil society organisations and public authorities from administrative activities to comply with the obligations in the policies. Such costs include labelling, reporting, registration, monitoring, and assessment needed to provide information. An example is the monitoring of permit conditions to demonstrate compliance under the Industrial Emissions Directive (IED). Enforcement costs (monitoring, inspections and litigation) are included within administrative costs where they support the functioning of the policy provision to implement the PPP. For example, the obligation on operators to verify annual emission reports by an independent verifier under the EU Emission Trading System (ETS) Directive.

Costs of environmental damage which are the costs of pollution borne by wider society. Such costs include the costs of measures to remedy environmental damage or to address negative environmental externalities, irrespective of whether the pollution causing the damage was within legal limits (called "allowable residual pollution") or accidental. An example is where the polluter is required to implement remedial actions and/or compensatory measures to address environmental damage under the Environmental Liability Directive (ELD). Another example is Extended Producer Responsibility applied under waste management policies that assigns liability for waste generated to the producer.

4 ECA (2021). The Polluter Pays Principle: Inconsistent application across EU environmental policies and actions. Special Report #12 https://www.eca.europa.eu/en/Pages/DocItem.aspx?did=58811

5 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016E191

In such cases, the PPP is commonly applied via market-based instruments (auctions, taxes, pollution charges, sanctions) that put a price on pollution to act as a disincentive.

ECA found that the PPP was applied inconsistently across EU environmental policies with gaps in its application in policy and the way it is applied. ECA also concluded that Member State implementation of the ELD[6] remained a challenge, with weaknesses apparent, despite Commission support. Furthermore, it presented evidence where the EU budget is used to fund clean-up actions (contrary to the PPP under which the costs are borne by the polluter). In view of the above, ECA made three recommendations, which are outlined below along with commentary on how these recommendations have been incorporated into the current fitness check:

Recommendation 1 – Assess the scope for strengthening the integration of the PPP into environmental legislation: The fitness check established the extent to which the PPP has been integrated into environmental legislation, the extent to which it is contributing to the 8EAP priority objectives and the reasons for successes and failures in this regard.

Recommendation 2 – Consider reinforcing the application of the Environmental Liability Directive (ELD): Legally, the PPP assigns responsibility for the causes of environmental externalities where costs are borne by the public, by assigning liability. In this way, the ELD is contributing to the application of the PPP. In the context of the fitness check, the role of the ELD in applying the PPP is reviewed in horizontal terms, relevant to multiple policy areas. A separate evaluation is being undertaken to review the ELD in-depth that will be published alongside this fitness check.

Recommendation 3 – Protect EU funds from being used to finance projects that should be funded by the polluter: The fitness check assesses the extent to which EU funds are used to finance projects that should be funded by the polluter.

Alongside its special report on the PPP, Special Report 16/2021: Common Agricultural Policy (CAP) and climate (europa.eu) concluded that "EU law does not apply a PPP to greenhouse gas (GHG) emissions from agriculture" and recommended that the Commission should assess the potential to apply the PPP to emissions from agricultural activities, and reward farmers for long-term carbon removals. In the replies of the Commission, the Commission accepted the recommendation and clarified that the [current] CAP, the Farm to Fork Strategy and the Green Deal do foresee positive incentives to reward farmers for long-term carbon removals[7]. The Commission has also carried out a study to assess the PPP in relation to agricultural GHG emissions, which was published on 13 November 2023 (Trinomics, 2023)[8].

1.2.2. Types of policy provisions used to apply the PPP

The PPP is implemented via policy provisions contained in EU policy, also referred to here as legislative instruments. As discussed by the OECD, the choice of instrument has a significant bearing on the effectiveness and efficiency of the PPP (OECD, 2008). For this fitness check, the instruments used to apply the PPP in EU policy are defined according to Tool #17 of the Better Regulation Toolbox[9] as follows:

6 Directive 2004/35/CE of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, Article 2, Definitions. Available at: EUR-Lex - 02004L0035-20190626 - EN - EUR-Lex (europa.eu)

7 Replies of the European Commission to the European Court of Auditors Special Report: "CAP and Climate: Half of EU Climate spending but farm emissions are not decreasing". Microsoft Word - 1_EN_ACT_part1_v7.docx (europa.eu)

8 Trinomics et al. (2023) Pricing agricultural emissions and rewarding climate action in the agri-food value chain. Pricing agricultural emissions and rewarding climate action in the agri-food value chain.pdf (europa.eu)

9 https://commission.europa.eu/system/files/2022-06/br_toolbox_-_nov_2021_-_chapter_2.pdf

- **Command and control approaches**: Legally binding rules and requirements which specify behaviour.
- **Market Based Instruments (MBIs):** Economic instruments which include taxes, levies, penalties, liability and compensation schemes, subsidies and incentives, deposit-refund systems, labelling schemes or tradeable permit schemes.

Voluntary actions: including recommendations, technical standards, voluntary bottom-up initiatives (self-regulation).

1.2.3. Scope for the fitness check

Policies in scope of the fitness check were identified based on their relevance to contributing to the environmental outcomes targeted in European Green Deal (EGD) and 8th EAP. We also refer to policies described in the EEA 2020 State and Outlook of the Environment Report (SOER)[10]. This list was checked both with different European Commission Directorate Generals and also with stakeholders, who were provided with an opportunity to comment on this list. No policies deemed to be of material relevance are considered omitted.

The scoping identified relevant Community policy to the environment based on:

- Environmental targets
- Environmental quality standards to protect EU environment from pollution
- Source controls to reduce or prevent emissions at their source
- Risk controls to minimise and manage risks of pollution
- EU funds and their role in safeguarding the environment

To make the number of policies in scope of the fitness check manageable, policies have been grouped by 8th EAP thematic priority objective and then by a series of more granular policy areas that the project team has defined for the fitness check to disaggregate the priority objectives to allow for clearer analysis (Table 1-1).

The 8th EAP priority objectives (PO) are:

- PO 1 achieving the 2030 **greenhouse gas emission reduction** target and **climate neutrality** by 2050
- PO 2 enhancing **adaptive capacity**, strengthening **resilience a**nd reducing **vulnerability** to climate change
- PO 3 advancing towards a regenerative growth model, decoupling economic growth from resource use and environmental degradation, and **accelerating the transition to a circular economy**
- PO 4 pursuing a **zero-pollution ambition**, including for **air, water** and **soil** and protecting the health and well-being of Europeans
- PO 5 protecting, preserving and restoring **biodiversity**, and enhancing **natural capital**
- PO 6 **reducing environmental and climate pressures** related to production and consumption (particularly in the areas of energy, industry, buildings and infrastructure, mobility, tourism, international trade and the food system)

The policy areas are: Climate change; Waste and recycling; Water; Air quality; Noise; Chemicals risk management; Nature, biodiversity, soil and land; Horizontal (environmental

10 https://www.eea.europa.eu/soer/2020

liability, environmental crime, built environment); EU funding and State aid. These policy areas defined for this fitness check differ slightly from those listed in the 8th EAP[11].

Analysis was undertaken of the **relevant impact pathways** (i.e. pollution and its source) based on the "Driver-Pressure-State-Impact-Response (DPSIR) framework[12] identified via literature review.

11 Differences are PO1 and 2: Policies to respond to the first two priority objectives regarding climate change are dealt with together under the policy area of climate change; Policies that contribute to accelerating the transition to a circular economy are grouped under the policy area waste management; Zero pollution consists of four policy areas: air and noise, water, chemicals; Soil is included for the fifth priority objective (nature) which is different to the 8EAP; the sixth priority objective is cross-cutting and includes measures in the areas of energy, industry, buildings and infrastructure, mobility, tourism, international trade and the food system. These measures are dealt with under the other five POs to avoid duplication, leaving the truly cross-cutting policies. Specific policies are defined for each of the 8th EAP policy area: https://environment.ec.europa.eu/strategy/environment-action-programme-2030_en#policy-areas. 8th EAP policy areas also include circular economy, plastics, sustainable development and urban environment. Where relevant, circular economy, sustainable development and urban environment are incorporated in thematic terms throughout the analysis as relevant to multiple policy areas. Plastics are grouped with waste and recycling.

12 https://www.fao.org/land-water/land/land-governance/land-resources-planning-toolbox/category/details/en/c/1026561/

Table 1-1 Mapping of policies in scope of the Fitness Check to the 8th EAP

New policies proposed at the time of the Fitness Check are in italics – proposals for existing policies are not presented in this table but are considered in evaluation analysis

8th EAP priority objective (PO)	Policy area	Policies in scope of the fitness check
PO 1 achieving the 2030 GHG emission reduction target and climate neutrality by 2050	**Climate change**[13]	• EU Emissions Trading System (EU ETS) Directive 2023/959 • Directive (EU) 2023/958 as regards aviation's contribution to the Union's economy-wide emission reduction target and the appropriate implementation of a global market-based measure • Effort Sharing Regulation (EU) 2018/842 (ESR) • Alternative Fuels Infrastructure (AFI) Regulation (EU) 2023/1804 (repealing AFI Directive 2014/94/EU) • CO_2 emission performance standards for new cars and vans (Regulation (EU) 2019/631) • Ecodesign Directive 2009/125/EC • EU Ecolabel Regulation (EC) No 66/2010 (Ecolabel) • Energy Efficiency Directive (EED) 2012/27/EU • Energy Performance of Buildings Directive (EPBD) 2018/844/EU • Energy Taxation Directive 2003/96/EC • Fluorinated greenhouse gases Regulation (EU) No 517/2014 (F-Gas Regulation) • Ozone depleting substances (ODS) Regulation (EC) No 1005/2009 • Renewable Energy Directive (RED) 2018/2001/EU • FuelEU Maritime Regulation No 2023/1805 • ReFuelEU Aviation Regulation (EU) No 2023/2405 • Regulation (EU) 2018/841 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry (LULUCF)
PO 2 enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change		
PO 3 accelerating the transition to a circular economy	**Waste and recycling**	• Waste Framework Directive 2008/98/EC (WFD waste) • Batteries Regulation (EU) 2023/1542 (repealing Batteries Directive 2006/66/EC) • End of life Vehicles (ELV) Directive 2000/53/EC • Landfill Directive 1999/31/EC • Ship Recycling Regulation (EU) No 1257/2013 • Waste Shipments Regulation (EC) No 1013/2006 • Single-use plastics Directive (EU) 2019/904 • Plastic Bags Directive (EU) 2015/720 • Directive 94/62/EC on packaging and packaging waste

13 Climate change policy area covers priority objectives 1 and 2 together

8th EAP priority objective (PO)	Policy area	Policies in scope of the fitness check
		• Extractive Waste Directive 2006/21/EC • Waste electrical and electronic equipment (WEEE) Directive 2012/19/EU • Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) Directive 2011/65/EU
PO 4 pursuing a zero-pollution ambition	**Water**	• Marine Strategy Framework Directive (MSFD) 2008/56/EC • Water Framework Directive (WFD water) 2000/60/EC • Nitrates Directive (ND) 91/676/EEC • Sewage Sludge Directive (SSD) 86/278/EEC • Urban Waste Water Treatment Directive (UWWTD) 91/271/EEC • Bathing Water Directive 2006/7/EC • Drinking Water Directive (EU) 2020/2184 • Environmental Quality Standards (EQS) Directive 2013/39/EU • Groundwater Directive 2006/118/EC • Safety of Offshore Oil and Gas Operations (2013/30/EU) • Ship-source pollution Directive 2005/35/EC • Floods Directive (Directive 2007/60/EC) • Water Reuse Regulation (EU) 2020/741
	Air quality	• Air Quality Directive (AAQD) 2008/50/EC • Reduction of national emissions (NEC) Directive 2016/2284/EU • Industrial Emission Directive (IED) 2010/75/EU • Medium Combustion Plant Directive (MCPD) (EU) 2015/2193 • European Pollutant Release and Transfer Register (E-PRTR) Regulation (EC) 166/2006 • Euro Standards Regulation (EU) 2018/858 • Eurovignette Directive (EU) 2022/362 (amending Directives 1999/62/EC, 1999/37/EC and (EU) 2019/520) • Fuel Quality Directive (FQD) 2009/30/EC • Petrol Vapour Recovery (PVR) Directives (94/63/EC and 2009/126/EU) • Sulphur content of liquid fuels (Directive (EU) 2016/802)
	Noise	• Environmental Noise Directive (END) (2002/49/EC)
	Chemicals risk management	• Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation (EC) No 1907/2006 • Classification, Labelling and Packaging Regulation (CLP) (EC) No 1272/2008 • Biocidal Product Regulation (EU) No 528/2012 • Carcinogens and Mutagens (CMR) Directive 2004/37/EC • Chemical Agents Directive 98/24/EC • Cosmetics Regulation (EC) No 1223/2009 • Fertiliser Regulation (EU) 2019/1009 • Mercury Regulation (EC) 2017/852

8th EAP priority objective (PO)	Policy area	Policies in scope of the fitness check
		• Persistent Organic Pollutants Regulation (EU) 2019/1021 • Pesticides Directive 2009/128/EC • Plant Protection Products Regulation (EC) No 1107/2009 • Regulation 649/2012 concerning the export and import of hazardous chemicals • Seveso Directive 2012/18/EU • Toy Safety Directive 2009/48/EC
PO 5 protecting, preserving and restoring biodiversity, and enhancing natural capital	**Nature, biodiversity, soil and land**	• Birds Directive (2009/147/EC) and Habitats (Directive 92/43/EEC) (Nature Directives) • Regulation on Invasive Species (EU) 1143/2014 • EU Biodiversity Strategy for 2030 • EU Forest Strategy for 2030 • EU soil strategy (COM/2021/699) • *Proposal for Directive on Soil Monitoring (COM/2023/416)* • *Proposal for Regulation on Nature Restoration (COM/2022/304)*
PO 6 reducing environmental and climate pressures related to production and consumption	**Horizontal policies** (environmental liability, environmental crime, built environment)	• Environmental Crime Directive (ECD) Directive 2008/99/EC • Environmental Liability Directive (ELD) 2004/35/EC • Environmental Impact Assessment (EIA) Directive 2014/52/EU • Strategic Environmental Assessment (SEA) Directive 2001/42/EC
Cross-cutting to all PO	**EU funding**[14]	• Horizon 2020 Regulation (EU) 2021/695 • CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development; Regulation (EU) 2021/2116 and Regulation (EU) 2021/2115 and Regulation (EU) 2021/2117) • Cohesion policy funds under the Common Provisions Regulation (EU) 2021/1060 • LIFE + Regulation (EU) 2021/783 • InvestEU Regulation (EU) 2021/523 • Recovery and Resilience Facility Regulation (EU) 2021/241
	State aid	• General Block Exemption Regulation (GBER) Regulation (EU) 651/2014

14 Together, the allocated expenditure to these instruments comprises the most prominent EU funds contributing to the EU horizontal objectives on climate, biodiversity and air (Table 4-6). Horizon Europe was not reviewed on the basis that research activities are not classified as clean-up activities.

1.2.4. Summary of policies

A summary of the definitions used for the fitness check and characteristics of the policies in scope is presented below. These frame the evaluation analysis.

Table 1-2 Summary of definitions used for the fitness check

Characteristic	Description
8th EAP Priority Objectives[15]	The six priority areas are: 1. swift and predictable **reduction of GHG emissions**; 2. continuous progress in **enhancing and mainstreaming adaptive capacity** […] **strengthening resilience and adaptation** and reducing […] vulnerability […] to climate change. 3. accelerating the **transition to a non-toxic circular economy** 4. **pursuing zero pollution** […] to achieve a toxic-free environment 5. **halting and reversing biodiversity loss and improving the state of ecosystems** […] by improving the state of the environment, in particular air, water and soil 6. **reducing key environmental and climate pressures** related to the Union's production and consumption, in particular in the areas of energy, industry, buildings and infrastructure, mobility, tourism, international trade and the food system.
Policy Areas used for clustering policies in scope of fitness check	Climate change; Waste and recycling; Water; Air quality; Noise; Chemicals risk management; Nature, biodiversity, soil and land; Horizontal (environmental liability, environmental crime, built environment); EU funding and State aid.
Type of cost to which the PPP may be applied	• **Costs of pollution prevention and control** (including preventing and controlling accidental[16] pollution). Costs are incurred from investments and expenses which stem from requirements of environmental policy. These may be required to prevent (i.e. stop pollution occurring) or control that pollution (i.e. limit pollution to defined levels and/or mitigate the effects). • **Costs of administrative measures**, defined as costs borne by businesses, citizens, civil society organisations and public authorities incurred by administrative activities performed to comply with the obligations of the policies. Such costs include labelling, reporting, registration, monitoring, and assessment. For the purposes of the fitness check, enforcement costs (monitoring, inspections and litigation) are included within administrative costs. • **Costs of environmental damage**, these are the costs of pollution borne by wider society. They include costs to remedy environmental damage or to address negative environmental externalities. In such cases, the PPP is commonly applied via market-based instruments (auctions, taxes, pollution charges, liability regimes, sanctions) that put a price on pollution to act as a disincentive.
Type of legislative intervention	Aligned with Tool #17 of the Better Regulation Toolbox[17], the main types of instruments to apply the PPP include: • **Command and control approaches**: Legally binding rules and requirements which specify behaviour. • **Market Based Instruments (MBIs):** Economic instruments which include taxes, levies, penalties, liability and compensation schemes, subsidies and incentives, deposit-refund systems, labelling schemes or tradeable permit schemes. • **Voluntary actions:** including recommendations, technical standards, voluntary bottom-up initiatives (self-regulation).
National approaches	The Member States have a responsibility to apply the PPP in line with the principle of subsidiarity. We draw out where such approaches may result in significant differences in the implementation of the PPP. A key criteria is whether the policy in question is a Directive or Regulation, or where national policies or schemes are used to ensure the polluter pays for action to address pollution, via taxation, for example.

15 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022D0591&from=EN

16 38.en.pdf (oecd.org)

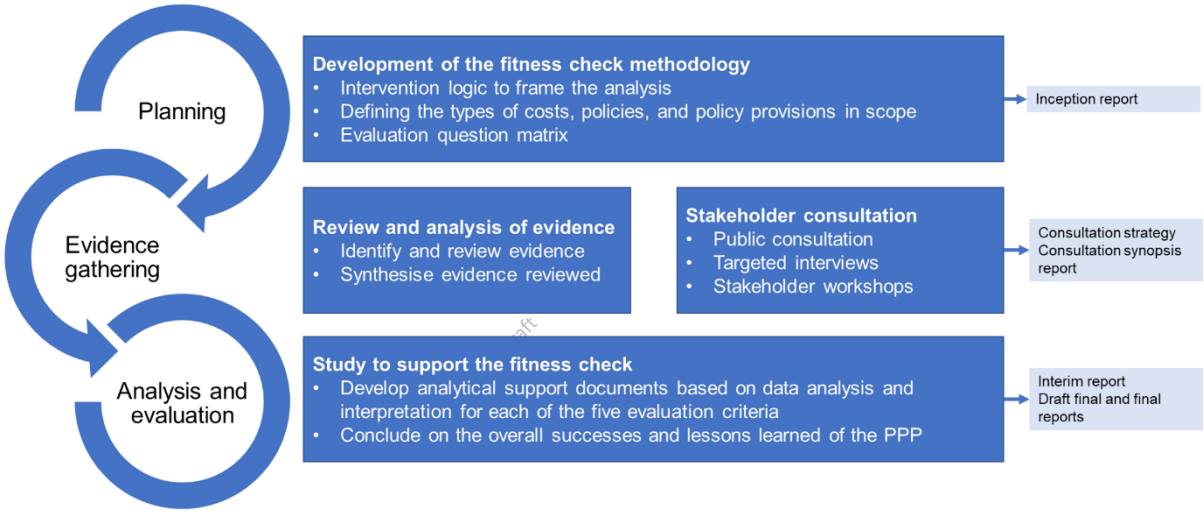
17 https://commission.europa.eu/system/files/2022-06/br_toolbox_-_nov_2021_-_chapter_2.pdf

2. Methodology

2.1. Overview

The description of the methodology is structured by three areas of work that have been undertaken: planning, evidence gathering and analysis and evaluation. The way these three areas of work relate to the key elements of the work undertaken is presented below together how they feed into the study outputs.

Figure 2-1 : Methodological framework for the study to support the fitness check of the PPP



2.1.1. Planning

An evaluation question matrix was developed to establish a workplan for the analysis. This is based on the call for evidence that was launched in November 2022 and set out the mandate and process for this work[18]. The specific evaluation questions for the study are outlined below.

Table 2-1 : List of evaluation questions

Evaluation criteria	Evaluation questions included
Effectiveness	EQ1. The extent to which the PPP is applied in all policies that affect environmental protection and the improvement of environmental quality. EQ2. How effective the PPP is in delivering efficient environmental improvements. EQ3. Any factors hampering its effective application.
Efficiency	EQ4. The extent to which the PPP is fair and consistent with a just transition, including how it affects different stakeholder groups, including vulnerable groups. EQ5. Whether (and if so, why) there are significant differences in the (efficient) application of the PPP across EU policies and between EU countries. EQ6. Whether EU policymaking could be made more efficient by incorporating the PPP.
Relevance	EQ7. The extent to which the PPP meets the EU's needs as set out in the European Green Deal | European Commission (europa.eu). EQ8. Whether the PPP is able to respond to new or emerging environmental issues and changes in technology
Coherence	EQ9. How consistent and coherent the application of the PPP is in the EU, across policies that affect environmental protection and the improvement of environmental quality.

18 Call for Evidence

Evaluation criteria	Evaluation questions included
	EQ10. How consistent and coherent the application of the PPP is outside the EU.
EU added value	EQ11. Is the way responsibility for applying the PPP is currently spread between the EU and EU Member States the right way? EQ12. Do current national and EU competences and Treaty legal bases support the PPP's application in environmental policy?

The evaluation matrix includes sub-questions which were developed for each of the 12 evaluation questions to elaborate specific elements of the analysis. For each sub-question, the matrix establishes:

- Assessment criteria that describe the operational questions we respond to for each sub-question.
- Indicators that are used to measure the different components of the intervention logic.
- Data analysis approach that describes the approach and the methods and tools to be used for each question.
- Data sources and data collection methods that identifies the key sources we use to answer the question as well as the way in which the data has been gathered.

The evaluation question matrix is in Appendix 1 (A1).

2.1.2. Evidence gathering

Working draft

Desk research

Desk research has comprised three strands: legal review of the policy provisions, qualitative literature/evidence assessment and quantitative assessment for selected indicators relating to costs and pollution trends.

Legal texts were extracted from the Official Journal of the European Union (EUR-Lex). Evidence and literature were sourced in the first instance by references in the terms of reference for this support study, including in particular the ECA report on ensuring polluters pay as well as a wealth of material on the development of the principle by the OECD. In addition, evidence was sourced from existing impact assessments, policy evaluation, and implementation assessment studies, as well as specific sectoral reports and other evidence signposted by the European Commission. Legal texts were reviewed for 83 items of legislation covering policies, EU funding programmes and strategies. Documents reviewed as part of the evidence and literature review number 273 items. Of this total, the majority (172) were existing impact assessments (45), policy evaluation (45) and implementation assessment (87) studies that were reviewed as part of a rapid evidence assessment following a structured template for data extraction. Quantitative data sources were sourced from Eurostat, the EEA and OECD.stat. Lastly, evidence and literature were sourced from signposting by stakeholders in response to the call for evidence, public consultation, interviews, and workshops. References are listed in Appendix 5.

Evidence compiled from this desk research is presented in Annex 1 that sets out the policy context for understanding how the PPP is implemented in EU policy.

Field research

Public consultation

The public consultation aimed at collecting public views and evidence about the implementation of the PPP in the EU for the fitness check, specifically looking at its

effectiveness, efficiency, coherence, and the EU added value of its application. A twelve-week public consultation was launched on 12 May 2023 and closed on 4 August 2023.

The questionnaire consisted of sixteen questions organised into the following parts:

- An introductory section that collected information about the demographic profile of the respondents,
- Five thematic sections that gathered opinions about the PPP implementation in the EU,
- A final section where the survey participants submitted general comments and uploaded the supplementary documents.

Responses were summarised in a factual summary report of five pages (September 2023)[19] and an in-depth report with the analysis of the responses to public consultation. In sum, 268 respondents completed the survey and, excluding one duplicate answer, 267 responses were considered suitable and included in the analysis. The respondents represented 27 countries: 95% (253) were from EU Member States, while 5% (14) were from non-EU countries. Six EU countries represented over two-thirds of the responses (68%, 181): Germany (16%, 44), Belgium (13%, 36), Portugal (12%, 31), Italy (9%, 25), France (9%, 23) and Spain (8%, 22).

Most respondents submitted their responses as EU citizens (39%, 104), followed by business associations (29%, 77). Nearly 80% of respondents represented a business entity (i.e., a company or a business association 40%, 107) or an EU citizen (39%, 104). In the survey, a group that comprised ≥ 5% of respondents and shared at least 50% of the responses was to be considered a campaign. Campaigns were reviewed in Excel by assessing responses to the closed and open-ended questions, sorting the responses by the categories of respondents, and identifying potential patterns in the responses. No campaigns were identified in this survey.

A total of 69 documents were received in the public consultation. Thirty-five of them were position papers, while the remaining 34 documents were academic articles, reports, research papers, pamphlets, brochures, or position papers not focused on the Polluter Pays Principle. Seven identical position papers were submitted by different organisations. Two contributions were received after the closure of public consultation. They were not considered in the analysis but were consulted as part of evidence-collection activities. For the interpretation of position papers, thematic analysis – a qualitative method for identifying major patterns and themes in texts was applied. Thematic analysis is a method typically used for analysing unstructured qualitative data, such as, e.g., text contributions. Through iterative analysis of texts, recurring topics in the textual contributions have been discovered and appropriately defined. The identified topics are presented by highlighting relations between separate themes (e.g., topics and sub-topics). Thematic analysis does not quantify the number of occurrences of specific topics in different contributions. Although some position papers were identical, they did not influence the outcomes of the analysis because of a qualitative approach. Thematic analysis resulted in the list of topics identified in the papers, but it did not measure and compare the frequency of mentions of specific topics.

Targeted interviews

To collect complementary information to the results of the literature review, 30 semi-structured interviews with expert stakeholders were carried out between November – December 2023.

Experts were identified through the analysis of public consultation responses, discussions during the stakeholder workshops, web search and recommendations from the Commission

19 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13546-Polluter-Pays-Principle-fitness-check-of-its-application-to-the-environment/public-consultation_en

and the interviewed experts. In the list of experts, the study team to the extent possible maintained diversity of the representatives of various stakeholder groups (e.g., public authorities, business entities, non-governmental organisation, research organisations, etc.) from specific sectors/areas (e.g., waste, water, chemicals, transport, etc.) and countries. To effectively summarise the opinions of specific stakeholder membership organisations that represented multiple countries (e.g., European business associations, non-governmental organisations, networks and platforms) were contacted.

Semi-structured interviews included a set of open-ended questions on a topic shared with the respondents in advance. Two thematic interview guides reflected the research needs of the study team:

- The guide 'Implementation of the PPP' aimed to get more insight into the issues of practical implementation of the 'polluter pays' principle with a focus on costs and impacts.
- The guide 'Design of policies related to the PPP' collected insights about the design of the policies and tools for implementing the 'polluter pays' principle at the EU level and in the EU Member States.

Thematic analysis was applied to analyse contributions of the respondents. Information on the interview findings was provided in the synopsis report and included in the relevant sections of the evaluation study.

Working draft

Stakeholder workshops

Two stakeholder workshops aimed to gather stakeholder feedback on the implementation of the PPP, present and validate the findings and emerging conclusions of the supporting study to the fitness check as well as disseminating information about development of the methodology for the identification and reporting of non-energy EHS. The workshops were organised online on 4 July and 20 November 2023 and included presentations of the study progress and preliminary findings and thematic discussions with the participants.

The study team used panel discussions as the main method for moderating the interaction with the workshop participants.

The first (one-day) online workshop was organised on 4 July 2023. A total of 194 people registered for the event, with 121 participants joining on the day. Attendees were from competent authorities, EU institutions, industry and trade associations, private companies, non-governmental organisations, researchers and members of the study team. **More information on attendance and the event proceedings are provided in Annex 3 to this report**. The proceedings have also been published on the event webpage[20] along with the slides used by the speakers.

The second (one-day) online workshop was held in on 20 November 2023. A total of 253 people registered for the event, with 169 attendees. The participants were from public authorities, EU institutions, industry and trade associations, business entities, non-governmental organisations, researchers and members of the study team. **More information on attendance and the event proceedings are provided in Annex 3 to this report**. The proceedings will be published on the event webpage[21] along with the slides used by the speakers.

20 https://www.rpa-europe.eu/polluter-pays-principle-and-ehs

21 https://www.rpa-europe.eu/polluter-pays-principle-and-ehs

3. What was the expected outcome of the intervention

3.1. Intervention logic for the polluter pays principle

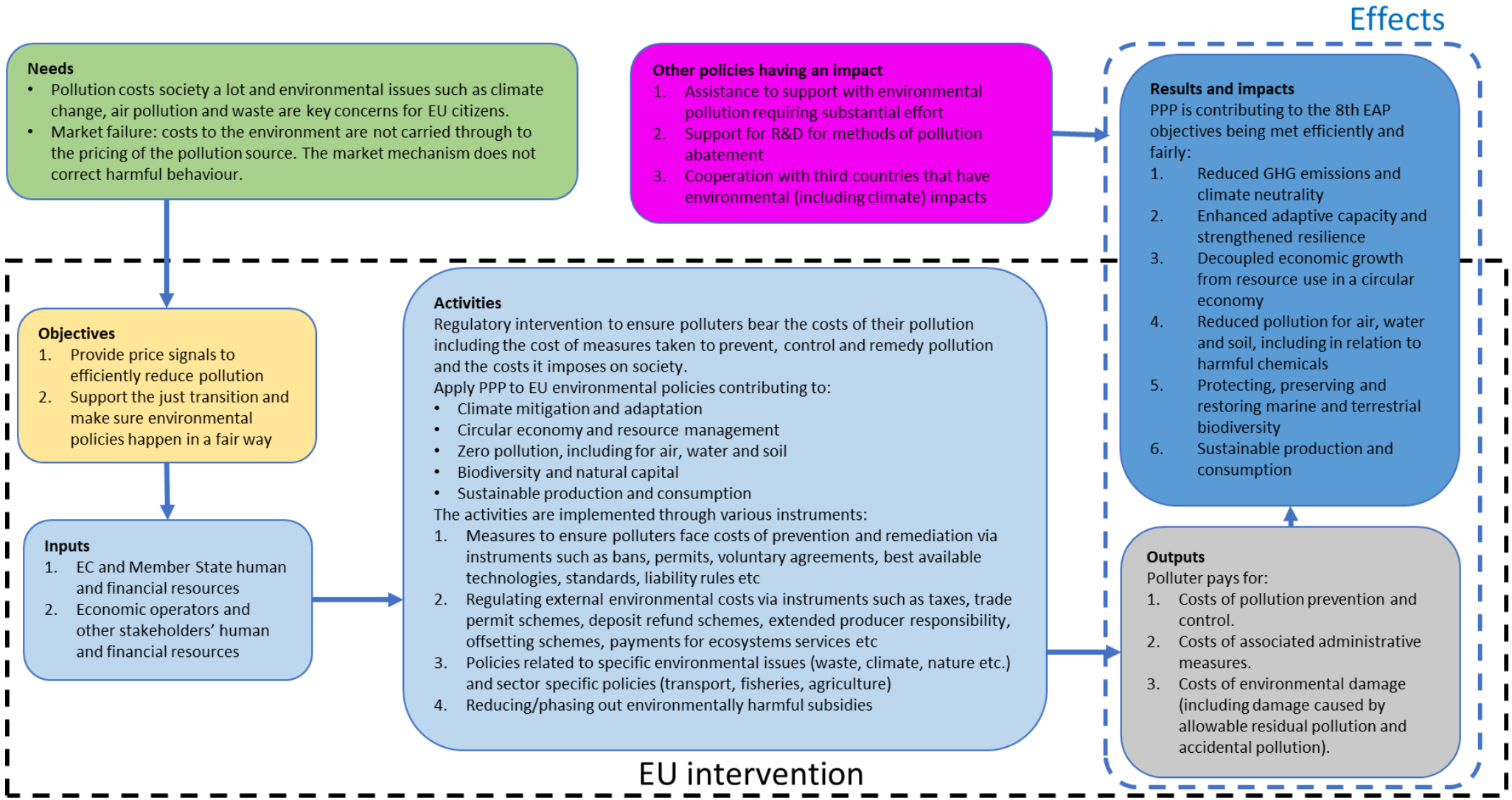
This section contains an intervention logic for the application of the PPP. Each policy initiative – or in this case policy principle - relies on a logic of intervention, which sets out how the specific actions of an intervention was expected to work at the time of adoption and implementation. In accordance with Tool #46 of the Better Regulation Guidelines[22], this logic is used to frame evaluation analysis as it reflects the general approach for how the PPP is implemented in the EU (Figure 3-1). Key features are:

- '**Needs'**, the costs of pollution prevention, control and costs on wider society are not fully reflected in prices paid or incurred by the polluter. This is assumed to contribute toward pollution with the associated damage and costs incurred by society, rather than the polluter[23]. This creates a market failure, where the polluter has no incentive to reduce their pollution levels, with the resulting risk of overproduction of polluting goods and services. The PPP aims to address this by ensuring polluters bear the costs of their pollution including the cost of measures taken to prevent, control and remedy pollution and the costs it imposes on society.[24]
- '**Objectives'**, the PPP is adopted via TFEU Article 191 (2). Based on the definition of the PPP used for the fitness check (as defined in Section 1.2), the objective is to provide price signals to efficiently reduce pollution and to support a just transition and ensure environmental policies happen in a fair way.
- '**Activities'**, are the policies where the PPP is implemented and the measures contained therein to implement the PPP in line with TFEU Article 191 (2).
- '**Effects**' include 'outputs' as well as 'results' and 'impacts'. The outputs are where the polluter pays for the costs of pollution prevention and control, costs of administrative measures, and costs of environmental damage. The impacts of the polluter paying are anticipated to be an efficient approach to reducing pollution, as aligned with the 8th EAP priority objectives and meeting the overall needs outlined above with no or minimal unintended or undesirable consequences.
- '**Other policies having an impact**', which influence the overall delivery of the objectives, actions, and outcomes of the PPP. For example, this includes EU funding that is contributing to clean-up actions (where a substantial effort is required, or R&D is needed).

23 This arises via economic activities that cause environmental degradation and/or harm to human or animal health – such as greenhouse gas (GHG) emissions, water pollution and damage to habitats and biodiversity – incur costs to parties otherwise unconnected with those activities and which are not reflected in the market price. These are termed externalities.

24 https://environment.ec.europa.eu/economy-and-finance/ensuring-polluters-pay_en See also Zahar, A. (2017) "The Polluter-Pays Principle and its Implications for Environmental Governance in China" Available at: https://ssrn.com/abstract=3009547 or http://dx.doi.org/10.2139/ssrn.3009547

Figure 3-1 Intervention logic



3.2. Points of comparison for the fitness check

To support analysis of the complex relationships presented in the intervention logic it is necessary to establish points of comparison against which progress in the implementation of the PPP over time, can be measured.

The fitness check looks back on what has occurred in practice historically, comparing this against "points of comparison" to establish what effect the PPP has had. It is impossible to identify a counterfactual or dynamic baseline of how that 2014 position might have evolved to 2024 without implementation of the PPP; there are too many policies and external factors at play. The state of play analysis examines the situation for the year 2023 and reflects on planned revisions to policies for the year 2024.

This approach is consistent with Tool #46 of the Better Regulation Guidelines and the Toolbox[25], which identifies a need to:

'Identify the appropriate point(s) of comparison: the different evaluation questions should be answered against relevant starting points (e.g. benchmarks) or expected achievements for example, comparisons may be drawn against the changes projected or expected under the preferred policy option (as in the impact assessment) or changes since measurements made at the start of an intervention.'

And*:*

'For consistency purposes, the source for identifying points of comparison should ideally stay the same for addressing all evaluation criteria (e.g. the prior impact assessment, the situation at or around the time the EU action started, etc).'

In constructing the points of comparison, the focus is how the application of the PPP has changed over the appraisal period. The main **point of comparison is the situation in 2023**[26]**.** This is defined in terms of **how the PPP was applied in different policies** and how its application has **influenced** results and impacts). This will allow for an evaluation of the extent to which the PPP implementation has changed over time to assess how progress has evolved since 2014 and progress achieved. The points of comparison cover the following aspects (Figure 3-2):

- Application of the PPP to identify how the PPP is applied in policies and the details of the policy provisions used to do so. We also consider the degree of Member State flexibility permitted by the policy provision in how they implement the PPP. We conclude on gaps and inconsistencies in the implementation of the PPP by 8th EAP priority objective and policy area and how these have evolved throughout the appraisal period.
- Key result variables which we use to infer the extent to which the application of the PPP has provided price signals which effectively reduce pollution as regards:
  - Costs of pollution prevention and control
  - Costs of administrative measures
  - Costs of environmental damage (including via environmental taxes)

25 Tool #46 of the better regulation toolbox, chapter 6, section 2.2 notes: the different evaluation questions should be answered against relevant starting points (e.g., benchmarks) or expected achievements. Where this analysis cannot be quantified, as a minimum, a qualitative description of what was expected to happen is needed. The points of comparison may differ for each evaluation criteria and, in this case, by type of pollution being considered.

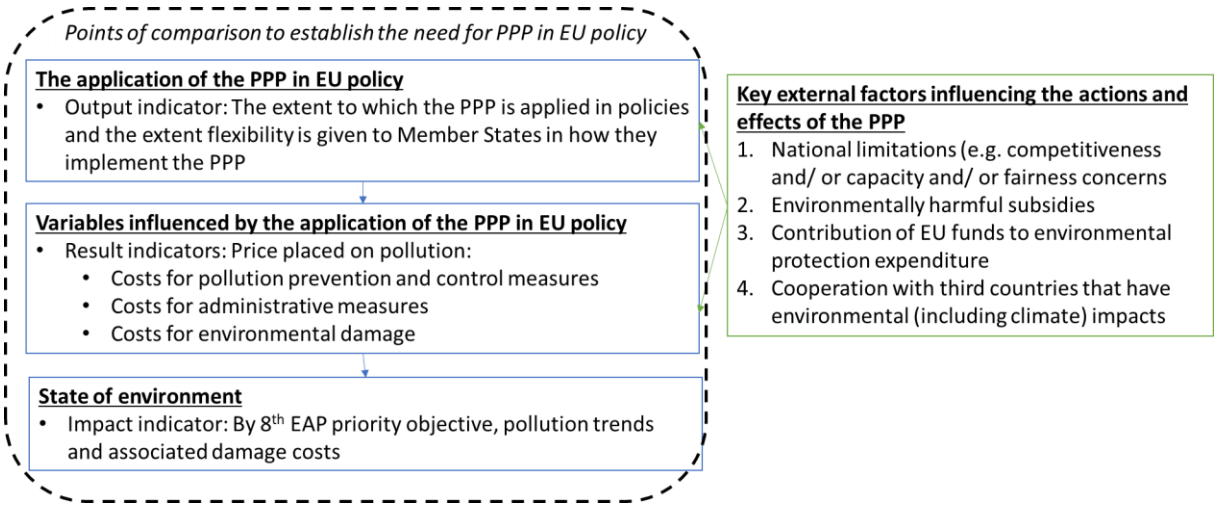
26 Note, the fitness check will place greater focus on the present implementation of the PPP and the overall direction of travel. This reflects the number of legislative acts in scope that have been revised during the last decade or are indeed in the process of being adopted. However, the most recent data in many cases may not be much more recent than 2022 in many cases so precise appraisal period will need to be flexible.

For each of the cost categories, the fitness check defines: the extent to which costs are addressed by polluters; the extent to which there are differences in the application of the PPP between policy areas and Member States; and how this impacts the effectiveness and efficiency of the PPP, and the extent to which the policy provisions provide adequate incentives.

We compare environmental trends for 8th EAP priority objectives and associated damage costs with changes in the application of the PPP to examine whether the PPP has been increasingly applied between 2014 and 2023 and positively influenced broader pollution trends and decreased the associated costs of pollution. This involves a high-level assessment of significant pollution, costs from environmentally attributable pollution, in each policy area, where data are available. This is based on the EEA SOER (2020)[27], existing evaluation and impact assessment studies as well as grey literature. Challenges in terms of data gaps, uncertainties, methodological differences in the literature, including inconsistencies in the time periods used within the current analysis in each policy area are explained in the analysis.

Underpinning the points of comparison are external factors which also influence the result and impact variables. Unpicking their role in influencing the way the PPP is applied also forms part of the evaluation analysis.

Figure 3-2 Points of comparison used to evaluate the application of the PPP in EU policy



27 The European Environment – state and outlook 2020 (SOER 2020). This includes thematic assessments exploring past trends, as well as the current position on pollution in freshwater, land and soil, marine environment, climate change, air pollution, waste and resources in a circular economy, chemical pollution, environmental noise, industrial pollution. Various thematic assessments, including on environmental pressures and sectors are also examined. https://www.eea.europa.eu/soer/publications/soer-2020

4. How has the situation evolved over the evaluation period?

4.1. Introduction

In this section, the 'state of play' in implementing the PPP is described. This is done by individual policy for the year 2023, grouped by policy area. Planned revisions for the year 2024 are reviewed as part of the evaluation together with how EU policies evolved, in terms of how they have applied the PPP, throughout the appraisal period. Evidence that underpins the state of play is presented in Appendix 2 (Policy Context).

The state of play is first described for individual policies (section 4.2) to determine what costs are being addressed by specific legislation. It is a review of individual policies and does not evaluate how groups of policies are working together to apply the PPP, nor how EU funding and state aid are being used to support implementation of specific policies (this is reviewed as part of the evaluation analysis under EQ3b). To complement this, we provide an overall perspective on the internalisation of environmental damage by sector (section 4.3).

The state of play is described as follows:

- **Impact pathway from pollution to impact**: For each policy/ policy area we identify the main sources of pollution, the principal economic activities or sector(s) causing it, the type of pollution that results, and the impacts of that pollution on human health and the environment.
- **Cost categories addressed in each policy and who pays**: For each policy we identify what policy provisions have been adopted to prevent, control and remedy both the pollution and the costs it imposes on society based on the three categories defined above. Importantly, the focus of the assessment is not whether those policy provisions are 'right', but instead we identify who pays the associated costs and identify costs that are not addressed in the specific policy, again based on the three categories. The relevance of EU funding and state aid to the way the PPP is applied is the extent to which EU funding and state aid are used for clean-up actions (i.e. actions to address pollution prevention and control, administrative measures, environmental damage or other externalities). Clean up actions are defined as structural investments and rural development schemes. Research and development is not defined as a clean-up action.

To categorise the state of play, we have applied a Red-Amber-Green-White rating to denote the extent to which the PPP is currently applied for each of the cost categories defined above and for each policy and fund in scope. This rating is an initial expert judgment based on secondary evidence review and assessment of the policies in question. It is based on a policy perspective, which examines the extent to which the PPP is applied by the *policy* in question:

- Red: The policy contains measures which incur a cost, but that cost is not, or largely not, met by the polluter. So, no application or a negligible degree of application of the PPP.
- Amber: The policy in question contains measures which incur a cost and that cost is partially met by the polluter. The policy in question establishes a duty for the Member State competent authority, hence the extent of application of the PPP depends on national plans and legislation.
- Green: The policy in question contains measures which incur a cost which is met or largely met by the polluter. So, a high degree of application of the PPP.

- White: The policy contains no measures which result in costs to be met by the polluter. So, the PPP cannot be applied.

The rating for each legislation is provided in the following tables. Legislation is grouped by 8th EAP Priority Objective and policy area. Initial ratings were presented to stakeholders at the second workshop held on 20 November 2023. As appropriate, ratings were amended to reflect feedback received from stakeholders.

The state of play also reviews how the PPP is applied in the case of EU funding and state aid. Contrary to the EU policies in scope of this fitness check, EU funds and state aid are considered relevant to the application of the PPP in their role in safeguarding the environment, rather than playing a role in addressing costs of pollution. To ensure this distinction is clear, they have been reviewed separately and the state of play provides a qualitative description for how the PPP is applied, however, no rating for the legislative text was given (section 4.2.1).

4.2. State of play for individual legislation

The state of play based on the situation in the year 2023 is described for each policy in the subsequent tables, grouped by 8th EAP priority objectives.

Table 4-1 State of play for policies contributing to the 8th EAP climate change priority objectives

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
EU Emissions Trading System (ETS) Directive[28]	Energy supply, energy intensive industry and aviation. Accidental releases are also an issue where large-scale accidental release of GHG emissions are emitted from industrial sites.	GHG emissions	GHG emissions are contributing to global temperature increases. As a result, GHG emissions also result in impacts on human health, ecosystems and buildings where increased frequency and/or severity of extreme weather events such as heatwaves can contribute to greater number of hospital appointments and mortality rates due to heat stress, damaging ecosystems, biodiversity and infrastructure including transport infrastructures and buildings. Between 1980 and 2020 over 220 000 people in the EU died as a result of	Green: The cap on GHG emissions creates a market price for the externality of GHG emissions, producing a financial incentive for companies to reduce their GHG emissions. Costs are primarily incurred by the industries that are the primary source of the GHG emissions.	Green: Operators have an obligation to monitor their emissions using a monitoring plan and submit annual emission reports, and to commission an independent verifier to verify monitoring and enforce the provisions. The costs are incurred by the industries that are the primary source of the GHG emissions.	Green: The price put on GHG emissions acts as a disincentive for companies, thereby addressing costs of externalities. The costs of trading are incurred by the industries that are the primary source of the GHG emissions.
Effort Sharing (ES) Regulation	Domestic transport (excluding aviation), buildings, agriculture, small industry, and waste.	GHGs and pollutants emitted from the energy, industrial processes, product use, and waste sectors		Green: Built on the carbon market price which reflects externalities of GHG emissions, legally binding national level GHG emissions reduction targets are set for non-ETS sectors. Member States can trade in GHG emissions at national level. Abatement measures are then implemented at source to reduce pollution. Costs are primarily incurred by the industries that are the primary source of the GHG emissions.	Red: Member States report annually on their national GHG emissions and every three years on the policies and measures adopted and implemented to achieve their targets. The Commission is responsible for evaluating progress and following up with Member States where progress is not on track (enforcement measures). These costs are not incurred by the industries responsible for GHG emissions.	Red: The price put on GHG emissions acts as a disincentive for companies, thereby addressing costs of externalities. However, trading is at national level and the carbon price varies by Member State.
Alternative Fuel Infrastructure	Transport (including road, maritime ports and airport). Note	The purpose of deploying more recharging and		Red: Establishes mandatory national targets for the deployment of sufficient	Red: Member States are required to develop national policy frameworks and issue	White: Costs of environmental damage are

28 Including Directive (EU) 2023/958 on aviation's contribution to the emission reduction target which extends the EU ETS to aircraft operators.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
(AFI) Regulation (repealing AFI Directive)	the assessment here refers to the carbon footprint of the transport sector and provisions within the AFI that may affect this.	refuelling stations for alternative fuels is to enable the transport sector to significantly reduce its carbon footprint at a faster pace. The pollutants are GHG gases.	extreme weather and climate related events. The combined damage costs of these events is estimated to be EUR 650 billion (EEA, 2023)[29]. Costs of pollution include non-market costs (costs of a statistical life, quantified based on willingness to pay method) and market costs (measured by health expenditure). The costs of abatement of GHGs to achieve the Paris Agreement were estimated at €100/tonne of GHG emissions. Based on GHG emissions emitted in 2017, the estimated annual cost of environmental externalities for the EU27 was EUR 402 752 million (IEEP, 2021).	alternative fuels infrastructure and develop measures to meet these objectives to create user-friendly recharging and refuelling experience, with full price transparency, and common payment rules in the EU. Costs are primarily incurred by operators at maritime ports and airports who are required to comply with rules to provide access. The extent to which these costs are passed through to the user (as the polluter) is not addressed by the legislation (other than to say 'prices shall be reasonable, easily and clearly comparable, transparent and non-discriminatory').	national progress reports towards deployment targets. These costs are not incurred by the operators responsible for GHG emissions.	not addressed by the legislation.
CO_2 emission performance standards on new cars and vans	Transport (Road)	Carbon Dioxide emissions from the road transport sector, specifically passenger cars and new light commercial vehicles		Green: Vehicle manufacturers are required to comply with EU fleet-wide CO_2 emission targets applying from 2020, 2025, and 2030. Financial penalties apply to vehicle manufacturers if targets are exceeded. Costs of compliance are primarily incurred by the vehicle manufacturers and passed onto consumers as the primary source of the GHG emissions.	Green: Manufacturers are required to ensure correspondence between the CO_2 emissions recorded in the certificates of conformity of their vehicles and the CO_2 emissions of vehicles in-service. Costs are primarily incurred by the vehicle manufacturers and passed onto consumers as the primary source of the GHG emissions.	White: Costs of environmental damage are not addressed by the legislation.

29 European Environment Agency (2023), Economic losses from weather- and climate-related extremes in Europe

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Energy Efficiency Directive (EED)	Energy	Greenhouse gas emissions related to low energy efficiency		Green: Requires Member States to achieve cumulative end-energy savings, with targets set at EU level. Includes provisions on minimum requirements for efficiency in energy use and for efficiency in energy supply, aiming to promote energy-efficient technologies and practices. Cost of compliance is primarily incurred by energy consumers.	Green: It establishes a framework for energy audits and management systems for large industrial energy consumers, and district heating and cooling. Cost of compliance is primarily incurred by energy consumers.	White: Costs of environmental damage are not addressed by the legislation.
Energy Performance of Buildings Directive (EPBD)	Construction, Building, Transport, Energy	Greenhouse gas emissions related to low energy efficiency		Green: Requires Member States to establish minimum energy requirements for new and existing buildings, and sets EU target for energy efficient renovations, which property developers are required to adhere to. Cost of compliance primarily incurred by property developers.	Green: When a building is sold or rented, energy performance certificates must be issued and inspection schemes for heating and air conditioning systems must be established (the cost is incurred by seller or landlord).	White: Costs of environmental damage are not addressed by the legislation.
Energy Taxation Directive (ETD)	Manufacturers and consumers of energy products	Greenhouse gas emissions related to low energy efficiency		White: Costs of pollution prevention and control are not addressed by the legislation.	White: Costs of administrative and enforcement measures are not addressed by the legislation.	Amber: Establishes framework for the taxation of energy products including electricity, motor and most heating fuels to avoid potential distortions of competition across the EU. Including minimum rates of excise duty, encouraging a low-carbon and energy efficient economy. Member States can set their own tax rates within the framework of the ETD thereby

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
						addressing costs of externalities (but have flexibility allowed to them over the degree to which this happens). Taxes are levied from the manufacturers and consumers of energy products.
Fluorinated gas (F-gas) Regulation	Semiconductor manufacturing sector and refrigerant manufacturing/supply	Fluorinated GHG (F-gases), including hydrofluorocarbons (HFCs)		Green: Producers and importers of F-gases are required to meet limits for the amount of F-gases on the market and bans its use in certain cases. Where F-gases are in use in existing equipment, it prevents emissions. Cost of compliance is primarily incurred by producers and importers of F-gases.	Green: Producers and importers of F-gases are required to report on placing F-gases on the market and cover the costs of doing so.	White: Costs of environmental damage are not addressed by the legislation.
Renewable Energy Directive (RED)	Transport, Development, End-use	Greenhouse gas emissions related to low energy efficiency		Green: Sets binding EU renewable energy target. Includes rules to ensure the uptake of renewables in the transport sector and in heating and cooling. Suppliers are required to adhere to rules and incur the compliance costs. Includes provisions on sustainability criteria for biofuels and bioliquids which are intended to ensure that these fuels are produced in an environmentally sustainable way. Producers of biofuels and bioliquids are required to meet standards	Green: Economic operators are required to submit reliable information regarding the compliance with the GHG savings thresholds set and are required to verify reporting via independent auditing of the information submitted. Operators incur the compliance costs.	White: Costs of environmental damage are not addressed by the legislation.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				and incur the compliance costs.		
Ozone Depleting Substances (ODS) Regulation	Mainly used in a range of industrial and consumer applications (refrigerators, air conditioners and fire extinguishers)	Ozone depletion	Ozone layer depletion causes increased UV radiation levels, damaging to human health (contributing to skin cancers, eye cataracts and immune deficiency disorders). UV radiation alters growth, food chains and biochemical cycles in terrestrial and aquatic ecosystems. Elevated ozone concentrations causes paint to wear off resulting in higher maintenance costs.	Green: Restrictions placed on the production, import, export and placing on the market of ODS and products and equipment containing or relying on them to phase them out. Restrictions also apply to recovery, recycling, reclamation and destruction of ODS. Cost of compliance is primarily incurred by producers and importers of ODS.	Green: Annual reporting is required from producers, importers and exporters of controlled substances. Operators incur the costs or reporting.	White: Costs of environmental damage are not addressed by the legislation.
Ecodesign Directive	Manufacturing industry (energy related products)	Burden of resource consumption on the environment, particularly energy consumption.	Unsustainable consumption behaviours due to lack of reliable information about products' environmental sustainability, reparability, lifespan and consumer choice (European Commission, 2020).	Green: Sets standards at the product level (through Implementing Measures) that all manufacturers in scope must comply with to be placed on the internal market. Manufacturers and, where relevant, importers, are responsible for ensuring their products are compliant with the regulation and they must absorb any costs associated with compliance.	Green: Independent competent bodies are assigned by public authorities to verify that products are compliant with the legislation. Manufacturers are responsible for overseeing verification process and the cost of employing the independent verification.	White: Costs of environmental damage are not addressed by the legislation.
Ecolabel	Manufacturing industry	Burden of resource consumption on the environment, during		Green: Manufacturers are responsible for ensuring their products adhere to minimum standards, helping	Green: It is the responsibility of manufacturers to ensure their products meet the minimum requirements for	White: Costs of environmental damage are not addressed by the legislation.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		full life cycle of various products.		consumers make informed choices and opt for environmentally friendly products. Costs to adhere to the standards are incurred by the manufacturer. Voluntary nature of the scheme will affect level of participation meaning that there is no guarantee that the polluter is targeted.	an EU Ecolabel, and to initiate proceedings to be granted the label. Participants pay a fee that covers the administrative cost.	
Regulation on land use, land use change and forestry (LULUCF) sector	Land use sector (the management of cropland, grassland, wetlands, forests, settlements)	GHG emissions	In 2021, not including carbon sinks, the land use sector emits 97.1 million tonnes of CO2 equivalent per annum (from cropland, settlements, grasslands, and wetlands) (EEA, 2023)[30].	Amber: The Regulation sets a land-based net carbon removals target which is to be implemented through binding net removal national targets for the LULUCF sector. The specific actions taken to meet the targets set are determined by Member State authorities via their National Energy and Climate Plans. However, the provisions do not explicitly address how the land use sector will bear the costs.	Red: There is emphasis on enhancing the quality of monitoring, reporting and verification (MRV) of emissions and removals but the provisions stipulated apply to the Member State authorities rather than directly to the land use sector	White: Costs of environmental damage are not addressed by the legislation.

Table 4-2 State of play for policies contributing to the 8th EAP priority objective for accelerating the transition to a circular economy

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Waste Framework Directive (Waste FD)	Construction, mining, waste and water services, manufacturing and households	2.7 billion tonnes of waste generated per annum in EU, with 4% of this being classified as hazardous	Solid waste causes air and water pollution, enhances GHG emissions, produces hazardous gases and	Green: Polluter is required to pay for the costs of waste management, including for the necessary infrastructure and its operation (Article 14) and contribute to meeting	Green: Waste management is monitored and reported by waste management operators (who incur the costs of these measures).	Amber: Producers are required to cover the cost under to the EPR obligation of: awareness raising measures;

30 https://www.eea.europa.eu/data-and-maps/daviz/eu-emissions-and-removals-of-2#tab-chart_2

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
			leachates, massive land use and exposure to dangerous chemicals (UNEP) IEEP (2021) identify the main external costs of waste management as follows (with estimates for EUR/tonne waste managed): • CH4 emissions from landfill sites (EUR 317/tonne) • Air pollution from waste incineration (including combustion of biogas and anaerobic digestion) (including particulates, dioxins, heavy metals, acid gases, NO_x, VOCs, CO_2) (EUR 193/tonne without energy recovery; EUR 112 / tonne including energy recovery)	EU targets for recycling and recovery. Implementation plans to facilitate Member States with meeting their waste management targets require the Member State to provide information on funding for waste management, specifying that the funding should be sourced according to the PPP. National approaches to implementation are varied and can have a major influence on the impact on waste management and by extension, the way in which the polluter is responsible. Despite this, given the explicit role of the PPP and EU targets, it is rated green.	Monitoring and reporting at national level and costs are incurred by Member State authorities. Member State authorities also incur the cost of establishing a monitoring framework that enables them to adequately ensure that producers of products and organisations on their behalf, implement their extended producer responsibility obligations. These measures are often funded through EPR payments by the producers.	waste collection; and clean-up costs from litter (including transport and treatment of litter collected). EPR does not cover the full environmental impacts of waste generated and it is more common for these payments to cover administrative costs. It is the Member State's responsibility to establish EPR schemes covering the above including penalties for infringement. Waste management activities in scope of the Waste FD are subject to the provisions of the ELD.
Batteries Regulation (repealing Batteries Directive)	Producers, distributors and end-users of waste batteries and accumulators	Hazardous substances contained in waste batteries and accumulators		Green: Restrictions apply to prohibit the placing on the market of batteries containing mercury and cadmium. Costs of compliance are incurred by the battery manufacturer.	Green: Collection and recycling rates are monitored and reported by waste management operators (who incur the costs of these measures). At national level, collection and recycling rates shall be monitored and reported, and this cost is primarily incurred by Member State authorities (in the form of Extended Producer Responsibility Organisations), funded through EPR payments by the producers. The 2023 revision includes battery passports which are required to maximise the	Amber: Distributors are required to take back waste portable batteries or accumulators at no charge when supplying portable batteries or accumulators, unless alternative existing schemes are available. Producers of automotive batteries and accumulators, or third parties, shall not refuse to take back waste industrial batteries and accumulators from end-users, regardless of chemical composition and origin and are required to set up schemes for the collection of waste

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
			• GHG emissions from composting and mechanical and biological treatment (EUR 0.08/tonne) • Recycling (EUR 132/tonne) • GHGs, air pollution and noise pollution from waste collection and transportation (EUR 4/ tonne)		exchange of information and enable tracking of batteries. The economic operator that places the battery on the market is responsible for information contained in the passport.	automotive batteries and accumulators from end-users or from an accessible collection point in their vicinity. Costs of compliance are incurred by the battery manufacturer but EPR does not cover the full environmental impacts of waste generated.
End-of-Life Vehicle (ELV) Directive	Producers, distributors and end-users of Vehicles	Hazardous substances released by end-of-life vehicles, including their components and materials		Green: Purpose of the Regulation is to prevent and control pollution caused by end-of-life management for vehicles (see costs of environmental damage/ externalities). Producers are required to ensure that vehicles are designed and manufactured in such a way as to allow the quantified targets for reuse, recycling and recovery to be achieved and they incur the cost of doing so.	Green: Economic operators are required to publish information on the design of vehicles and their components with a view to recoverability, recyclability, and the environmentally sound treatment of end-of life vehicles. Costs are incurred by the operator.	Amber: Member States are required to ensure the last holder and/ or owner can deliver the end-of life vehicle to an authorised treatment facility. Member States should ensure that producers meet all, or a significant part of, the costs of the implementation of these measures; the normal functioning of market forces should not be hindered.
Landfill Directive	Producers and distributors of waste	Hazardous substances released from waste located in landfill		Green: Landfill operators are required to operate according to permit conditions that include methods for pollution prevention and abatement. All of the costs involved in the setting up and operation of a landfill site shall be covered by the operator.	Green: The operator is required to maintain a register of the quantities and characteristics of the waste deposited and representative samples for inspection. Operators are responsible for annual reporting of monitored results and incur the costs of doing so. Costs are covered by the price charged to the polluter disposing of waste.	Amber: Landfill operators are required to operate according to permit conditions that include a plan for the closure and after-care procedures. Estimated costs of the closure and after-care of the site for a period of at least 30 years shall be covered by the price to be charged by the operator for the disposal of any type of waste in that site. Closure

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
						and after-care procedures partially address risk of environmental damage and ensure the costs are covered by the price charged to the polluter disposing of waste. Landfill activities are subject to the provisions of the ELD.
Waste Shipments Regulation	Producers, distributors and end-users of waste	Hazardous substances released during the shipment of waste and recycling of waste		Green: All waste shipments for transboundary movements of hazardous wastes and their disposal are subject to procedures of prior written notification and consent. This requires a contract between the notifier responsible for the shipment and the consignee for the recovery or disposal of the notified waste. Notifiers are also required to hold an insurance policy to cover the risks of environmental pollution. Costs are incurred by the notifier responsible.	Green: The notifier responsible for the shipment is required to supply document information to accompany the prior written notification and incurs the cost of doing so.	Amber: The notifier responsible for the shipment is required to take-back a shipment if it cannot be completed as intended and cover costs arising from the transaction. However, all externalities from the waste are not addressed. Transboundary shipment of waste is subject to the provisions of the ELD.
Single-use plastics Directive	Producers, distributors and end-users of single-use plastic waste	Hazardous substances released from single-use plastic waste	Plastic pollution is a global problem due to its ability to alter habitats and natural processes, reducing ecosystems' ability to adapt to climate change, directly affecting people's livelihoods, food production capabilities and	Green: Operators placing on the market of single-use plastics are required to comply with restrictions and labelling requirements and incur the cost of doing so.	Green: Operators placing on the market of single-use plastics are required to cover the costs of data gathering and reporting and incur the costs of doing so.	Amber: Producers are required to cover the cost under to the EPR obligation of: awareness raising measures; waste collection; and clean up costs from litter (including transport and treatment of litter collected). It is the Member State's responsibility to establish EPR schemes covering the above, including penalties for infringement.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Plastic Bags Directive	Producers, distributors and end-users of single-use plastic bag waste	Hazardous substances released from single-use plastic bag waste	social well-being. (UNEP)	Green: Member States are required to set either or both of the following: annual consumption targets set to limit the number of lightweight plastic bags per person, and fees so that lightweight plastic carrier bags are not provided free of charge at the point of sale of goods or products. The consumer incurs the cost.	White: Costs of administrative and enforcement measures are not addressed by the legislation.	Green: Producers are required to cover the cost under the EPR obligation of: awareness raising measures; waste collection for lightweight plastic carrier bags that are discarded in public collection systems, including the infrastructure and its operation, and the subsequent transport and treatment of that waste; and the costs of cleaning up litter resulting from those bags and the subsequent transport and treatment. The Directive also requires Member States to put in place a tax on plastic bags (unless a reduction in use takes place through other measures). Implementation is determined by the Member State and therefore varies depending on Member State ambition (resulting in an amber rating).
Directive on packaging and packaging waste	Producers, distributors and end-users of packaging	Hazardous substances released from packaging waste		Green: Sets national recycling targets per material used in packaging. Member States are required to adopt measures to meet the targets – this may include deposit-return schemes, targets, economic incentives, or minimum percentages of reusable packaging placed on the	Green: Operators responsible for placing packaging on the market are required to report material used in packaging and incur costs of doing so. *Proposal for revision means that by end of 2024, EU countries should ensure that producer responsibility schemes are established for*	White: Costs of environmental damage are not addressed by the legislation. *Proposal for revision means that by end of 2024, EU countries should ensure that producer responsibility schemes are established for all packaging, covering the financing or financing and*

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				market for each type of packaging, etc. The measures adopted determine the extent of prevention or control in placing packaging on the market. Packaging placed on the market is required to meet minimum requirements to limit the weight and volume of packaging, to minimise use of hazardous substances and to design reusable or recoverable packaging. Costs of compliance are incurred by operators responsible for placing packaging on the market.	*all packaging, covering the financing or financing and organisation of the return and/or collection of used packaging and/or packaging waste and its channelling to the most appropriate waste management option, as well as for reuse or recycling of the collected packaging and packaging waste.*	*organisation of the return and/or collection of used packaging and/or packaging waste and its channelling to the most appropriate waste management option, as well as for reuse or recycling of the collected packaging and packaging waste. However, EPR does not cover the full environmental impacts of waste generated and it is more common for these payments to cover administrative costs.*
Extractive Waste Directive	Extractive industries	Hazardous substances released from the waste of extractive industries	Mining damages landscapes, habitats, biodiversity, human health and water resources. Water is contaminated by hazardous substances. The hydrologic cycle is changed and water sources are depleted by pumping water from aquifers[31]	Green: Operators are required to apply for a permit. The application includes a waste management plans with all measures necessary to prevent or reduce adverse effects on the environment and human health incurred by management of extractive waste and they incur the costs of doing so.	Green: Operators are required to keep up-to-date records of all waste management and make them available for inspection. If requested, the operator is required to demonstrate, through a risk assessment that that concentration limits are appropriate in view of environmental quality standards and site-specific conditions and they incur the costs of doing so.	Green: Requirements also apply after the closure of a waste facility. Operators are required to establish an emergency plan to prevent major accidents and minimise the extent, actual or potential, of the environmental damage. Penalties apply in the case of infringements. Management of waste from extractive industries is in scope of the ELD.
Waste Electrical and Electronic	Producers, distributors and end-users of	Hazardous substances released from waste	44.3 million tonnes of EU e-waste ends up either in landfills,	Green: Requires the separate collection and proper treatment of WEEE	Amber: Producers supplying EEE are required to register in the Member State that	White: Costs of environmental damage are not addressed by the

31 https://ec.europa.eu/environment/pdf/waste/mining/MWEI%20BREF.pdf

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Equipment Directive	electrical and electronic equipment	electrical and electronic equipment	burned, illegally traded, or disposed of by informal workers in poor conditions. Informal disposal of e-waste causes soil and water contamination and GHG emissions and exposes workers to highly carcinogenic substances such as mercury, lead, and cadmium[32]	and sets targets for their collection as well as for their recovery and recycling. For WEEE from private households, distributors that make an EEE available on the market are responsible for establishing systems that allow the WEEE to be returned free of charge and incur the costs of doing so.	they sell to and incur the cost of doing so. Member States are responsible for ensuring collection systems are in place and for implementing the producer responsibility principle to ensure minimum collection rate is achieved annually.	legislation. See RoHS Directive for restrictions on the use of substances.
Restriction of Hazardous Substances Directive	Producers, distributors and end-users of electrical and electronic equipment	Hazardous substances released from waste electrical and electronic equipment		Green :Restricts the use of certain hazardous substances (heavy metals, flame retardants or plasticizers) in EEE where alternatives are available. Requirements apply to manufacturers, importers and distributors and they incur the associated compliance costs.	Green Manufacturers, importers and distributors may be required to demonstrate conformity with the requirements of the Directive and they incur the costs of doing so.	Amber: In cases of non-conformity, manufacturers, importers and distributors are required to take corrective measures to bring that EEE into conformity, to withdraw it or recall it, as appropriate, and to inform the competent national authorities.
Ship Recycling Regulation	Producers, distributors and end-users of Ships	Hazardous substances (asbestos, heavy metals, mineral oils, bilge and ballast water, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, oragnotins) released from ships which constitute waste and which are subject to a	Environmental damage costs are occurring in third countries where recycling facilities are not subject to the requirements of the Ship Recycling Regulation. Damage is caused to coastal ecosystems where shipbreaking is done by beaching with impacts on	Green Purpose of the Regulation is to prevent and control pollution caused by ship recycling (see costs of environmental damage/ externalities). The registered shipowner must recycle their end of life vessel in EU-approved facilities. The ship recycling facility must demonstrate to competent authorities how each type of waste will be treated in subsequent facilities (downstream).	Amber: Ship owners are required to register in the European list, ensuring the ship's compliance with the requirements of the administrations of the Member State. Before a ship is recycled, its owner must provide the company carrying out the work with specific information about the vessel and prepare a ship recycling plan. This, for instance, identifies the type and amount of hazardous	Amber: Ship owners are responsible for the recycling of the ship at ship recycling facilities. However, the policy provisions do not fully address the risk of externalities where ship-owners may register their ship in a non-EU country subject to lighter end-of-life controls. Moreover, where disposed of by approved facilities, there is no requirement for the ship owner to take-back a ship if

32 https://ieep.eu/wp-content/uploads/2022/12/Policy-brief_The-right-to-repair_IEEP-2022.pdf

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		transboundary movement for recycling[33]	human health and environment as a result of toxic spills, bioaccumulation of hazardous substances, and loss of marine and terrestrial biodiversity and habitat.[34]	Shipowners before recycling the vessel shall update and maintain the Inventory of Hazardous Material (enlisting all the hazardous materials contained in the vessel). The registered shipowner incurs the compliance costs.	materials and waste that will be generated from the obsolete vessel. Costs of enforcement are met by the competent authorities.	the inventory of hazardous waste is incorrect and the ship cannot be disposed of as intended or to cover costs arising from the transaction. There is no requirement for ship owners to hold an insurance policy that covers the risks of environmental pollution associated with ship recycling, which would be used to address the costs of pollution prevention and control in the case of accidental pollution.

33 https://shipbreakingplatform.org/issues-of-interest/why-ships-are-toxic/

34 https://shipbreakingplatform.org/our-work/the-problem/environmental-costs/

Table 4-3 State of play for policies contributing to the 8th EAP zero pollution priority objectives

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Policy area : Water						
Marine Strategy Framework Directive (MSFD)	Agriculture, Industry, Households	Excess nutrients, plastic litter and chemical pollution (as described for REACH).	Nutrient pollution often causes eutrophication of marine and coastal waters. Approximately 25% of the EEA assessed areas exceed thresholds for nutrient enrichment and eutrophication with nutrient levels exceeding threshold values in 40% of the assessed sites. Chemical pollution in marine or coastal environments is degrading European marine ecosystems, with 80% of assessed areas designated as 'problem areas'. Almost 75% of Europe's marine and coastal areas are designated as problem areas for marine litter, based on EEA assessment criteria. Plastics constitute up to 95% of the waste that accumulates on shorelines, the sea surface and the sea floor (EEA SOER, 2020).	Red: Member States are required to adopt and implement programmes of measures to achieve or maintain Good Environmental Status of EU marine waters. Member States shall ensure that measures are cost-effective and technically feasible, and shall carry out impact assessments, including cost-benefit analyses, prior to the introduction of any new measure. Implementation shall be supported by existing Community financial instruments and co-financed by Member States. It is not clear who will bear the cost of compliance.	Red: Member States are responsible for the assessment and monitoring of sites and incur the associated costs.	White: Costs of environmental damage are not addressed by the legislation.
Water Framework Directive (Water FD)	Agriculture, Industry, Households	Nutrient and chemical pollution	Key impacts are damage to ecosystems and loss of amenity from eutrophication, as well as human health impacts caused by pollution of drinking water IEEP	Amber: Abatement measures are implemented at source to prevent and reduce pollution via programmes of measures. The extent to which the PPP is applied is dependent on	Red: Member State competent authorities are directly responsible for meeting the requirements of the Directive and incur the associated costs. Such pollution is diffuse with	White: Costs of environmental damage are not addressed by the legislation. Water management is subject to the provisions of the ELD.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
			(2021) estimate the external costs of water pollution at EUR 22 343 million per annum at EU 27 level.	national / local plans. When financing the programmes of measures, Member States are required to ensure that adequate contributions are received from the different water users. Costs of compliance are partially incurred by water users.	obstacles to and no requirement for water users such as agriculture, industry (or indeed households) to monitor pollution (such monitoring costs are incurred via related source control policies).	
Environmental Quality Standards(EQS) Directive	Chemicals, Industry, Households	Chemical pollution which poses a threat to the aquatic environment, with effects such as acute and chronic toxicity	See Water FD.	Amber: Sets EQSs for priority substances and eight other pollutants. Member States are responsible for compliance. EQSs are factored into decisions taken for source controls that regulate emissions to water e.g. IED permitting. Water users are required to take into account their impact on EQS and take mitigation action as needed (incurring associated costs).	Red: Requires Member States to establish inventory or emissions, discharges and losses and costs are incurred by authorities.	White: Costs of environmental damage are not addressed by the legislation.
Groundwater Directive (GWD)	Chemicals, Industry, Households	Deterioration from human activity and chemical pollution	Human health impacts include cancers caused by nitrite pollution of drinking water as well as impacts such as osteoporosis from the ingestion of cadmium in food grown using P fertilisers. IEEP (2021) estimate EU 27 external costs of water pollution from phosphorus leaching on soil (cadmium pollution) at EUR 70 million/ year.	Amber: Requires that measures to prevent or limit inputs of pollutants into groundwater are included in the programme of measures under the Water FD. The extent to which the PPP is applied is dependent on national / local plans which identify who is responsible for addressing pollution. When financing the programmes of measures, Member States are required to ensure that adequate contributions are received	Red: Provides criteria for Member States to assess groundwater in the context of the Water FD and costs are incurred by authorities.	White: Costs of environmental damage are not addressed by the legislation.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				from the different water users.		
Nitrates Directive (ND)	Agriculture	Nutrients pollution from agriculture	IEEP (2021) estimate EU27 external costs of water pollution from nitrogen leaching (non-specific agricultural source) at EUR 6 098 million per year for drinking water, and 7 715 million/year for surface water.	Green: The agriculture sector is responsible for implementing the provisions of the Directive and assume the associated compliance costs to reduce nutrient pollution. Measures are adopted at national or regional level which have a direct bearing on the compliance costs borne by the agriculture sector, and which seek to avoid/prevent damage.	Green: Farmers assume the costs of implementing nutrient management plans that involve monitoring.	White: Costs of environmental damage are not addressed by the legislation.
Sewage Sludge Directive (SSD)	Agriculture	Hazardous substances emitted to water and soil due as result of the use of Sewage sludge in agricultural activity	See Water FD.	Green: Regulates how farmers can use sewage sludge as a fertiliser. Regulates the type of treatment used for sewage sludge and specifies sludge composition and properties (e.g. limits for heavy metals contained in sewage sludge). Costs incurred to comply with these requirements are borne by the farmer. Operators of sewage sludge treatment facilities are required to meet sludge composition and properties and cover costs incurred.	Amber: Sets requirements for the sampling and analysis of sludge and soils and record keeping where sludge is used. Requirements apply to Member States. Reporting requirements for treatment facilities are borne by operator.	White: Costs of environmental damage are not addressed by the legislation.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Urban Wastewater Treatment Directive (UWWTD)	Households, Industry	Emissions to water (including organic matter and micropollutants). GHG emissions – one of the biggest consumers of energy in the public domain.	Emissions to water are impacting on water quality with adverse effects for human health and the environment. GHG emissions are contributing to global temperature increases. IEEP (2021) estimate EU 27 annual external costs of water pollution from households at EUR 3 934 million, and from industry at EUR 1 059 million.	Amber: Operators required to achieve treatment standards for discharges of certain population sizes or sensitive areas/receiving waters. It is not prescribed how infrastructure required are financed but it requires substantial investments made by operators, Member States and water users to improve urban waste water treatment processes to address point source pollution from industrial and domestic sources. *The 2022 revision of the UWWTD will require producers to pay for the cost of removing micro-pollutants from waste water via an EPR scheme*.	Amber: Operators of plants are responsible for monitoring of the performance of treatment plants and receiving waters. Member State competent authorities are directly responsible for meeting the requirements of the Directive.	White: Costs of environmental damage are not addressed by the legislation.
Bathing Water Directive	Industry, Households	The presence of microbiological contamination or other organisms or waste affecting bathing water quality and presenting a risk to bather'' health	See Water FD.	Amber: Risk management measures are defined at national level to prevent health hazards in the context of predictable short-term pollution or abnormal situations. Operators are required to implement the risk management measures and incur the associated compliance costs.	Red: Member State competent authorities are required to monitor bathing water quality and incur the costs of doing so.	White: Costs of environmental damage are not addressed by the legislation.
Drinking Water Directive	Industry, Households	Hazardous substances being emitted to waters due to human activity	IEEP (2021) estimate EU 27 external costs of water pollution from nitrogen leaching on drinking water at EUR 6 098 million/ year.	Amber: Sets water quality standards. Source controls for water quality are required to take into account related environmental standards. Water users are required to take into account their impact on EQS and take	Red: Requires Member States to conduct regular monitoring to check compliance with water quality standards.	Red: Requires Member States to define provisions for remedial measures in the case of exceedances. Cost borne by competent authorities.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				mitigation action as needed (incurring associated costs).		
Safety of Offshore Oil and Gas Operations	Industry	Hazardous substances emitted from ineffective oil spill response systems	Human health impacts for workers onsite including skin disease such as dermatitis, cancer and lung disease such as asthma.	Green: Operator is required to develop and implement reports to ensure safety and avoid accidents. Operators are required to ensure that offshore oil and gas operations are carried out on the basis of systematic risk management so that the residual risks of major accidents to persons, the environment and offshore installations are acceptable. They incur the compliance costs.	Green: Operations are licenced. It is the responsibility of the operator to apply for licence and to organise independent verification. It is the responsibility of Member State to grant. Operators incur the costs of this process.	Green: In the case of a major accident, Member States shall ensure that operators take all suitable measures to limit its consequences for human health and for the environment. Operators are financially liable.
Ship-source pollution Directive	Transport (Maritime)	Hazardous or noxious substances being emitted from ships	Ship source pollution includes permanent organic substances, heavy metals, oil and oil compounds, radioactivity, sewage, solid wastes, garbage, food, debris, and noise, impacting on increasing seawater temperatures, acidification, and decreasing seawater oxygen rates. (Bayazit and Kaptan, 2023)	Green: Regulates discharges of polluting substances in internal waters of a Member State, territorial seas, straits and high seas. Applies to all seas in EU waters, irrespective of its flag. Ships are responsible for compliance and incur associated costs.	Red: Costs of enforcement measures are incurred by Member States.	White: Costs of environmental damage are not addressed by the legislation. Infringements are regarded as criminal offences under the ECD and persons responsible are liable for damage.
Floods Directive	Developers of infrastructure projects	Climate adaptation needs are not met in infrastructure design	The combined damage costs caused by river flooding is estimated to be over EUR 5 billion per annum (European Commission, 2020).	Red: Member States are responsible for adopting and implementing flood risk management plans. No requirements specified for how costs of implementation are targeted at developers in cases of infrastructure at risk.	Red: Member States are responsible for conducting preliminary flood risk assessments in river basin districts and prepare flood hazard maps and flood risk maps to monitor and report risks. No requirements specified for how costs of implementation are	White: Costs of environmental damage are not addressed by the legislation.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
					targeted at developers in cases of infrastructure at risk.	
Water Reuse Regulation	Agriculture	Water scarcity	20 % of the European territory and 30 % of Europeans are affected by water stress during an average year (EEA, 2022). IEEP (2021) reviewed the external cost of water scarcity for five case studies using the externality value of €0.30/m^3. Owing to limited data, it was not possible derive EU 27 estimate.	Red: The reclamation facility operator (i.e. not the source of the pollution in the water) is required to meet minimum requirements for water quality to guarantee that reclaimed water is safe for agricultural irrigation. No reference to how costs incurred may be transferred to supplier of waste water/ polluter of waste water.	Red: The reclamation facility operator is responsible for monitoring and provisions on risk management, for the safe use of reclaimed water and they incur the costs of doing so.	White: Costs of environmental damage are not addressed by the legislation.
Policy area : Air						
Ambient Air Quality Directives	Transport , Industry, Agriculture, energy, residential and commercial sector By pollutant, sources include (EEA, 2023)[35]: $PM_{2.5}$: and PM10, energy consumption in the residential, commercial and	Anthropogenic atmospheric emissions of sulphur dioxide (SO_2), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC), ammonia (NH_3) and fine particulate matter ($PM_{2.5}$). Concentrations of other pollutants also regulated or reporting	In 2021 97% of the urban population was still exposed to $PM_{2.5}$ concentrations above the new (2021) WHO air quality guideline level of 5µg/m^3. About 238 000 premature deaths each year in Europe are attributable to air pollution (EEA, 2023)[36].	Amber: Member States choose the measures to attain air quality standards set in the Directives (complementing source legislation such as the IED or Euro standards). Costs can be incurred by the polluter (not always (fully) possible). Implementation is dependent on design of national / local air quality plans.	Red: Competent authorities are responsible for monitoring ambient air quality to demonstrate compliance with air quality standards which are set for ambient air and they incur the costs of doing so.	White: Costs of environmental damage are not addressed by the legislation.
National Emission Reduction Commitment Directive				Amber: Abatement measures are implemented at source to prevent and reduce pollution. Implementation is dependent on design of national air	Red: Competent authorities in MS are responsible for managing air pollutant emission inventories to demonstrate compliance	White: Costs of environmental damage are not addressed by the legislation.

35 https://www.eea.europa.eu/publications/air-quality-in-europe-2022/sources-and-emissions-of-air

36 Health impacts of air pollution in Europe, 2022 — European Environment Agency (europa.eu)

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
	institutional (responsible for 44% and 58% of total emissions) No_x: Road traffic (37% of total emissions), agriculture (19%) and the extractive industry (15%). NH_3: Intensively managed agricultural areas (94% of total emissions).	purposes (e.g. BC, heavy metals, POPs).		pollution control programmes and driven by compliance with EU determined national commitments. Where possible, costs are incurred by the polluter (not always possible e.g. road infrastructures). Implementation is dependent on design of the national air pollution control programmes.	with emission reduction commitments.	
Industrial Emissions Directive[37]	Industry	Key pollutants to air include NH_3, NO_X, HCl, SO_X, VOC, TOC/COD and AOX. Key pollutants to water include As, Cd, Cr, Cu, Hg, Ni, Pb, PAHs, total nitrogen, and total phosphorus.	The effects of industry's contribution to air and water pollution are included in the respective policy areas for air and water quality. The largest contribution to damage costs arise from energy production. The dominant valuation comes from GHG impacts (total ~€190-200 bn/year), followed by the impact of the main air pollutants (~€65-70 bn/year), then heavy	Green: Operators are required to apply for permits setting environmental conditions, including any derogations obtained and to comply with permit conditions. Compliance costs are incurred by the operator.	Amber: Operators are responsible for monitoring and reporting to demonstrate compliance with permit conditions. Member State authorities are responsible for demonstrating compliance and enforcement.	Amber: Costs of externalities arising from allowable including transboundary pollution not addressed by the Directive. Operators are responsible for site remediation in cessation of industrial activity. Liability regarding the environmental consequences of accidents and incidents is a matter for relevant national law and, where

37 The European Pollutant Release and Transfer Register (E-PRTR) Regulation (EC) No 166/2006 was included in the scoping review but not included in the state of play because it was found to not address cost categories relevant to the application of the PPP.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
			metals (~€11 bn/year) and finally from organic pollutants (~€0.1-0.2 bn/year).[38]			applicable, other relevant Union law. Industrial activities in scope of the IED are subject to the provisions of the ELD.
Medium Combustion Plant Directive	Combustion plants between 1 MW and 50 MW	Emissions of SO_2, No_x and dust into air	Risks to human health and the environment caused by pollution to air of SO_2, No_x and dust. Key impacts include premature deaths from chronic $PM_{2.5}$ and short-term ozone exposure; and ecosystems exceeding the acidification and eutrophication critical loads.[39]	Green: Operators are directly responsible for implementing the provisions of the directives. Operators are responsible for meeting ELVs set and are required to take preventive action to comply with the ELVs. Costs are largely incurred by operators.	Amber: Operators are responsible for monitoring and reporting to demonstrate compliance for their plants. Member State authorities assume the costs of enforcement.	White: Costs of environmental damage are not addressed by the legislation.
Euro Standards Regulation	Transport (Road)	Emissions to air from cars, vans, trucks and buses of No_x, PM and CO and HC	See AAQD and NEC Directive for damage associated with these pollutants.	Green: Vehicle manufacturers are required to comply with limits on the emissions of various pollutants from cars, vans, trucks, and buses, and incur the compliance costs.	Green: Vehicle manufacturers are required to demonstrate compliance with the emissions standards through a type-approval process, and to provide information on the emissions performance of vehicles and incur the costs of doing do.	White: Costs of environmental damage are not addressed by the legislation.
Eurovignette Directive	Transport (Road)	Anthropogenic atmospheric emissions of sulphur dioxide (SO_2), nitrogen oxides (NO_x), non-methane volatile organic compounds	See AAQD and NEC Directive for damage associated with these pollutants.	White: Costs of pollution prevention and control are not addressed by the legislation.	Amber: Costs of administrative and enforcement measures are borne by the road operator which may be recovered through the tolls set. Implementation varies by Member State.	Amber: Framework for Member States to introduce road charges (tolls or vignettes). Costs are incurred by the road user via the tolls or vignettes levied. Participation is voluntary meaning the extent costs

38 https://environment.ec.europa.eu/system/files/2022-04/SWD_2022_111_2_EN_impact_assessment_part2_v5.pdf

39 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52013SC0531

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		(NMVOC), ammonia (NH_3) and fine particulate matter ($PM_{2.5}$)				of environmental damage are borne by the polluter is dependent on Member State applying a toll or a vignette. Three Member States do not apply any road charge.
Fuel Quality Directive	Transport (Road)	Air pollutants (SO_2) and GHGs resulting from fuel	See AAQD and NEC Directive for damage associated with these pollutants.	Green: Sets quality requirements for fuels used in road transport (petrol diesel and biofuels) and in non-road-mobile machinery (gasoil) to enable air pollutant emission reductions (namely SO_2) (and GHG emission reductions). For air, the PPP is applied via a mandatory reduction of sulphur content in fuels (requiring fuel suppliers to comply with the rules). Additional rules apply for GHG reductions which are relevant to climate change policy area rather than air (to avoid duplication, focus is on air pollutants). Compliance costs are incurred by the fuel supplier.	Green: Fuel suppliers required to demonstrate compliance with rules with monitoring and reporting and incur the costs of doing so.	White: Costs of environmental damage are not addressed by the legislation.
Petrol Vapour Recovery (PVR) Directives	Transport	Petrol vapour emitted to the atmosphere during the refuelling of motor vehicles at service stations	See AAQD and NEC Directive for damage associated with these pollutants.	Green: Service stations are required to be equipped with a PVR system to capture petrol vapour and they incur the costs of purchase and installation.	Green: Service stations are required to monitor vapour/petrol ratio and inform consumers of the use of PVR systems which are compliant with the Directives. They incur the costs of doing so.	White: Costs of environmental damage are not addressed by the legislation.
Sulphur Content of Liquid Fuels Directive	Transport	SO_2 resulting from the combustion of certain types of	See AAQD and NEC Directive for damage	Green: Sets quality requirements for liquid fuels (gas oils and marine fuel) to	Green: Fuel suppliers required to demonstrate compliance with rules with	White: Costs of environmental damage are

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		liquid fuels and thereby to reduce the harmful effects of such emissions on man and the environment and emissions of sulphur dioxide resulting from the combustion of certain petroleum-derived liquid fuels	associated with these pollutants.	enable air pollutant emission reductions (SO_2). The PPP is applied via a mandatory reduction of sulphur content in fuels (requiring fuel suppliers to comply with the rules). Compliance costs are incurred by the fuel suppliers.	monitoring and reporting and incur the costs of doing so.	not addressed by the legislation.
Policy area: Noise						
Environmental Noise Directive	Roads, railways, airports and industry.	Daily average noise levels of 55 dB(A) or above and night-time noise levels of 50 dB(A) and above.	More than one in five EU citizens is exposed to chronic harmful levels of road traffic noise (greater exposure in many urban areas). Long-term exposure is estimated to contribute to 48 000 new cases of heart disease and to 12 000 premature deaths per year (EEA, 2020), with little improvement between 2012 and 2017 (EEA, 2023).	Amber: Abatement measures to prevent and reduce noise pollution are implemented at source. The extent to which the PPP is applied is dependent on national / local plans to implement the provisions of the policy (noise action plans). Where possible, costs are incurred by the polluter (not always possible e.g. double glazing to reduce noise pollution from roads).	Red: Competent authorities are responsible for monitoring noise levels and mapping exposure to noise pollution and incur the costs of doing so.	Costs of environmental damage are not addressed by the legislation.
Policy area: Chemical Risk Management						
Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)	Manufacturers, importers and downstream users of chemical substances and mixtures. Risks via uncontrolled release of a	The use of harmful substances can cause various types of damage during manufacture downstream industrial and/ or consumer use as	A variety of human health conditions are associated with releases of and exposure to harmful substances. These include cancers, endocrine disruption, reproductive disorders, adverse effects to neurodevelopment and cardiovascular effects.	Green: Manufacturers, importers and downstream users of chemical substances and mixtures are required to prepare Registration for relevant substances depending on tonnage. They incur the costs of Registration	Green: Registration incurs a fee, which will offset the costs for Competent Authorities, ECHA and the European Commission in administration. The costs for preparation of Application for Authorisation are incurred by the applicants (i.e. the	White: Costs of environmental damage are not addressed by the legislation.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
	toxic substance. (EEA, 2023)	well as after disposal.	Adverse effects to the environment include terrestrial and marine animal and plant health, soil contamination, including persistent, bioaccumulative, mobile and toxic substances. Costs of pollution include the direct and indirect costs of healthcare provision, lost earnings and employment. It also includes various mortality and morbidity costs, degradation and/or loss of ecosystem services, typically valued using Willingness To Pay (WTP) methods as well as remediation costs.	preparation, submission and update. The same incur the costs of preparation of Application for Authorisation. The evidence indicates that, even where authorisation is approved additional risk management measures are typically applied, either voluntarily and/or as conditions/ recommendations by ECHA. The same must comply with Restrictions under REACH to prevent and control pollution and incur the costs of reformation and or loss of market, where relevant based on their use/sale of the substances affected.	user), alongside a fee payable to ECHA, to offset administration costs. Enforcement is undertaken by Member State CAs, at their cost.	
Classification, Labelling and Packaging (CLP) Regulation	Manufacturers, distributors and end-users of Packaging	Substances and mixtures that are hazardous for human health and the environment	Described above for REACH.	Green: The CLP regulation ascribes responsibility to manufacturers for identifying hazards of substances and mixtures for their classification and labelling and they incur the costs of doing so.	Green: Manufacturers are required to comply with harmonised provisions and criteria for the classification and labelling of substances, mixtures and articles. Manufacturer is responsible for costs of labelling and monitored required to comply with rules.	White: Costs of environmental damage are not addressed by the legislation. CLP of dangerous substances are subject to the provisions of the ELD.
Biocidal Regulation	Manufacturers, distributors and end-users of Biocidal products	Biocidal products that have negative implications for human health and the environment	Described above for REACH.	Green: Costs incurred by preventative measures (prohibiting substances for use and their placing on the market except in specific situations). Substances are restricted where alternatives are deemed available, unless the alternatives are	Amber: Authorisation costs are incurred by the applicants (i.e. the user). However, authorisations are reviewed by Member States (costs incurred by Member State), products are compared to existing biocidal products, non-	White: Costs of environmental damage are not addressed by the legislation. The placing of biocidal products on the market is subject to the provisions of the ELD.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				not sufficiently effective, economically viable or otherwise impractical. Manufacturers cover cost of authorisation requests.	chemical means of control and other prevention methods to understand the risks/benefits. The regulation does not specify how the cost is offset by the user.	
Carcinogens and Mutagens (CMR) Directive	Chemicals	Carcinogens, mutagens and reprotoxic substances that have negative implications for human health	Described above for REACH.	Green: Aims to protect workers against risks to their health and safety from exposure to carcinogens or mutagens in the workplace by setting occupational exposure limits (OELs). Companies (workplaces) are responsible for protecting employees and bearing the cost of complying with OELs.	White: Costs of administrative and enforcement measures are not addressed by the legislation.	White: Costs of environmental damage are not addressed by the legislation.
Chemical Agents Directive	Chemicals	Chemical agents that have negative implications for human health	Described above for REACH.	Green: Sets out minimum requirements for the protection of workers from risks to their health and safety arising from the effects of chemical agents that are present in the workplace. Companies (workplace) are responsible for bearing the cost of complying with the requirements of the legislation.	Green: Companies are responsible for costs incurred to conduct evaluation of emissions and process wastes to understand and regulate human and environmental exposure.	White: Costs of environmental damage are not addressed by the legislation.
Cosmetics Regulation	Manufacturers of Cosmetic products	Cosmetic products that have negative implications for human health	Described above for REACH.	Green: Responsible persons that place a cosmetic product on the market are responsible for ensuring the safety of their products to provide a high level of protection of human health from cosmetic products and the regulation sets out lists of	Green: Responsible persons are required to verify labelling information is compliant with the Regulation. It is the responsibility of the responsible persons to respond to information	Green: Responsible persons that placed a cosmetic product on the market that is not in conformity with the Regulation are required to take immediate corrective action (withdraw or recall as appropriate).

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				restricted substances. Compliance costs are incurred by the person responsible for placing on the market.	requests by a competent authority.	
Fertiliser Regulation	Chemical (fertiliser)	Fertilising products that are overused or ill-managed	Described above for REACH.	Green: Economic operators that manufacture, import or place a fertiliser product on the market are required to comply with rules on safety, quality and labelling requirements for fertilising products and limits for toxic contaminants. Compliance costs are incurred by the operator.	Green: Manufacturers are required to keep records to demonstrate compliance with the Regulation. Importers and distributors are required to keep documentation to demonstrate compliance and provide it to competent authorities on request and cover the costs of doing so.	White: Costs of environmental damage are not addressed by the legislation.
Mercury Regulation	Industry	Mercury, mercury compounds and mixtures of mercury when not used or stored, manufactured, or managed effectively	Described above for REACH.	Green: Bans the export, import and manufacturing of mercury except for specified products. Establishes measures and conditions concerning the use, storage of and trade in mercury, mercury compounds and mixtures of mercury, and the manufacture, use of and trade in mercury-added products, and the management of mercury waste. Industry must bear the costs of phase outs and substitutions, and costs may be passed to consumers.	Green: In cases of large sources, economic operators are required to report Member State authorities data on total mercury stored. Reporting requirements apply for storage also.	Red: The legislation requires competent authorities to identify and assess sites contaminated by mercury and mercury compounds and to address the significant risks such contamination may pose to human health and the environment. There is no provision to identify the historic source of pollution or reclaim cost from polluter.
Persistent Organic Pollutants (POPs) Regulation	Industry	Persistent Organic Pollutants (POPs)	Described above for REACH.	Green: Implements the Stockholm Convention. It sets out lists of substances subject to restrictions (for their manufacture and use), release reduction provisions and waste management	Red: Member States are responsible for monitoring and reporting including the drawing up inventories of POPs.	Green: The holder of a stockpile, which consists of or contains any substance listed in Annex I or II, for which no use is permitted, shall manage

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				provisions. The relevant manufacturers are responsible for preventing releases to the environment for reformulation if required, or loss of market associated with bans.		that stockpile as waste. The holder of a stockpile incurs the associated costs.
Pesticides Directive	Agriculture	Hazardous chemicals released from pesticides, causing adverse implications for the environment and human health	Described above for REACH.	Amber: Regulates the use of pesticides via national action plans that require Member States to set quantitative objectives and targets to reduce risks and impacts of pesticide use. Action plans shall include at minimum prohibition of aerial spraying, and avoid pesticide use near aquatic environments and promotes integrated pest management approaches. Professional users are responsible for complying with these measures. Member States shall facilitate compliance for non-professional users. Member States may recover the costs associated with any work pursuant to obligations under this Directive by means of a fee or charge (unclear if this relates to professional and/ or non-professional users). There is ambiguity regarding non-professional users and the degree to which they incur compliance costs.	Amber: Member States are required to monitor use of pesticides. Member States are required to inspect equipment used for pesticide application and establish certificate systems to allow verification of inspections for professional users. Distributors selling pesticides are required to provide information on risks for health and environment. Member States may recover the costs associated with any work pursuant to obligations under this Directive by means of a fee or charge (unclear if this relates to professional and/ or non-professional users).	White: Costs of environmental damage are not addressed by the legislation.
Plant Protection Products Regulation	Agriculture	Hazardous chemicals released from	Described above for REACH.	Green: Stipulates harmonised rules for the approval of active plant	Green: Producers of the active substances are responsible for preparing	White: Costs of environmental damage are

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		plant protection products, causing adverse implications for the environment and human health		protection substances to ensure high levels of protection for humans and the environment. It is underpinned by the precautionary approach. To be authorised, a plant protection product must satisfy a number of requirements, including not having any (direct or indirect) harmful effects on human or animal health and not having any unacceptable impact on the environment, particularly with regards to non-target species and biodiversity. Compliance costs are incurred by the manufacturer of the product.	and submitting application dossiers and incur the cost of doing so.	not addressed by the legislation. The placing of plant protection products on the market is subject to the provisions of the ELD.
Export and import of hazardous chemicals Regulation	Chemicals, importers/ exporter and distributors hazardous substances	Environmental damage and human health effects resulting from inefficient and ineffective handling of hazardous chemicals resulting in major accidents	Described above for REACH.	Green: Sets out procedures for the export and import of hazardous substances that are banned or restricted in the EU. Compliance costs are incurred by producers and users of chemicals.	Amber: Exporter and importers of chemicals in scope of the Regulation are required to notify the designated authorities and incur the costs of doing so. European Chemicals Agency oversees implementation and is responsible for registration and making available to public. Agency is funded by EU budget and voluntary Member State contributions (obtained via a fee from the polluter to partially offset costs).	White: Costs of environmental damage are not addressed by the legislation.
Toy Safety Directive	Industry (Toys)	Hazardous substances	Described above for REACH.	Green: Requires safety assessment for physical/mechanical/chemica	Manufacturer is responsible for providing technical document to	White: Costs of environmental damage are

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters ?	What is the pollution ?	What is the damage ?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				l/electrical properties, flammability, hygiene and radioactivity and establishes conformity assessment procedures. Obligations apply to manufacturers, importers and distributors responsible for placing on market who incur compliance costs.	satisfy assessments to Member State authorities on request.	not addressed by the legislation.
Seveso	Industrial installations with dangerous substances on site	Major accidents which involve dangerous substances, and limit their impact on human health and the environment	A variety of serious effects to human health (including injury and death).	Green: Operators are directly responsible for implementing the provisions of the directives, including to prevent major accidents involving dangerous substances and ensure appropriate preparedness and response. Compliance costs are incurred by the operator.	Amber: Operators are responsible for monitoring and reporting under the Directive. Member State authorities are responsible for demonstrating compliance and enforcement.	Green: Where such accidents occur, operators are responsible for limiting the consequences for human health and the environment

Table 4-4 State of play for policies and strategies contributing to the 8th EAP priority objective for protecting, preserving and restoring biodiversity, and enhancing natural capital

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Nature Directives (Habitat and Birds Directives)	Agriculture, Forestry, urban Development, Infrastructure	The most significant environmental damage include land-use change (and its role in habitat loss,	60% of species had unfavourable conservation status and 77% of habitats (EEA SOER)[40]. However, there limitations when quantifying the extent of damage due to poor data	Amber: There are legal grounds requiring the polluter to pay for prevention and remedial costs via the appropriate assessment procedure.	Amber: Member State competent authorities are directly responsible for meeting the requirements of the Directive. Monitoring may be necessary as	White: Costs of environmental damage are not addressed by the legislation.

40 Note these data are caveated by the EAA in the report as associated with uncertainties and limitations.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		fragmentation, and degradation), natural resource extraction, pollution, climate change.	quality and/ or gaps in data completeness[41]. Costs of damage may be derived based on ecosystem service values although the range in values is significant making it difficult to establish an estimate at EU level.	National approaches to implementation are varied and can have a major influence on the impact the Directives have on nature and by extension, the way in which the polluter is responsible.	part of the appropriate assessment procedure; in which case the developer is responsible for covering costs.	
Regulation on Invasive Species	Agriculture forestry Trade Gardening	The introduction of invasive alien species.		Green: Polluters are responsible for implementing restrictions on keeping, importing, selling, breeding, growing and releasing into the environment, invasive species.	Green: Legal requirement for Member State competent authorities to recover all control related costs from the polluter.	White: Costs of environmental damage are not addressed by the legislation.
EU Biodiversity Strategy for 2030 **Note: the proposal for a *Nature Restoration Law (2022) will be a key policy for implementing the actions in the Biodiversity Strategy. However, the state of play only covers current legislation.***	Agriculture, Forestry, Development, Infrastructure, industry	The most significant environmental damage include land-use change (and its role in habitat loss, fragmentation, and degradation), natural resource extraction, pollution, climate change.		Amber: The strategy seeks to strengthen implementation of the Birds and Habitats Directives by referring to the need for improved enforcement to complete the Natura 2000 network, to ensure the effective management of all sites, and to promote species-protection provisions. There is no compliance cost assumed with the strategy.	White: Costs of administrative and enforcement measures are not addressed by the legislation.	Amber: The strategy notes that the 'user pays principle' and PPP have to be applied to prevent and correct environmental degradation. To this end, the Commission will further promote tax systems and pricing that reflect environmental costs, including biodiversity loss. This should encourage changes in national fiscal systems to shift the tax burden from labour to pollution, under-priced resources, and other environmental

41 https://www.consilium.europa.eu/en/policies/nature-restoration/

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
						externalities. However, there is no compliance cost assumed with the strategy. *Under the proposed Restoration Law, there are proposals for targets to restore ecosystems. It is proposed that measures to attain the targets are included in Member State national restoration plans and that the user would incur costs of compliance.*
EU Forest Strategy for 2030	Agriculture, Forestry, Development, Infrastructure	Increased strain placed on forests as a result of natural processes but also because of increased human activity and pressures. Climate Change has significant negative effects on forests as it highlights its hidden vulnerabilities, aggravating other destructive pressures	As a result of extreme weather and climate related events, the estimate damage costs of these events is estimated to is EUR 2 billion per annum in forest fires. Global deforestation is occurring at a rate of approximately 10 million hectares per year alongside damage caused by storms, for example(European Commission, 2020).	Amber: The Strategy emphasises the role of the Habitats and Birds Directives in providing for the conservation of a range of forest habitats and of forests-related animal and plant species. The Strategy also mentions that in order "to improve forest resilience and adaptation, it is necessary to increasingly protect and restore forest biodiversity and adopt biodiversity-friendly forest management practices." There is no compliance cost assumed with the strategy.	White: Costs of administrative and enforcement measures are not addressed by the legislation.	Amber: The Strategy emphasises the role of the ELD in requiring the prevention and remediation of environmental damage involving forest habitats. However, there is no compliance cost assumed with the strategy.
EU soil strategy	Agriculture Development Infrastructure	Unsustainable land use and management	Land and soil continue to be subject to severe degradation processes such as erosion,	Amber: The strategy deals with prevention of pollution with reference	Amber: *The Soil Monitoring Law contains reporting requirements*	Amber: Includes steps for restoring degraded soils and remediating

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Note: the proposal for *the Soil Monitoring Law will be a key policy for implementing the actions in the Soil Strategy. However, the state of play only covers current legislation.*	industry	(erosion, loss of soil fertility, pollution, loss of organic matter, etc).	compaction, organic matter decline, pollution, loss of biodiversity, salinisation and sealing.	to existing policies (Sewage Sludge Directive, REACH, EU fertilising products regulation) and includes 4 steps for pollution prevention. There is no compliance cost assumed with the strategy.	*for the Member State with no requirements directed to the land manager.*	contaminated sites and highlights the role of the IED and ELD in managing land damage.

Table 4-5 State of play for policies contributing to the 8th EAP priority objective for reducing environmental and climate pressures related to production and consumption

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Policy area: Horizontal policies						
Environmental Crime Directive (ECD)	Biodiversity, waste, chemicals, water, and air quality/climate change.	Pollution to air and water, degradation of wildlife and loss of biodiversity and habitats.	Contributes to greater risk of disease and environmental disaster, irreversible climate change, the contamination of the food chain, reduced life expectancy and the death of human beings (EURPOL).	Amber: Article 15 states that the Member State shall take appropriate action to reduce overall environmental criminal offences and hold polluters accountable for their offences. Penalties may include costs to prevent or control further pollution going forward on a case-by-case basis but this is not prescribed by the Directive. The offender is required to pay the financial penalties imposed.	Amber: Competent authorities are responsible for enforcement and for reporting on actions to reduce environmental criminal offences. Penalties cover administrative costs incurred on a case-by-case basis but this is not prescribed by the Directive.	Amber: Polluter may be required to restore nature to its previous condition or compensate for clean-up costs. Article 5 states that MS may take optional necessary measures to subject criminals to additional sanctions that include an 'obligation to reinstate the environment within a given time period'.
Environmental Liability Directive (ELD)	Industry (including manufacturing and transportation).	Pollution to air and water, degradation of wildlife and loss	Damage made to protected species and natural	Green: Where instances of environmental damage have occurred, the polluter may be required to take preventive	Green: Where instances of environmental damage have occurred, the polluter is responsible for	Green: The operator is required to take preventive or remedial action in instances where environmental damage, or

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		of biodiversity and habitats.	habitats, air, water and soil	action to prevent or control further pollution going forward, as determined by the competent authority. Competent authorities are also able to recover retrospective costs for undertaking preventive action. However, Member State flexibility in how environmental damage is defined has led to varied implementation of the PPP to address costs of environmental damage.	and incurs the costs of gathering additional information on the incident, as determined by the competent authority. However, Member State flexibility in how environmental damage is defined has led to varied implementation of the PPP to address costs of environmental damage.	threat of damage may occur. However, Member State flexibility in how environmental damage is defined has led to varied implementation of the PPP to address costs of environmental damage. Where instances of environmental damage have occurred, competent authorities will identify the polluter and set out remedial actions for the polluter to take. Competent authorities are also able to recover retrospective costs for undertaking remedial action.
Environmental Impact Assessment (EIA) Directive	Construction (of major building and development projects including nuclear power stations, railways, motorways, roads, waste disposal installations for hazardous waste, dams, urban or industrial development projects, tourism developments, canalization and flood relief works).	Where development has unintended consequences on the environment, including GHG emissions, damage to habitats and biodiversity and water pollution.	The built environment can result in damage to a wide range of environmental agents including human health, biodiversity, land, soil, water, air, and climate, via buildings owners, developers, suppliers, contractors and not least occupants.	Green: Project developers are required to identify the potential environmental impacts of their projects and to develop measures to mitigate or avoid those impacts. The cost of these measures is typically borne by the project developer. This can be supplemented via the – additional – payment of a fee when the submission of the EIA is made to the competent authority for their decision on whether to permit development as well as the payment for mitigation measures identified in/via the EIA process. Development consent may be granted where the economic benefits are deemed to outweigh	Green: Where required as part of the development consent, cost of reporting e.g. monitoring measures is incurred by developer. The cost of determining whether to permit development (and of legal challenge of the decision where relevant) is incurred by the Competent Authority, offset by the payment of a fee when the EIA is submitted (and award of legal costs if any legal challenge is dismissed), paid for by the developer. Note national practice may differ.	White: Costs of environmental damage are not addressed by the legislation.

Policy	Impact pathway from pollution to impact			Cost categories addressed in each policy and who pays		
	Who are the polluters?	What is the pollution?	What is the damage?	Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
				identified environmental damage.		
Strategic Environmental Assessment (SEA) Directive				Red: The SEA Directive applies to wider development plans and programs which are the responsibility of competent authorities (rather than the developers).	Red: Cost of reporting is incurred by the competent authorities.	White: Costs of environmental damage are not addressed by the legislation.

4.2.1. State of play for EU funds and state aid

4.2.1.1. EU funds

Underlying the environmental pressures facing the EU is the presence of external environmental costs owing to 'the absence of, or distortion to, price signals arising from a failure to account properly for environmental costs or from public subsidies for environmentally harmful activities'. To address such environmental externalities, investment for environment and climate policy is needed, namely via:

- Public private initiatives for eco-innovation under European Innovation Partnerships are intended to support eco-innovation activities and the uptake of new technologies. Funding is allocated via Horizon 2020.
- Since 2014-2020, mainstreaming of environment and climate objectives applies to EU funding under the EU budget.
    - Key spending areas are research and innovation and economic, social and territorial cohesion and natural resources.
    - The most significant funds for mainstreaming are those under the Common Agricultural Policy (European Agricultural Guarantee Fund, European Agricultural Fund for Rural Development) and the Cohesion Policy Funds (European Regional Development Fund, Cohesion Fund, European Social Fund Plus, Just Transition Fund).
    - Underpinning mainstreaming is the LIFE programme, to facilitate strategic targeting of EU funding according to environmental and climate policy priorities.
- Mainstreaming of environment and climate objectives also apply to financial instruments and loans designed to increase available capital. Financial instruments are designed to attract private funding. The most significant financial instruments and loans for mainstreaming are InvestEU as well as the loan component of the Recovery and resilience fund (RRF)

In this way, the EU funds reviewed for this fitness check include:

- Funding under the Common Agricultural Policy, European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD)
- Cohesion policy funds, the European Regional Development Fund (ERDF), the European Social Fund Plus (ESF+), the Cohesion Fund (CF), and the Just Transition Fund (JTF)
- LIFE+
- InvestEU
- Recovery and Resilience Facility (RRF)

Together, the allocated expenditure to these instruments comprises the most prominent EU funds contributing to the EU horizontal objectives on climate, biodiversity and air (Table 4-6).[42] Horizon Europe was not reviewed on the basis that research activities are not classified as clean-up activities.

42 https://data.consilium.europa.eu/doc/document/ST-10530-2022-INIT/en/pdf

Table 4-6 : Planned target contributions to climate/ biodiversity/ clean air objectives in the 2021-2027 EU budget (including NGEU)*

Budget Programme	2021-2027 Target contributions in M EUR (% of the envelope)		
	Climate objectives	Biodiversity objectives	Clean air objectives
Horizon Europe	31 342.6 (34%)	6 954.4 (7%)	3 762.9 (4%)
Euratom Research and Training Programme	661.7 (33%)	-	-
International Thermonuclear Experimental Reactor	5 157.3 (100%)	-	-
InvestEU Programme	3 106.6 (33%)	-	83.0 (1%)
Connecting Europe Facility including Military Mobility	24 139.7 (72%)	-	2 697.7 (8%)
Digital Europe Programme	210.1 (3%)	-	-
Single Market Programme	112.7 (3%)	-	-
European space programme	2 143.7 (15%)	930.0 (6%)	
Cohesion Policy Funds	92 554.5 (35%)	16 002.6 (6%)	41 891.6 (14%)
Recovery and Resilience Facility	202 875.7 (40%)	13 184.6 (3%)	96 111.7 (19%)
Union Civil Protection Mechanism	343.1 (10%)	73.4 (2%)	
European Social Fund +	6 071.1 (6%)	-	-
Erasmus+	579.5 (2%)	-	-
Creative Europe	169.2 (8%)	-	-
Common Agricultural Policy (CAP)	146 120.4 (38%)	66 318.6 (17%)	176.0 (0%)
European Maritime Fisheries and Aquaculture Fund	3 182.4 (52%)	1 855.7 (30%)	-
Sustainable Fisheries Partnership Agreements and Regional Fisheries Management Organisations	110.9 (10%)	136.1 (12%)	-
Programme for Environment and Climate Action (LIFE)	3 325.1 (61%)	2 654.9 (49%)	128.7 (2%)
Just Transition Mechanism (JTM)	19 326.6 (96%)	778.2 (4%)	2 334.5 (12%)
Neighbourhood Development and International Cooperation Instrument	22 461.1 (28%)	6 625.8 (8%)	
Humanitarian Aid	1 857.0 (14%)	-	-
Pre-Accession Assistance	4 064.0 (28%)	586.0 (4%)	-
ReactEU	7 917.6 (16%)	38.5 (0%)	-
TOTAL	**578 264**	**115 264**	**147 486.2**

Note: * The NextGenerationEU recovery package allocates EUR 202 billion to climate objectives, EUR 13 billion to biodiversity and EUR 41 billion to clean air objectives.

Source: EC (2023): Climate overview MFF 2021-2027; EC (2023): Biodiversity overview MFF 2021-2027); EC (2023): Clean Air overview MFF 2021-2027

The Do No Significant Harm (DNSH) Principle aims to ensure that economic activities do not significantly harm the EU's environmental objectives[43]. Although not explicitly referenced, the DNSH principle was found to be relevant to some degree in implementing the PPP and applies to all funds reviewed. The European Green Deal adopted the green oath to "do no harm" reflected in the Commission Communication on the European Green Deal in 2019. Further references to the DNSH are revealed in the EU Taxonomy Regulation, laying down the foundations for the six environmental objectives. There are certain tools for the DNSH

43 The six environmental objectives set out in the EU's Sustainable Investment Regulation (2020/852) are: climate change mitigation, climate change adaptation, the sustainable use and protection of water and marine resources, the transition to a circular economy, pollution prevention and control, and the protection and restoration of biodiversity and ecosystems.

implementation modalities in the EU budget[44], among which Selection Phase screening, Sustainability proofing, Climate proofing, Technical DNSH guidance, Environmental Impact assessment, Strategic Environmental Assessment, and Exclusion list are the ones whose rationale is reflected in the Programmes under investigation. Despite the differences between the PPP and the DNSH principle (PPP is shifting the cost of pollution on the polluter, whereas the DNSH is aimed at vetting projects and beneficiaries), both aim to minimise the harmful environmental practices and maximise the conditionality requirements to meet certain environmental targets anchored in the EU respective funding programmes. In summary and in line with the JRC comparative analysis on the implementation of the DNSH principle (2023)[45]:

- **Horizon Europe:** Applicants shall refer to the DNSH principle for the proposed research methodology and impact to assure that they do not "make a significant harm to any of the six environmental objectives" set by the EU taxonomy regulation (Horizon Europe Proposal Evaluation, 2023). The adaptation of DNSH approach into the Programme was in June 2021. The principle is aligned with the EGD objectives defining that the six environmental objectives in EU Taxonomy Regulation must be complied with. However, the scoring of a proposal by evaluators shall be based on the adherence to the DNSH only if it is explicitly referred in a Work Programme (there are several Work Programmes under Horizon Europe, such as Marie Skłodowska-Curie actions and European innovation ecosystems). At this stage, mainly the European Innovation Council programme refers to such actions) [46]
  Horizon Europe refers to the DNSH principle both at the programme and project levels. At programming stage, "*Horizon Europe work programme has been co-created to support research and innovation activities that respect climate and environmental priorities of the EU and cause no significant harm to them*"[47]. With regards to the project level incorporation, the principle is reflected in the application form to provide researchers with the opportunity to demonstrate the credibility of their initiatives according to the DNSH principle (Part B, Standard Application Form of Horizon Europe Programme). Moreover, among many criteria for funding, environmental ethics is also included[48]. DNSH is applicable within the scopes of Pilar II (Global Challenges reflected in (Cluster 4, Cluster 5, Cluster 6, and Missions) as well as Pillar III of Innovative Europe[49].
- **CAP:** The PPP is implemented by linking the respect of conditionality obligations to most CAP payments and sanctioning non-compliance by payment reductions. Farmers are required to respect common rules and standards for preserving the environment and the landscape (conditionality). This includes Statutory management requirements (SMR) and Good agricultural and environmental conditions (GAEC)[50], and the revised green architecture which provides grounds for enhanced conditionality. This enhanced conditionality in the latest CAP amendments aims to ensure a high degree of sustainability, incorporating social, environmental and climate elements[51]. Member State CAP Strategic Plans shall refer to conditionality that subjects farmers and other direct payment recipients to administrative penalties if the statutory management criteria and

44 COMMISSION STAFF WORKING DOCUMENT: Climate Mainstreaming Architecture in the 2021-2027 Multiannual Financial Framework

45 JRC (2023) The implementation of the 'Do No Significant Harm' principle in selected EU instruments. A comparative analysis. JRC Publications Repository - The implementation of the 'Do No Significant Harm' principle in selected EU instruments (europa.eu)

46 See Horizon Europe Proposal evaluation

47 Horizon Europe Programme Guide

48 See Horizon Europe Work Programme 2023-2024

49 See https://ncpflanders.be/infosheets/dnsh-principle-in-horizon-europe

50 For a summary and explanations, see here.

51 Regulation (EU) 2021/2116 of the European Parliament and of the Council of 2 December 2021 on the financing, management and monitoring of the common agricultural policy and repealing Regulation (EU) No 1306/2013 .

GAEC standards are not complied with[52]. The common rules and standards are mandatory and form the very basis for ensuring that agricultural activity is undertaken in a sustainable way. These rules and standards form the "reference level" up to which the costs for complying with these obligations have to be born by the farmer, according to the PPP. The main legal provisions of conditionality are:

- Regulation (EU) 2021/2115 of the European Parliament and of the Council – recitals 41 to 44, Articles 12 and 13 and Annex III.
- Commission Delegated Regulation (EU) 2022/126 – Article 48.
- Regulation (EU) 2021/2116 of the European Parliament and of the Council – recitals 66 to 68, Articles 83 to 86.
- Commission Delegated Regulation (EU) 2022/1172 – recitals 8 to 14, Articles 6 to 11.

DNSH principle applies before the Commission's approval of CAP Strategic Plans. Moreover, a list of potential investments harming the environment and climate are exempt from the funding eligibility (e.g., Irrigation investments that are inconsistent with the Water FD's objectives)[53].

- **Cohesion Policy:** No measure under cohesion policy should lead to harm to the environmental objectives of the Taxonomy Regulation (Article 9) and one of these relates to Pollution Prevention and Control, including air pollution. Additional ways in which the pollution is safeguarded from is compliance with climate proofing of investments (also found to be relevant to implementing the PPP) and the use of EIA/SEA, to the extent relevant. While the Common Provisions Regulation (CPR) for the 2021-2027 programming period makes an explicit reference to the DNSH, the CPR and relevant guidance documents54 for the 2014-2020 programming period contained explicit reference to the application of the PPP[55].
- **LIFE**: The LIFE Programme directly serves the six environmental objectives defined by the EU taxonomy rule and thus the DNSH principle applies. This is to ensure the compliance of actions with the EGD, Paris Agreement and UN SDGs. Annex 1 of the 2021-2024 Multiannual Work Programme for LIFE anchors the green oath and DNSH principle at the sub-programme level. Besides, the LIFE programme under 2014-2020 MFF already highlighted the alignment of the biodiversity offsets with the PPP. According to the Technical methodology[56] defining the project selection procedures, any project compensating Natura 2000 site damage is ineligible for funding.
- **InvestEU:** Operations under the sustainable infrastructure window are subject to climate, environmental and social sustainability proofing to minimise negative impacts and maximise benefits for the climate, environment and social dimension (see Article 8 of the Regulation.) This is described in the Technical guidance on sustainability proofing for the InvestEU Fund. InvestEU funding requires ex-ante sustainable proofing[57], which is carried out by validating the compliance of an economic activity with the DNSH principle as well as other guidance by the EU. The Commission's sustainability guidance, associated with the DNSH principle, provides for the accounting of project consolidated impact in terms of the primary components of natural capital, namely air, water, land, and biodiversity (Chapter II of Regulation (EU) 2021/523). Part B of Annex V of main regulation refers to the excluded activities, such as investments in facilities for the disposal of waste in landfill.

52 Rules and financial support for CAP Strategic Plans

53 COMMISSION STAFF WORKING DOCUMENT Analysis of links between CAP Reform and Green Deal

54 See European Commission (2014) Guide to Cost-Benefit Analysis of Investment Projects for Cohesion Policy 2014-2020.

55 For more detailed comparison of respective programming periods, see here.

56 See here.

57 Regulation (EU) 2021/523 of the European Parliament and of the Council of 24 March 2021 establishing the InvestEU Programme and amending Regulation (EU) 2015/1017

- **RFF:** Compliance with the DNSH applies as well as the different tracking investment fields and relevant common indicators. The application of DNSH to the RRF builds on the technical guidance of the Commission (2021/C 58/01).

4.2.1.2. State aid

To avoid market distortion, there is a general prohibition of State Aid in the EU. Exceptions are permitted where intervention is needed for a well-functioning and equitable economy. The granting of aid requires prior notification to the Commission by the Member State concerned, unless the aid is covered by a Block Exemption, fall below the *de minimis* threshold or form part of an aid scheme already approved by the Commission.

Where relevant, State aid rules require Member States to comply with the PPP for aid to be declared compatible. Notably, the Guidelines on State aid for climate, environmental protection and energy (CEEAG) explain that aid cannot be considered compatible where it supports the costs which the polluter must bear in accordance with the PPP ('Compliance with the 'polluter pays' principle through environmental legislation aims at ensuring that a market failure linked to negative externalities will be rectified. Therefore, State aid is not an appropriate instrument and cannot be granted insofar as the beneficiary of the aid could be held liable for the pollution under existing Union or national law').

Furthermore, the CEEAG requires the application of the PPP where aid is granted for specific categories of projects, namely resource efficiency projects (point 238 CEEAG[58]), projects concerning the remediation of environmental damage, the rehabilitation of natural habitats and ecosystems, the protection or restoration of biodiversity and the implementation of nature-based solutions for climate change adaptation and mitigation (points 284-286 CEEAG[59]), and to cover exceptional costs (including exceptional environmental costs) resulting from the closure of uncompetitive coal, peat and oil shale activities (see point 443-444 CEEAG).

The corresponding provisions of the General Block Exemption Regulation (GBER), also contain direct references to the PPP. Specifically, for the following categories of aid, compliance with the PPP is a compatibility condition:

- Investment aid for the remediation of environmental damage, the rehabilitation of natural habitats and ecosystems, the protection or restoration of biodiversity and the implementation of nature-based solutions for climate change adaptation and mitigation (Article 45[60] and 56e(8)(a)(iii)).;

58 « In accordance with the 'polluter pays' principle, undertakings generating waste should not be relieved from the costs of waste treatment. The aid should therefore not relieve undertakings that generate waste from any costs or obligations relating to the treatment of waste for which they are liable under Union or national law, including under extended producer responsibility schemes. In addition, the aid should not relieve undertakings from costs that should be considered as normal costs for an undertaking ».

59 "The Member State must demonstrate that all necessary measures, including legal action, have been taken to identify the liable entity or undertaking at the origin of the environmental damage and make it bear the relevant costs".

60 See in particular paragraph 5: Without prejudice to Directive 2004/35/CE of the European Parliament and of the Council (63) or other relevant Union rules on liability for environmental damage, where the entity or undertaking liable for the environmental damage under the law applicable in each Member State is identified, that entity or undertaking shall finance the works necessary to prevent and correct environmental degradation and contamination in accordance with the 'polluter pays' principle, and no aid shall be granted for the works that the entity or undertaking would be legally required to conduct. The Member State shall take all necessary measures, including legal action, to identify the liable entity or undertaking at the origin of the environmental damage and make it bear the relevant costs. Where the entity or undertaking liable under the applicable law cannot be identified or made to bear the costs of remediating the environmental damage it has caused, in particular because the liable undertaking has ceased to legally exist and no other undertaking can be regarded as its legal or economic successor, or where there is insufficient financial security to meet the costs of remediation, aid may be granted to support the remediation or rehabilitation works. Aid shall not be granted for the implementation of compensatory measures referred to in Article 6(4) of Council Directive 92/43/EEC (64). Aid may be granted under this Article to cover the extra costs necessary to increase the scope or ambition of those measures, beyond the legal obligations under Article 6(4) of Directive 92/43/EEC.

- Investment aid for resource efficiency and for supporting the transition towards a circular economy (Article 47[61]).

4.3. State of play – overall perspective on internalisation of environmental damage by sector

The previous section examined internalisation of environmental damage on a policy by policy basis, but this is only part of the story and so can be misleading because:

- A single policy can lead to internalisation of environmental damage associated with other policies. For example, the ETS provides a price signal relevant to all climate policies.
- Member States have a capacity and responsibility to apply price signals to environmental damage through price signals, such as green taxes

The following provides an overview of the level of environmental externalities, and their internalisation by sector, with further analysis presented under the evaluation questions in the following sections.

Estimates of environmental damage

The EEA has recently provided an update of the environmental damage costs associated with the negative impacts of air pollution caused by Europe's industrial plants. Methods of estimating the damage or 'external' costs associated with industrial pollution's impacts on human health, ecosystems, infrastructure, and climate continue to evolve. The European Environment Agency has recently presented the latest assessment of the trends of externalities of industrial air pollution caused by over 10 000 facilities during the last decade (2012-2021)[62].

Some key messages are that:

- Europe's industry has made significant progress in reducing environment and climate impacts. Over the last decade, external costs caused by air pollution from industry decreased by nearly 35 %, although they have rebounded after a drop in 2020 driven by lower economic activity in Europe during the COVID-19 pandemic.
- Almost 80 % of the decrease of total external costs during the last decade occurred in the energy sector (thermal plants generating electricity and heat). This has been driven by the successful implementation of best available techniques (BAT) in the sector and a shift to less polluting and carbon-intensive fuels driven by environmental and climate policy. Other industrial sectors have consequently a lower relative reduction in external costs and there may still be more potential for improving environmental performance.
- Just over a hundred of the circa 10 000 facilities addressed in the EEA study are responsible for 50% of the aggregate damage caused by their air emissions.

However, the external costs are still significant. During the last ten available years in the European Industrial Emissions Portal (2012-2021)[63], industrial air emissions had an estimated external cost between €2.7 and €4.3 trillion, or on average, between €268 and €428 billion per year. These external costs have decreased consistently (-33 %) over the decade. This suggests that policies to mitigate and control pollution as well as other factors such as use of less carbon intensive fuels, have had a positive impact, leading to decreased environmental

61 See in particular paragraph 4: The aid shall not relieve undertakings that generate waste from any costs or obligations relating to the treatment of waste for which they are liable under Union or national law, including under extended producer responsibility schemes, or from costs that should be considered as normal costs for an undertaking.

62 https://www.eea.europa.eu/publications/the-cost-to-health-and-the

63 European Industrial Emissions Portal (https://industry.eea.europa.eu/)

damage and associated societal costs. However, significant costs persist, indicating the need for continued action to further reduce pollution levels and associated impacts. In 2021, the external costs of industrial air pollution from those large industrial operators included in this study were equivalent to approximately 2 % of the EU's GDP.

The updated assessment also identifies the sectors with the highest externalities. Over the decade (2012-2021), the highest external costs were caused by the energy sector, followed by heavy industry, fuel production and processing, light industry, waste management, livestock and wastewater treatment.

The ranking of relative contributors to the total damage costs is the same in 2021, but the energy sector has been cutting emissions at a higher rate than the other sectors. Almost 80 % of the decrease of total external costs during the study period corresponds to this sector. This has been driven by the successful implementation of the best available techniques (BAT) in the sector via European environmental legislation from the last decades, including the large combustion plants Directive (2001/80/EC) or LCPD and earlier legislation tackling large power stations as well as the Directive on integrated pollution prevention and control (96/61/EC) or IPPCD and more recently the IED[64]. Climate policy has also played a major role in the shift from coal to natural gas (as a transitionary fuel) and the boost of renewables of the last 25 years, which has also contributed successfully to the reduction of air emissions from power stations.

Whereas the energy sector has always represented the biggest source of external costs from industrial air emissions (around 50 %), other sectors have become increasingly important as their relative decrease in external costs has been lower and they now represent a bigger proportion of industrial pollution. The need for tighter control and better environmental performance was also one of the key themes in the Commission's proposal for the revision of the IED, which has a strong focus on the need of applying the most stringent emission limits and of reducing the opportunity of using derogations[65].

In 2021, the main polluting facilities were located in Germany, Poland, Italy, France, and Spain. These countries have the largest facilities and highest number of facilities reporting to E-PRTR. When these costs are compared to GDP as an indicator of relative environmental performance per unit of national economic output, the top five comprises Bulgaria, Poland, Estonia, Greece, and Cyprus[66].

Estimates for other environmental media or sectors are not always available or comprehensive, but where they exist they tell the same story of significant costs that are not internalised i.e. the polluter pays principle is not applied to them. This includes:

- 60-70 % of EU soils are in unhealthy condition and costs associated with soil degradation in the EU exceed 50 billion € per year[67]
- There are costs of at least EUR 169 billion per year due to poor management of oceans such as over-exploitation of fisheries, nutrient pollution and invasive marine species carried in ship ballast water[68][69]

64 https://environment.ec.europa.eu/topics/industrial-emissions-and-safety/industrial-emissions-directive_en#evaluation

65 https://www.consilium.europa.eu/en/press/press-releases/2023/11/29/industrial-emissions-council-and-parliament-agree-on-new-rules-to-reduce-harmful-emissions-from-industry-and-improve-public-access-to-information/#:~:text=First%20adopted%20in%202010%2C%20the,for%20a%20toxic%2Dfree%20environment.

66 https://www.eea.europa.eu/publications/the-cost-to-health-and-the

67 Mission Board Soil health and food, 'Caring for Soil is Caring for Life', European Commission, Directorate-General for Research and Innovation, 2020.

68 UNDP and GEF (2012), Catalysing Ocean Finance Volume I Transforming Markets to Restore and Protect the Global Ocean United Nations Development Programme, http://www.thegef.org (accessed on 29 March 2019).

69 Barbier et al. (2018), How to pay for saving biodiversity.

- According to a recent study, “social and environmental costs from the emission of GHGs are not consistently incorporated into the cost structure of the agri-food value chain, and thus are a burden on other market participants, future generations, and the ecosystem.” It goes on to state that “Polluter pays policy options can close the gap between market prices and the true cost of agri-food goods by quantifying and monetizing them.” This study[70] also found that “While the CAP is an important policy framework to support farmers in adopting more climate-friendly practices, it was not designed specifically to address GHG emissions. Rather, its aims to cover a multitude of objectives including environmental objectives such as biodiversity, as well as social and economic objectives for rural areas. The need to introduce an additional policy tool in the farming sector, and its form, need to be assessed considering synergies and complementarity with the CAP, applying the polluter pays principle may be able to support the CAP in facilitating its climate-related objectives. However, in the case of the introduction of a PPP based policy instrument, it will need to be designed in a way to both support and avoid undermining the economic and social objectives of the CAP.”
- The total external costs of transport for EU28 for road, rail, inland waterway transport, aviation and maritime amount to € 716 billion, which corresponds to 4.8% of the total GDP in EU28. The congestion costs amount to another € 271 billion for 2016 (delay costs generated by road transport modes). The total external costs including congestion costs sum up to € 987 billon (6.6% of the GDP).[71]

Estimates of degree of internalisation for environmental damage

The most systematic assessment of whether there is full internalisation of external costs was published in 2021[72]. Some of the key findings in this study were that:

- Comparing estimates of the external costs of air and water pollution, GHGs, water abstraction, waste management and the management of biodiversity with the environmental taxes and other forms of pricing to which polluters are subjected shows clearly that EU polluters are not being made to pay in full. Of the total (and partial) cost estimates provided of at least €750bn per year, well under half is internalised in some form of economic instrument.
- Internalisation rates are highest overall with regard to the costs of air pollution and GHGs, but even here they reach only 44% economy-wide across the EU, and with wide variation between Member States and between economic sectors. In other areas, internalisation rates across the EU are even lower. It is notable that households (which in this study includes costs and revenues related to household use of transport fuel in passenger vehicles) both EU-wide and in most Member States contribute substantially more in revenues in relation to their air pollution and GHG costs than do sectors like industry, energy or agriculture. The internalisation rate of water pollution costs reaches 16% for point sources, linked to households and industry, but is negligible for non-point sources associated with the agriculture sector, which is by far the major source of pollution.
- For the external costs of waste management, the internalisation rate is less than 1% across the EU, and less than 5% in most Member States (although it is notable that these figures exclude significant revenues related to waste that are collected by actors other than national governments).
- Estimates for water scarcity and biodiversity are harder to derive, but case study approaches suggest that in these sectors the internalisation rates are also extremely low. For water scarcity, the study found internalisation rates of just 2-3% across the

70 https://climate.ec.europa.eu/news-your-voice/news/looking-how-mitigate-emissions-agriculture-2023-11-13_en

71 - Handbook on the external costs of transport – January 2019

72 Ensuring that polluters pay - European Commission (europa.eu)

case studies, representing some €3-4 billion of external costs that are unpriced in the five case study regions alone. Similarly, the assessed existing forest charges in Europe are significantly lower than the value of ecosystem services from forests identified in the literature (albeit these are highly site specific).

Overall, providing accurate figure on the environmental damage costs and the rate of internalisation is methodologically challenging, but the evidence suggests that polluters are far from internalising the costs of pollution across Member States, pollutants and sectors.

Estimates of degree of internalisation for sanctions

In general, the state of play for individual legislation (section 4.2) shows that there are limited examples of sanctions used to apply the PPP in EU policy. The dominant examples are the use of sanctions under the ELD and ECD but references to infringements by the polluter and the use of sanctions to address infringements were also identified for Single-use plastics Directive, Extractive Waste Directive, and the Safety of Offshore Oil and Gas Operations.

In such cases, the provisions stipulate that the polluter is financially liable where pollution has not been addressed in accordance with the requirements of the legislation. However, only in the case of the ECD and ELD do the provisions stipulate that authorities may recover retrospective costs (which is understood to encompass enforcement costs and costs of remedial action). In other cases, sanctions are used to address the costs of pollution control and prevention and/ or environmental damage only. Rather the review of legislation shows that sanctions to enforce legislation do not typically apply the PPP but are more commonly used to enforce the requirements of the legislation with no specific mention of how costs of environmental damage shall be addressed by the polluter as a result of the breach. In such cases, where Member States are fined for failure to implement a policy, the PPP is not applied in policy, i.e. where Member States are fined for failure to meet recycling or landfill targets and ineffective management.

The limited examples of criminal sanctions thus penalties under the ECD and sectoral legislation such as the IED, which are considered as MBIs according to the BR guidelines**, do not typically apply the PPP**. Instead there are so far only used to enforce the requirements of the legislation with no specific mention of how costs of environmental damage shall be addressed by the polluter as a result of the breach. While the use of sanctions is reviewed as part of the evaluation analysis for EQ1b, EQ2b and EQ6a, an outline of the key issues regarding the use of sanctions to apply the PPP is provided here, referring to the examples of sanctions under the ECD and ELD.

Sanctions under the Environmental Crime Directive and Environmental Liability Directive

Under Directive 2008/99/EC, there is no comprehensive data about the amount of penalties imposed under the ECD compared to the amount of environmental damage occurred by the infringements. Moreover, the large scope for the transposition of the ECD means that the sanctions imposed in criminal proceedings vary considerably between Member States. Accordingly, the 2020/2021 evaluation of the Directive concluded that the extent to which the ECD applied the PPP was very limited. Sanctions fully implement the PPP if they include (as part of the main or as a side penalty) the remedy of the damage caused or compensation of the clean-up costs. Application of the PPP is improved by the current ECD reform, particularly the optional accessory remediation or compensation sanction for environmental damage recommended therein.

Member States were not obligated under Directive 2008/99/EC to consider the damage caused when determining the sanction – and this approach was considered not effective[73]. The ECD only stipulated in its Articles 5 and 7 that “Member States shall take the necessary

[73] European Commission, Evaluation of the Directive 2008/99/EC of the European Parliament and of the Council of 19 November 2008 on the protection of the environment through criminal law, p. 47f

measures to ensure that the offences are punishable by effective, proportionate and dissuasive criminal penalties." while the PPP is not mentioned in the recitals or the text[74]. The same applies to the Art 79 IED as an example of provisions on sanctions in sectoral legislation (additional to the ECD as horizontal policy[75].

According to the 2020/ 2021 evaluation of the ECD these criteria are defined as following:

- **Effectiveness**: criminal sanctions are sufficient to ensure compliance with law. Criminal sanctions should, however, be considered as part of a sanctioning system that also includes administrative and civil sanctions, as well as accessory sanctions.
- **Proportionality**: criminal sanctions adequately reflect the gravity of the violation and do not go beyond what is necessary to achieve the desired objective. Taking account of the existence of aggravating and mitigating circumstances is essential in this respect, along with other elements that provide the criminal judge with the necessary tools to adapt the actual sanctions to the circumstances of the case.
- **Dissuasiveness**: criminal sanctions prevent the offender from repeating the offence and prevent other potential offenders from committing a similar offence. It is also important that the sanctions more than outweigh the benefits/gains expected by the offender.[76]

Thus, the application of the PPP is not an explicit element of any of these definitions.

According to the 2020/2021 evaluation, the fact that the PPP is not an explicit element of any of these definitions has led to the implementation of the PPP fully depending on the Member State transposition, which was mostly lacking. The inconsistent approach to imposing penalties under the ECD has led to examples where the scale of sanctions imposed do not always correlate to the damage caused. One case study which was presented as a positive example of a serious sanction demonstrates the missing correspondence between the amount of penalty and the damage caused. A practitioner in an interview gave as an example a case on waste crime in a port. The prosecutor had asked for imprisonment of 4 months to 1 year while the costs of cleaning up the waste that was left was estimated at EUR 16 million. The case ended with prison sentences of 2 years, 3 years and 5 years, and fines of EUR 600 000. On the other hand, another case study concerning glass eels trafficking provides evidence that the scale of sanctions imposed do correlate to the damage caused, thus demonstrating how the use of sanctions can be used to apply the PPP effectively. The polluters were sentenced to pay damages to victims (professional organisations and associations) up to an amount of EUR 230 000 to compensate for moral and ecological damage. (European Commission, 2020)[77] It is argued in the evaluation based on stakeholder views and use case that Member States with low legal penalties might provide for **additional accessory sanctions** to be imposed in criminal proceedings. These can even be more deterrent than the actual criminal sanction, in particular with regard to legal persons[78]. In France, although the sanctions applicable to natural persons can be rather low for some environmental crime categories, the **criminal judge would typically also order the remedy or compensation of**

[74] Directive 2008/99/EC on the protection of the environment through criminal law

[75] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

[76] European Commission, Evaluation of the Directive 2008/99/EC of the European Parliament and of the Council of 19 November 2008 on the protection of the environment through criminal law, p. 44

[77] European Commission (2020) Evaluation of the Environmental Crime Directive. SWD(2020)259. https://commission.europa.eu/document/download/9a390ce4-a593-4764-823d-a69bc82e17b8_en?filename=evaluation_-_swd2020259_-_part_1.pdf

[78] European Commission, Staff Working Document Impact Assessment Report accompanying the document Proposal for a Directive on the protection of the environment through criminal law and replacing Directive 2008/99/EC, p. 51

the environmental damage, so-called "préjudice écologique" which was considered as more dissuasive than the main fine.

The sanctions under the current reform proposal of the ECD which will be adopted in 2024 partially implement the PPP[79].

It improves the material legal application of the PPP by including minimum and maximum sanctions, and the consideration of the voluntary remediation of the damage as a mitigating factor according to its Article 9. In this context, the remediation of damage which is obligatory under the Art 6(1) ELD is therefore excluded as a mitigating factor.

Additionally, ECD Article 3 (6) to assess whether the quantity is negligible or non-negligible, means that the cost of restoration of environmental damage, when quantifiable, shall be considered. It also increases the scope of environmental infringements which can be sanctioned, extending the costs of environmental damage to which the PPP can be applied.

Most importantly, Article 5 (6) stipulates that Member States shall take the necessary measures to ensure that natural persons may be subject to additional criminal or non-criminal sanctions or measures which may include the obligation to reinstate the environment within a given period of time, provided that the damage is reversible, or, where the damage is irreversible, the obligation to compensate costs linked to the damage to the environment. This will improve the application of the PPP and contribute to more effective and dissuasive and proportionate sanctions, as they provide the criminal judge with a toolbox from which he could choose the most appropriate and dissuasive ones adapted to the individual case[80].

However, this strengthening of the application of the PPP is endangered by the fact that the damage caused is still only optionally considered if the Member State decides to transpose this part into national law and the new minimum max sanctions do not necessarily equal the often very high amount of damage. Therefore, this can only be seen as a partial implementation of the PPP, which leads in turn to an insufficient improvement of the dissuasiveness of the sanctioning.

Moreover, the implementation of this provision into national law enhances the PPP – which only says that the costs of pollution must be borne by the polluter-, but it might endanger the application of the ELD's principle of reduction of net loss of biodiversity. The conditions under which the obligation to restore nature are different under the two instruments, the latter requiring a criminal conviction. In addition, the environmental scope of application of the two Directives overlap but are not identical[81]. It can lead to the same results when the criminal court orders the reinstatement of the environment, which means that the application of the PPP is ensured, either within the criminal or administrative procedure. However, the effect of the Directives might be divergent as the interpretation of irreversibility of the damage, leading to a condemnation to pay compensation instead of remediation, is not defined in alignment with the ELD. Moreover, in the case that both Directives would find the remediation impossible, the ECD leads to compensation instead of in-kind remediation in the form of complementary or compensatory measures under the ELD. [82]

There is no further procedural clarification in the reformed ECD nor in the ELD concerning the interplay of the ECD criminal procedure and the ELD administrative procedure. The reformed ECD only states in its Recital 14b that 'Accessory sanctions or measures could, without prejudice to the requirements of [the ELD] include a requirement to reinstate the

[79] Council of the European Union, Proposal for a Directive of the European Parliament and of the Council on the protection of the environment through criminal law - General approach

[80] European Commission, Staff Working Document Impact Assessment Report accompanying the document Proposal for a Directive on the protection of the environment through criminal law and replacing Directive 2008/99/EC, p. 51

[81] Idem, p. 50

[82] Ongoing ELD impact assessment of EU Commission, not yet published

environment where the damage is reversible, and a requirement to provide compensation where the damage is irreversible, or the perpetrator lacks the capacity to carry out a reinstatement'.

The current ELD evaluation shows that interaction of national ELD legislation with national criminal legislation has affected the effective implementation of the ELD in some Member States due to procedures in national criminal legislation. For example, civil judicial proceedings pursuant to ELD legislation concerning damage from a wastewater treatment plant in the Brussels-Capital Region were stayed in 2016 due to pending criminal proceedings. The Brussels civil court concluded that there could be contradictory decisions, if it ruled that the operator and/or other defendants did not commit an extra-contractual fault and the criminal court ruled that they committed a criminal offence – which implied a civil offence. The civil proceedings have not been reactivated. Further, a halt of enforcement of national ELD legislation until the police had finalised investigating an environmental damage incident and the police not sharing information about the case until a prosecution has been finalised was reported in some Member States[83].

A use case concerning a French sugar refinery demonstrates another issue on interaction between criminal and ELD proceedings. Therein, the intervening Belgian authorities presented a remediation plan and budget, but the judge only agreed to grant half the amount in the proceedings[84]. The criminal judge has more arbitrary power then the administrative authority to define the compensation amount, not necessarily allowing to repair the damage. The ELD contains a definition of the concept 'restoration of the environment' and how to achieve it, but this is not referenced in the new ECD text[85].

Another issue which can also be exemplified by the glass eels case mentioned above is the difficulty of the criminal judge to distinguish between compensation for health, economic and moral damage to associations and the compensation for ecological damage to society as a whole targeted to be used for environmental rehabilitation purposes. This is intertwined with the procedural fact that the way the ELD mainly interacts with procedures under national criminal legislation is the application by a person that has a civil claim for monetary compensation for prevention and remediation measures to be a party to criminal proceedings against the operator that caused environmental damage.[86]

This means that while the 2024 ECD reform is a step forward to enforce the application of the PPP, the in-kind remediation measures and thus prevention of net loss of biodiversity foreseen in the ELD could be effectively hindered on a practical implementation level. To prevent such a negative effect, specific provisions on the procedural interface of the two Directives (as well as other sectoral Directives), or common guidelines could give helpful guidance to Member States[87].

[83] Ongoing ELD impact assessment of EU Commission, not yet published

[84] Ongoing ELD impact assessment of EU Commission, not yet published

[85] European Commission, Staff Working Document Impact Assessment Report accompanying the document Proposal for a Directive on the protection of the environment through criminal law and replacing Directive 2008/99/EC, p. 50

[86] [86] Ongoing ELD impact assessment of EU Commission, not yet published

[87] European Commission, Staff Working Document Impact Assessment Report accompanying the document Proposal for a Directive on the protection of the environment through criminal law and replacing Directive 2008/99/EC, p. 55

5. Evaluation findings

5.1. Introduction

The following sections set out findings for the fitness check evaluation questions (EQ). The purpose of the fitness check is to assess the implementation of the PPP in EU environmental policy including selected EU funding programmes. This analysis was carried out according to the five evaluation criteria of the Commission's Better Regulation Guidelines: effectiveness, efficiency, relevance, coherence and EU added value. By criterion, the purpose of this analysis is to:

- Effectiveness: assess the extent to which the PPP is applied in EU policy and whether the way the PPP has been applied has contributed to the reduction of pollution.
- Efficiency: review whether the way the PPP has been applied is fair and consistent with a just transition, and whether EU policy could be made more efficient via recourse to the PPP.
- Relevance: review whether the PPP is consistent with the current, new and emerging environmental needs and other related issues.
- Coherence: assess the coherence of the application of the PPP, in terms of how well or not EU policies work together to apply the PPP to address costs of pollution in and outside the EU.
- EU added value: review the extent to which Member States would have been able to apply the PPP in national policies without EU action.

The evaluation question matrix contained in Appendix 1 sets out the approach to the evaluation in more detail. The responses to each question are then presented in subsequent sections, structured by the five evaluation criteria. Each EQ is introduced with a summary of findings together with an assessment of their robustness and overview of the evidence sources used. The assessment of robustness is based on expert judgement according to the following criteria:

- Strong: Robust evidence base to inform the analysis with clear causal chain established between evidence and outcomes described for the analysis.
- Medium: Limitations apply to the evidence base used to inform the analysis and some ambiguity in the causal chain established between evidence and outcomes described for the analysis.
- Weak: Severe limitations apply to the evidence base used to inform the analysis and weak causal chain established between evidence and outcomes described for the analysis.

The evidence sources primarily include literature and data sources as well as stakeholder feedback gathered from a call to evidence, public consultation, two workshops and a series of interviews.

5.2. Effectiveness

With reference to the state of play (section 4.2), this criterion examines the extent to which the PPP is fully applied in all policies impacting on environmental protection and the improvement of the quality of the environment.

5.2.1. EQ1. The extent to which the PPP is fully applied in all policies impacting on environmental protection and the improvement of the quality of the environment

This question is answered via several sub questions, where we reviewed:

a) The extent to which the PPP is implemented in EU policy. This includes a review of how the PPP is referenced in the legal provisions together with a review of how the PPP is applied via the policy provisions based on the description included in section 4 for the state of play.

b) The type of legislative interventions that the PPP.

c) The extent to which Member States have implemented the PPP, where EU policy is active.

d) The level of costs of pollution borne by polluters, based on national expenditure for environmental protection data by Member State and for specific sectors.

e) The way in which the implementation of the PPP has evolved throughout the appraisal period.

Points of comparison: The analysis focusses on the application of the PPP in EU policy and the details of the policy provisions used to do so.

5.2.1.1. EQ1a. To what extent is the PPP implemented in EU environmental policies?

To determine how the PPP is implemented, a review of the legal text was carried out to identify:

- References to PPP in the legal text (recitals and/or articles).
- Policy provisions used to ensure the costs are borne by the polluter (based on the rating in the state of play).

Based on its application, conclusions are drawn on gaps in implementation by policy area and for each of the three cost categories relevant to the application of the PPP. The focus is on the current situation (2023).

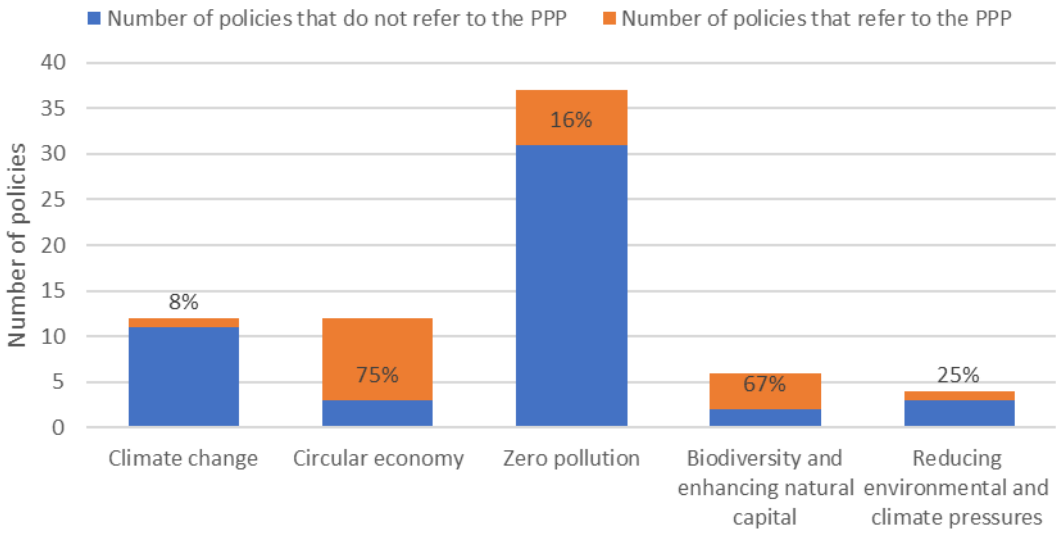
Key finding(s)	Robustness
Based on a review of individual EU policies and their provisions **the PPP is generally well implemented in policies to address the costs of pollution prevention and control** (48 of 72 policies, 67%). Provisions to address the costs of pollution prevention and control are not targeted at the polluter in the case of 5 policies where the costs are borne by the operator or the competent authority.	Strong
There are gaps in how the PPP is implemented in policies to address the costs of administrative measures. This is where monitoring requirements apply at national level and costs of administrative measures are partially (15 policies) or fully (17 policies) borne by competent authorities (44% of policies of the 72 policies reviewed).	Strong
Environmental damage is not addressed by the legislative provisions in 46 policies (64% of total). In some cases, while the specific legislation does not address costs of environmental damage, these costs are addressed by other legislation (e.g. the Emissions Trading Scheme) or by national measures (e.g. green taxes).	Strong
There is potential to strengthen the implementation of the PPP where provisions are incurring a cost that is not borne by the polluter (notably regarding costs for administrative and enforcement measures) and within policy areas defined for zero pollution to water and natural capital and biodiversity.	Medium
There is potential to strengthen the role of horizontal policies that address the costs of environmental damage where a majority of policies are not incurring a cost.	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

References to PPP in the legal text

The PPP is referred to in the legal text of 21 of the 72 policies and strategies reviewed (Figure 5-1). Analysis is grouped by policy area and show many of the policies relate to the 8th EAP priority objectives for circular economy, zero pollution and biodiversity and enhancing natural capital.

Figure 5-1 Number of policies that refer to the PPP in recitals and/ or legal provisions (in the year 2023)



Number of policies with provisions to apply the PPP	0	3	1	1	1
Number of policies with recitals that refer to the PPP	1	8	5	1	1

Source: Logika Group, based on review of policy

Reference to the PPP in the legal text is most commonly done via the recitals (i.e. the legal obligation to apply the PPP is in the TFEU but not the individual policy). This is the case for 16 of the policies reviewed, including: the EU ETS Directive[88] (and the Directive on the aviation's contribution to the emission reduction target amending the EU ETS Directive to include aircraft operators[89]), the Batteries Regulation[90], ELV Directive[91], Landfill Directive[92], SR

88 Recital 32: The PPP is explicitly referenced in the context of extending the scope of Directive 2003/87/EC to maritime transport and where reimbursement for the costs of the vessel energy efficiency measures taken by the shipowner have been sought, that it is in line with the 'polluter pays' principle.

89 Recital 24: Refers in general terms to Article 191 of the TFEU and the aim to preserve, protect and improve the quality of the environment and to protect human health, which includes the PPP.

90 Recital 100: Establishing the need to impose obligations on producers as regards the management of waste batteries in view of the PPP.

91 Recital 2: Establishing the need to introduce an EU framework that is in line with the PPP (and the principle of subsidiarity) to facilitate management of end of life vehicle, covering the design of vehicles for recycling and recovery, to the requirements for collection and treatment facilities, and to the attainment of the targets for reuse, recycling and recovery.

92 Recital 5: Refers to the PPP in the context of addressing damage to the environment produced by a landfill.

Regulation[93], SUP Directive[94], Directive on packaging and packaging waste[95], Extractive Waste Directive[96], WEEE Directive[97], MSFD[98], Water FD[99], EQS Directive[100], IED[101], Eurovignette Directive[102], Regulation on IAS[103], and the ELD[104]. The PPP is also referred to in two of the strategies reviewed (the Biodiversity Strategy and the Soil Strategy).

In six cases, references to the PPP are made in the specific policy provisions (Waste FD, Landfill Directive, Directive on packaging and packaging waste, Water FD, Regulation on Invasive Alien Species, and the ELD) to varying degrees:

- The Waste FD, Landfill Directive and Directive on packaging and packaging waste each require Member States to present information on funding for waste management in line with the PPP in implementation plans. Further, the Waste FD stipulates that the cost of waste management shall be borne by the original waste producer.
- In two cases (Water FD and IAS Regulation), the legislation contains explicit reference to Member State recovery of costs for carrying out the actions required by the policy (including environmental and resource costs from damage), thereby providing Member States with legal provisions to enforce the PPP and recover costs from polluters.
- For the ELD, the PPP is stated in the objectives of the policy as an underlying principle. In legal terms, the effect is similar to references made in recitals.

EU funds and state aid have been reviewed separately from EU policies and thus are not included in the above figure. As regards EU funds, in most cases, no reference to the PPP is made in the underlying legislation (Horizon Europe, CAP, LIFE+, InvestEU, RRF). The PPP is only referred to by Recital 6 of the CPR which refers to the PPP among the underpinning goals and applies to CAP and Cohesion funds as well as explicit reference in the provisions of the JTF legislation as regards green infrastructure and repurposing projects (Article 8) and the recitals of the ERDF and CF legislation. As regards state aid, the PPP is referred to in both the recitals and provisions of the GBER, emphasising the need to comply with the principle (Recital 20), stipulating that state aid shall not be granted for works that the entity would be legally required to carry out under the ELD or according to the PPP (Article 45) and that aid shall not relieve undertakings that generate waste from any costs or obligations relating to the treatment of waste for which they are liable under Union or national law, including under

93 Recital 19: Establishing the need for a financial mechanism to generate resources that would facilitate the environmentally sound recycling and treatment of ships, having regard to the PPP.

94 Recitals 21 and 23: Establishing the need for EPR schemes to cover the necessary costs of waste management and clean-up, and awareness raising, in line with the PPP.

95 Recitals (no numerical reference): Establishing the need for those involved in the production, use, import and distribution of packaging and packaged products to accept responsibility for such waste, in accordance with the PPP.

96 Recitals 25 and 34: Establishing the need for the operator of a waste facility servicing the extractive industries to be subject to appropriate liability in respect of environmental damage caused by its operations or the imminent threat of such damage, in accordance with the PPP and the ELD, while recognising that different national applications of that principle may lead to substantial disparities in the financial burden on economic operators.

97 Recital 2: Establishing the need for preventive action to be taken, and that environmental damage should, as a priority, be rectified at source and that the polluter should pay, in the line with the PPP.

98 Recital 27: measures should be devised on the basis of the precautionary principle and the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay.

99 Recitals 11 and 38: Establishing the need for preventive action to be taken, and that environmental damage should, as a priority, be rectified at source and that the polluter should pay, in the line with the PPP.

100 Recital 6: While recognising the need to develop a cost-effective and proportionate policy on the prevention and control of chemical pollution of surface waters, the need to apply the PPP consistently with the Water FD is noted.

101 Recital 2: That the PPP applies in the context of preventing and reducing industrial emissions.

102 Recitals 1; 12; 13;14 20: Highlighting the fact the full application of the 'polluter pays' and 'user pays' principles, to generate revenue and ensure financing for future transport investments, has been slow and inconsistencies persist in the application of road infrastructure charging across the Union, and establishing the need to strengthen their application with the adopted revisions.

103 Recitals 26 and 33: Noting that the costs of restoration measures should be recovered in accordance with the PPP and that sanctions to enforce provisions of the Regulation should be applied in line with the PPP.

104 Recitals 2 and 18: Establishing the need for costs of prevention and remedial action to be paid for by the polluter and noting that the cost of administrative measures to assess environmental damage should be borne by the polluter as well.

extended producer responsibility schemes, or from costs that should be considered as normal costs for an undertaking (Article 47).

Assessment of policy provisions used to implement environmental policy

The policy provisions used to apply the PPP have been reviewed according to the categorisation described for the state of play (section 4.2). Analysis has been presented by cost category to assess whether the PPP is applied to them: Costs of pollution prevention and control; Costs of associated administrative measures; and Costs of environmental damage.

Costs of pollution prevention and control

The assessment of policy provisions identified policies that have led to pollution prevention and control costs and assessed whether these apply the PPP (in the year 2023). In sum:

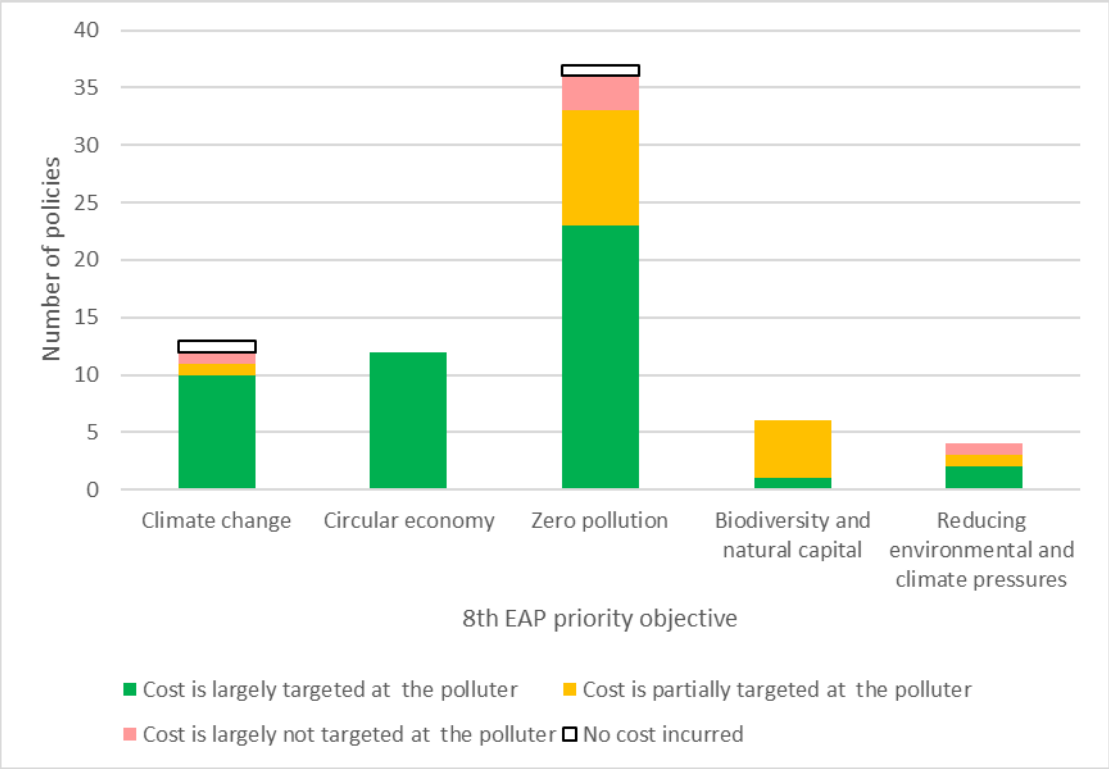
- The PPP is applied to policy provisions that incur costs to prevent and control pollution for 48 policies (67% of the 72 policies reviewed). For example, the IED leads to pollution prevention measures that they pay for. For 16 of the policies reviewed)[105], it would be for Member States to decide on who pays for measures. There are relatively few cases where the PPP does not appear to be applied e.g. the Floods Directive, and in these cases it is not clear how the PPP could be applied (see below).
- The PPP is not applied to policy provisions that incur costs to prevent and control pollution where the costs are borne by the operator (AFI Regulation) or the competent authority (MSFD, Floods Directive, Water Reuse Regulation and the SEA Directive). Provisions to address the costs of pollution control and prevention were not identified in two policies (ETD and Eurovignette Directive). (meaning the costs are not addressed by the policies).
- By policy area, the costs incurred by the provisions are met or largely borne by the polluter for 10/13 climate change policies, all 12 circular economy policies, and 23/37 zero pollution policies[106].
- Although not disaggregated in Figure 5-2, within zero pollution, the costs incurred by the provisions are met or largely borne by the polluter for 6/9 air quality policies and 13/14 chemical risk management policies. The provisions to address the costs of pollution prevention and control are often partially directed to the polluter, water quality (6/13 policies) and the PPP is not applied for a further 3 policies (MSFD, Floods Directive and the Water Reuse Regulation). In such cases, the provisions to address the costs of pollution prevention and control are directed at the competent authorities with no reference to how the costs may be borne by the polluter.
- The number of policies and strategies reviewed that contribute to biodiversity and the enhancement of natural capital are small compared to other 8th EAP priority objectives (6/72 policies). Only in the case of the IAS Regulation are the costs incurred by the provisions met or largely borne by the polluter. Three are strategies that outline actions for the Member State competent authority to establish a duty to apply the PPP.
- Of the horizontal policies contributing more generally to reducing environmental and climate pressures, PPP is applied to policy provisions that incur costs to prevent and control pollution for two policies (ELD and EIA Directive), and partially applied for the ECD. Provisions that incur costs to prevent and control pollution in the SEA Directive are incurred by the competent authority, meaning the PPP is not applied.

105Waste FD, MSFD, Water FD, UWWTD, Bathing Water Directive, Drinking Water Directive, EQS Directive, Groundwater Directive, AAQD, NEC Directive, END, Pesticides Directive, Nature Directives, ELD, ECD and EIA Directive

106 Policies that contribute to zero pollution include air quality (6/9 policies) and chemical risk management (13/14 policies). For other policy areas, the provisions to address the costs of pollution prevention and control are often partially directed to the polluter, water quality (5/13 policies) and environmental noise.

A quantitative overview of the policies reviewed is presented in Figure 5-2. showing that many policies are categorised as green or amber where the provisions incur a cost to prevent or control pollution that is borne by the polluter (meaning the PPP is largely or partially applied). A qualitative description for how policies have been implemented the PPP to address these costs is provided for the state of play (section 4).

Figure 5-2 Number of policies leading to pollution prevention and control costs, and whether these apply the PPP (in the year 2023)



Source: Logika Group, based on review of policy

EU funds and state aid have been reviewed separately from EU policies and thus are not included in the above figure. For EU funds, the DNSH principle was found to be relevant to some degree in implementing the PPP and applies to all EU funds reviewed (section 4.2.1.1). For state aid, where exemptions apply, some articles require Member States to comply with the PPP for aid to be declared compatible (section 4.2.1.2).

Costs of associated administrative measures

The assessment of policy provisions identified policies that have led to costs to implement administrative and enforcement measures and assessed whether these apply the PPP (in the year 2023). In sum:

- The PPP is applied to provisions incurring costs for administrative and enforcement measures for 35 policies (49% of the 72 policies reviewed)[107].
- By policy area, the PPP is applied to 9/13 climate change policies, 9/12 circular economy policies, and 14/37 zero pollution policies. Although not disaggregated in

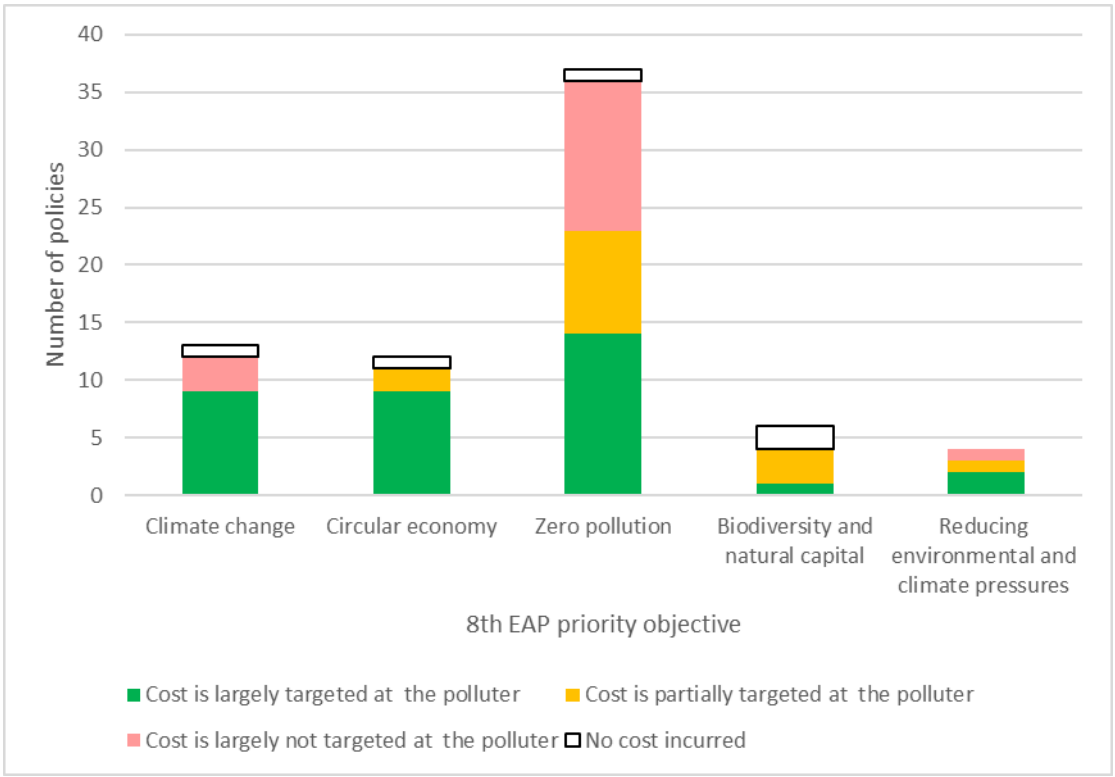
107 EU ETS, CO2 emission performance standards on new cars and vans, Ecodesign Directive, Ecolabel, EED, EPBD, F-gas Regulation, ODS Regulation, RED, WFD (waste), Batteries Regulation, ELV Directive, Landfill Directive, Waste Shipments Regulation, SUP Directive, Directive on packaging and packaging waste, Extractive Waste Directive, RoHS Directive, ND, Safety of Offshore Oil and Gas Operations, Euro Standards Regulation, FQD, PVR Directives, Sulphur Content of Liquid Fuels Directive, REACH, CLP Regulation, Chemical Agents Directive, Cosmetics Regulation, Fertiliser Regulation, Mercury Regulation, Plant Protection Products Regulation, Toy Safety Directive, Regulation on Invasive Species and EIA Directive.

Figure 5-3, within zero pollution, the PPP is applied to two water quality policies, four air quality policies and eight chemical risk management policies.

- For 15 policies (21% of the 72 policies reviewed)[108], the provisions for administrative and enforcement incur costs only partially borne by the polluter, where the provisions were also found to incur costs borne by competent authorities.
- For 17 policies (24% of the 72 policies reviewed), the provisions incur costs which are not borne by the polluter, where the PPP is not applied and measures to monitor and report progress are carried out by competent authorities.[109] Or where there is no provision stipulating that costs to monitor and enforce shall be recovered by the competent authority. Many zero pollution policies are categorised as such, and although not disaggregated in Figure 5-3, this includes nine water policies, two air policies, one noise policy, and two chemical risk management policies.

A quantitative overview of the policies reviewed is presented in Figure 5-3 showing that many policies are categorised as red where the provisions incur a cost to implement administrative and enforcement measures that is borne by the competent authorities (meaning the PPP is not applied). However, policies are mainly categorised as green or amber where the provisions incur a cost to implement administrative and enforcement measures that is borne by the polluter (meaning the PPP is largely or partially applied). A description for how policies have applied the PPP to address these costs is provided for the state of play (section 4).

Figure 5-3 Number of policies leading to costs of administrative and enforcement measures, and how the PPP is applied (in the year 2023)



Source: Logika Group based on review of policy

108 SR Regulation, WEEE Directive, SS Directive, UWWTD, IED, MCPD, Eurovignette Directive, Biocidal Regulation, Pesticides Directive, Export and import of hazardous chemicals Regulation, Seveso Directive, Nature Directives, EU soil strategy (and the Soil Monitoring Law), and ECD.

109 ES Regulation, AFI Regulation, Plastic Bags Directive, MFSD, WFD (water), Bathing Water Directive, Drinking Water Directive, EQS Directive, Groundwater Directive, Ship-source Pollution Directive, Floods Directive, Water Reuse Directive, Floods Directive, Water Reuse Regulation, AAQD, NEC Directive, END, POPs regulation, and the SEA Directive.

EU funds and state aid have been reviewed separately from EU policies and thus are not included in the above figure. The beneficiaries of EU funds and state aid are required to track and report expenditure that contributes to clean-up action, as well as environmentally harmful subsidies and incur the costs of doing so.

Costs of environmental damage

The assessment of policy provisions identified policies that have led to costs to address environmental damage and assessed whether these apply the PPP (in the year 2023). In sum:

- The PPP is applied to policy provisions that incur costs to address environmental damage for 8 policies (11% of the 72 policies reviewed). By policy:
    - The EU ETS places a price on GHG emissions to address the costs of externalities.
    - The Safety of Offshore Oil and Gas Operations and Ship-source pollution Directive states operators are required to take all suitable measures to limit its consequences for human health and for the environment regarding discharges to water and they are financially liable for the consequences.
    - Seveso requires that operators are responsible for site remediation in cessation of industrial activity. Liability regarding the environmental consequences of accidents and incidents is a matter for relevant national law and, where applicable, other relevant Union law. Where such accidents occur, operators are responsible for limiting the consequences for human health and the environment.
    - Cosmetic Regulation states that responsible persons that placed a cosmetic product on the market not in conformity with the Regulation are required to take immediate corrective action (withdraw or recall as appropriate).
    - POPs Regulation requires that stockpiles of POP substances shall be managed by the owner.
    - Annex III of the ELD cites specific activities in scope of the Directive meaning that for some policies, the provisions to establish liability for environmental damage are explicit, including for industrial emissions, discharges to groundwater and surface water, water abstraction, chemical risk management for manufacture, use, storage, and transportation. The ELD is a policy that imposes obligations on operators to make them responsible for damage (to prevent an imminent threat of damage, to undertake immediate limitation measures and/ or remediation measures, including primary, complementary and compensatory remediation), and can apply PPP for environmental damage related (in principle) to other policies, so that they function as a package. The extent to which the ELD is effectively applied to all relevant cases of environmental liability is reviewed as part of a separate evaluation. The focus is here on whether the ELD is facilitating the implementation of the PPP to ensure that costs of environmental damage are borne by the polluter. There are also other policies that apply the PPP to ex-post liability for environmental damage and remediation of environmental damage[110], including through different legal mechanisms than remediation of environmental damage, i.e. through criminal liability for environmental damage, and civil liability for environmental damage. The PPP is applied in the context of liability and/or responsibility for remediating environmental damage by the ELD, the Waste Framework Directive, the Extractive Waste Directive, the Industrial Emissions

110 There are also policies that apply the PPP to responsibility for remediating environmental damage pursuant to the conditions of an environmental permit, such as the Landfill Directive and the Extractive Waste Directive.

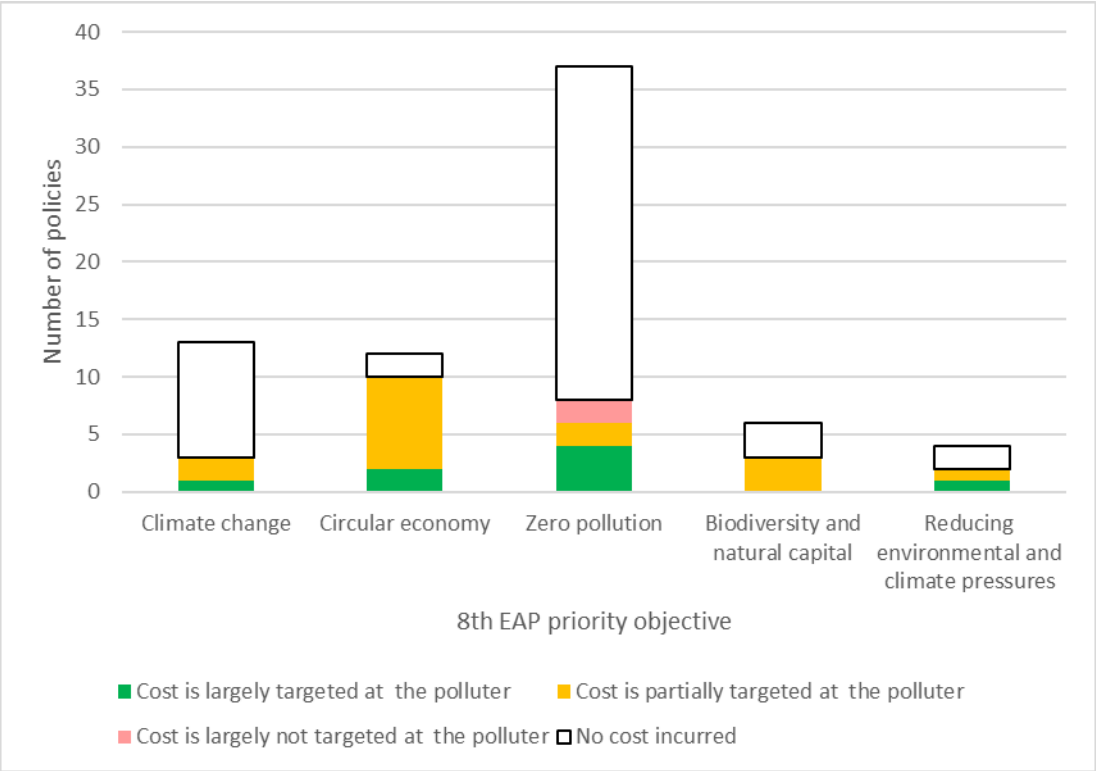
Directive and its proposed revision, the Offshore Safety Directive, the Seveso III Directive, the Landfill Directive, and the Basic Safety Directive. The PPP is applied through criminal liability for environmental damage by the Environmental Crime Directive and its proposed revision, and the Ship-source Pollution Directive and its proposed revision. The PPP is applied through civil liability for environmental damage by the proposed Directive on corporate sustainability due diligence and the proposed revised Directive on industrial emissions.

- The provisions that incur costs to address environmental damage are partially borne by the polluter in 18 policies[111]. E.g. costs are partially borne by the polluter in the cases of the ES Regulation which also places a price on GHG emissions and the Energy Taxation Directive which establishes a framework for the taxation of energy products that includes minimum tax rates.). Another example is the use of extended polluter responsibility (EPR) schemes among 10/12 circular economy policies that include awareness raising measures; waste collection; and clean up costs from litter (including transport and treatment of litter collected). In such cases, EPR schemes do not cover the full environmental impacts of waste generated and thus are only partially addressing the costs of environmental damage.
- For biodiversity and natural capital policies, costs are only partially addressed by the policy provisions. Under the Nature Directives and the IAS Regulation reference is made to policy provisions contained in the ELD.
- For two policies (Drinking Water Directive and Mercury Regulation), the provisions address environmental damage but the cost is incurred by the competent authority.
- The costs of environmental damage are not addressed by the legislation in 46 policies (64% of the 72 policies reviewed) and hence require no costs to be borne directly by the polluter or other stakeholder group. An example is REACH where the policy is intended to manage the use of chemical substances but does not extend to the management of historical chemical use and associated clean-up costs.

A quantitative overview of the policies reviewed is presented in Figure 5-4 , showing that for the majority of the policies reviewed are categorised as white where no cost is incurred to address costs of environmental damage (regardless of whether the PPP is applied). In a few cases, the policies are categorised as red, where the provisions incur a cost to address environmental damage that is borne by the competent authorities (meaning the PPP is not applied). A qualitative description for how policies have been implemented the PPP to address these costs is provided for the state of play (section 4).

111 ES Regulation, Energy Taxation Directive, Waste FD, Batteries Regulation, ELV Directive, Landfill Directive, Ship Recycling Regulation, Waste Shipments Regulation, Single-use plastics Directive, Plastic Bags Directive, Extractive Waste Directive, RoHS Directive, IED, Eurovignette Directive, EU Biodiversity Strategy for 2030 (and the Nature Restoration Law), EU Forestry Strategy for 2030, EU soil strategy (and the Soil Monitoring Law) and ECD.

Figure 5-4 Number of policies addressing environmental damage, and how the PPP is applied (in the year 2023)



Source: Logika Group, based on review of policy

EU funds and state aid have been reviewed separately from EU policies and thus are not included in the above figure. There are provisions to ensure that the use of EU funds and state aid are consistent with the PPP, as described for costs of pollution prevention and control.

Conclusions on EQ1a

Reference to the PPP in the legal text is most commonly done via the recitals (i.e. the legal obligation to apply the PPP is in the TFEU but not the individual policy). Comparing the extent to which the PPP is referenced in policies and in the provisions shows that in the few policies where reference to the PPP is made in the legal text, there are clearly defined provisions to ensure costs are borne by the polluter (across all three cost categories). It is noted that references to the PPP are not exclusive to environmental legislation and is referenced in sectoral legislation as well such as the transport or agriculture sector e.g. in the Eurovignette Directive.

Based on a review of individual EU policies and their provisions to address the costs of pollution prevention and control, administrative and enforcement measures and environmental damage, the PPP is applied in the following ways:

- It is generally well applied to address the costs of pollution prevention and control (48 of 72 policies, 67%).
- It is less consistently applied to provisions that incur costs for administrative and enforcement measures where monitoring requirements apply at national level and costs are partially (15 policies) or fully (17 policies) borne by competent authorities (44% of the 72 policies reviewed).
- The majority of policies reviewed do not contain provisions that address environmental damage (46 policies; 64% of the 72 policies reviewed). In some cases, while the sectoral legislation does not address costs of environmental damage, other pieces of

legislation do cover it e.g. external costs of GHG emissions from industry are addressed by the Emissions Trading Scheme or where external costs of environmental damage caused by industrial emissions are covered by the Environmental Liability Directive – as described for the state of play (Section 4.2).

Based on the findings, there is potential to strengthen the implementation of the PPP:

- Where provisions are incurring a cost that is not borne by the polluter (notably regarding costs for administrative and enforcement measures) and within policy areas defined for zero pollution to water and natural capital and biodiversity.
- Via horizontal policies that address the costs of environmental damage where a majority of policies are not incurring a cost.

5.2.1.2. EQ1b. What policy mechanisms are used to implement the PPP in EU policies?

For the purposes of this analysis, the "policy mechanism" refers to the policy provisions that ensure the costs are borne by the polluter. To respond to this question, the policy provisions used to apply the PPP were categorised to identify common approaches taken. These have been grouped by a standard typology used to define legal instruments (section 1.2.2): command and control, market-based instruments and voluntary actions. The rating used in the state of play (section 4.2) was also used here to identify which policy mechanisms are more effectively used to apply the PPP (i.e. where policy mechanisms are rated 'green' or 'amber'). The focus is on the current situation (2023). The findings identify common approaches to applying the PPP in EU policy and do not provide an indication of their effectiveness. Rather, the extent to which the legal instruments identified are effectively contributing to environmental improvements is examined for EQ2b.

Key finding(s)	Robustness
Command and control mechanisms are most commonly used to regulate the polluter's actions, and therefore **the PPP is most commonly implemented through command and control mechanisms in EU policy** (81 policy provisions identified as implementing the PPP, 76% of the total policy provisions identified as applying the PPP).	Strong
Market Based Instruments (MBIs) that place a cost on externalities are less common (23 policy provisions identified as implementing the PPP, 21% of the total policy provisions identified as applying the PPP). MBIs include tradeable permit schemes, sanctions, subsidies and incentives, liability and compensation schemes and extended producer responsibility schemes, among others. Prominent examples of MBI to apply the PPP relate to climate priorities (under the EU ETS and Energy Taxation Directive), circular economy and waste management policies (e.g., extended producer responsibility and plastic bag fee to implement the Batteries Regulation or Plastic Bags Directive), or sanctions incurred via the Environmental Liability Directive.	Strong
Penalties used to enforce legislation do not typically apply the PPP, with few examples identified where the use of a penalty is intended to address costs of environmental damage where a breach in implementation has led to additional pollution costs.	Medium
Voluntary actions are used to apply the PPP in only three policies. However, there is no mandate incurring costs borne by polluters in these cases suggesting they are not effective in implementing the PPP consistently.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Categorisation of policy provisions used to apply the PPP in EU policies

We further disaggregate specific types of legal interventions used to apply the PPP within the three typologies. These are described below.

Table 5-1 Types of legal interventions to which the PPP is applied in EU policies

Type of legislative intervention	Description of how the legislative intervention is used to apply the PPP
Command and Control	
EU applicable restrictions	Requirement to comply with restrictions e.g., banned substance or restricted use of a substance for specified purposes.
EU authorisation	Requirement to seek prior approval before carrying out an activity e.g., approval to ship waste, or continued use of substances of very high concern (SVHCs).
Targets	Requirement to contribute to the achievement of a target. Targets may be determined at EU level or determined at national level. Targets may apply at EU, national and/ or sector level.
EU framework to guide MS implementation	Requirement to adopt and implement programmes of measures to achieve a shared goal, e.g., achieving national target or adhering to limit values. The EU policy instrument provides a framework for developing the programme of measures without specifying the measures contained therein.
EU standards	Requirement to meet harmonised standards e.g., quality standards, environmental performance, emission limit values.
Permit conditions	Requirement to meet conditions prescribed by permit. Conditions may include compliance with limit values, monitoring and reporting requirements, inspection requirements, among others.
Market based instrument	
Extended producer responsibility (EPR)	In the context of waste management, schemes that require the producer to cover all costs of waste management throughout a products life cycle. Costs include: 'Collection, transport and treatment costs for separately collected waste; Revenue from the sales of the materials Collection, transport and treatment costs for non-separately collected waste covered by EPR (e.g. waste covered by EPR collected with mixed municipal waste); Cost for public communication and awareness raising (on waste prevention, separate collection, etc.); Costs for litter prevention and management; Costs for the appropriate control of the system (including auditing, measures against free riders, etc.) Administrative costs.' (Bio by Deloitte, 2014)
EU labelling	Requirement to comply with labelling specifications.
Liability and compensation schemes	Requirement to take remedial actions and cover any retrospective costs.
Sanctions	The use of penalties or criminal proceedings to enforce requirements that address the costs of pollution.
Subsidies and incentives	Rules used to regulate EU funds and state aid.
Tradeable permit scheme	Establishing a trading system to place a market price on an externality.
Voluntary actions	
Recommendations	E.g. actions outlined in strategies.

Review of the types of legal interventions used to implement the PPP in EU policies

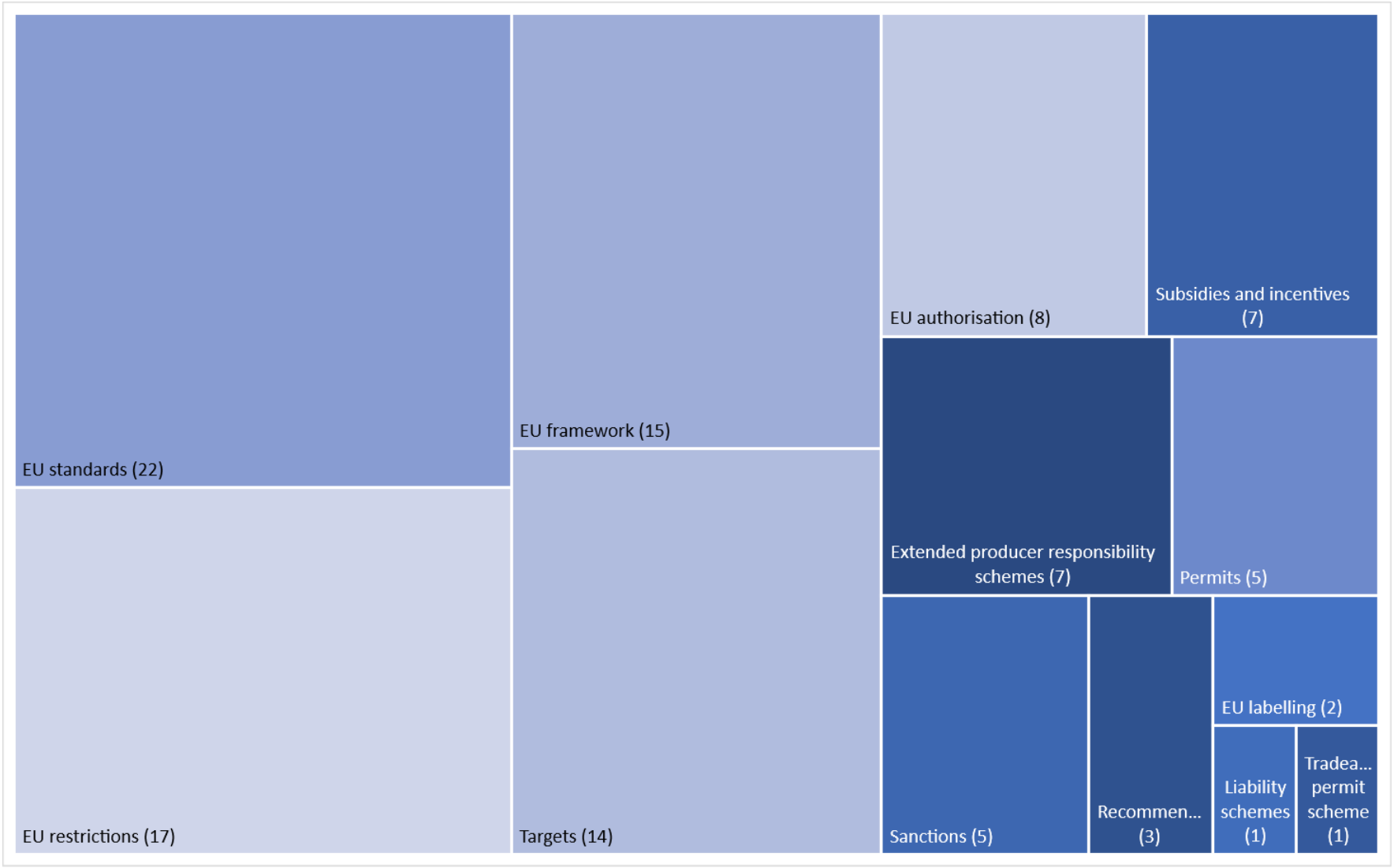
Figure 5-5 presents a quantitative overview of the number of legislative interventions used to apply the PPP. Note that in some cases, more than one type of legislative intervention is used to apply the PPP (thus the total number described exceeds the total number of policies in

scope of the fitness check). Figure 5-5 shows command and control interventions are the dominant approach to applying the PPP (81 legislative interventions used to apply the PPP), with comparatively fewer examples of MBI used to apply the PPP (23 legislative interventions) and voluntary actions (3 legislative interventions). This reflects the fact that command and control mechanisms are most commonly used to regulate the polluter's actions and is not an indication of the effectiveness of a legal intervention to implement the PPP.

Figure 5-6 presents a quantitative overview of the number of legislative interventions used to apply the PPP by 8th EAP priority objective. Note that the use of subsidies and incentives to apply the PPP is included in the overview figure but not by 8th EAP priority objective (as per the grouping of policies, EU funds and state aid used for this fitness check).

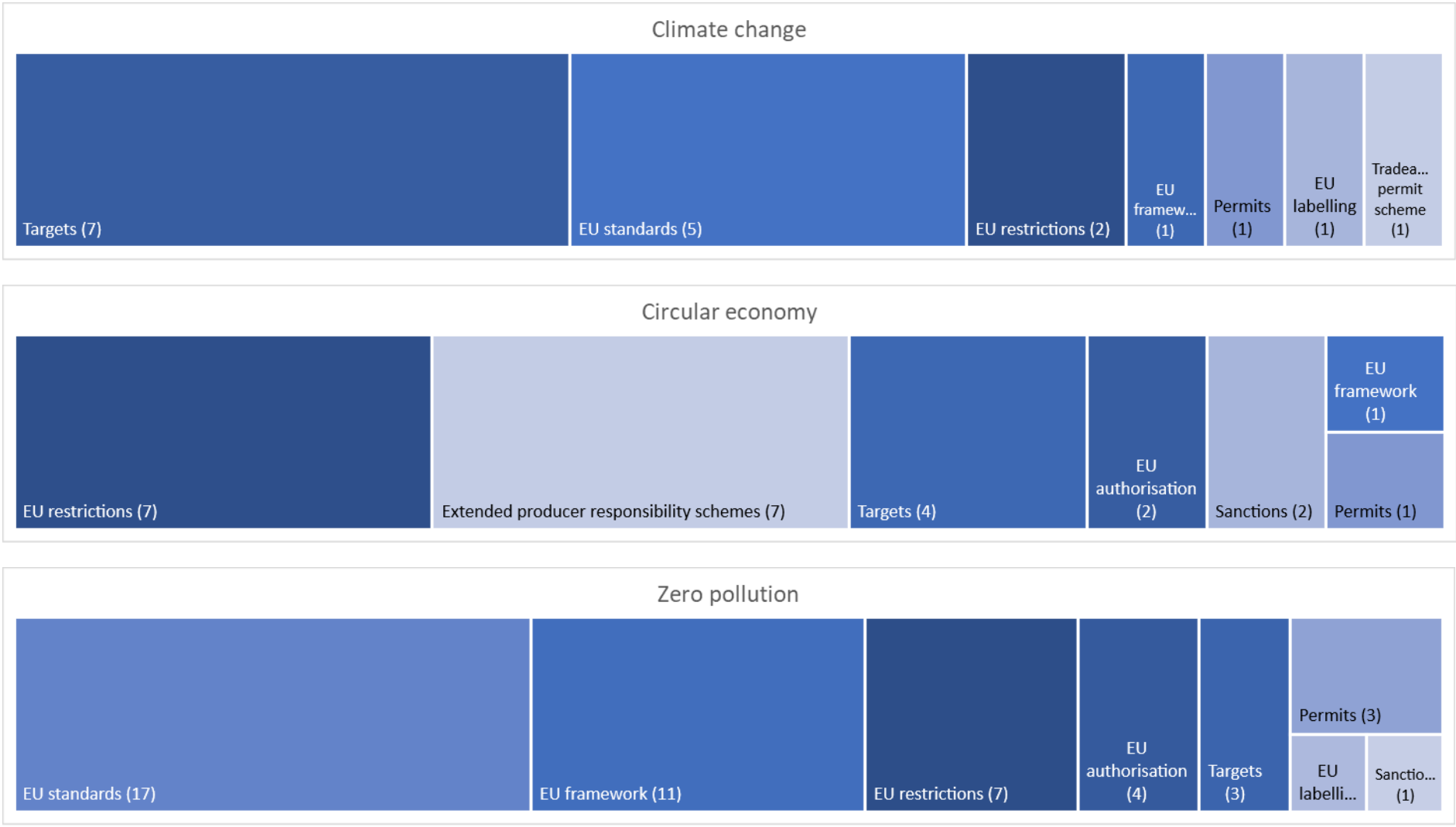
A qualitative description of the interventions used is provided below the figures.

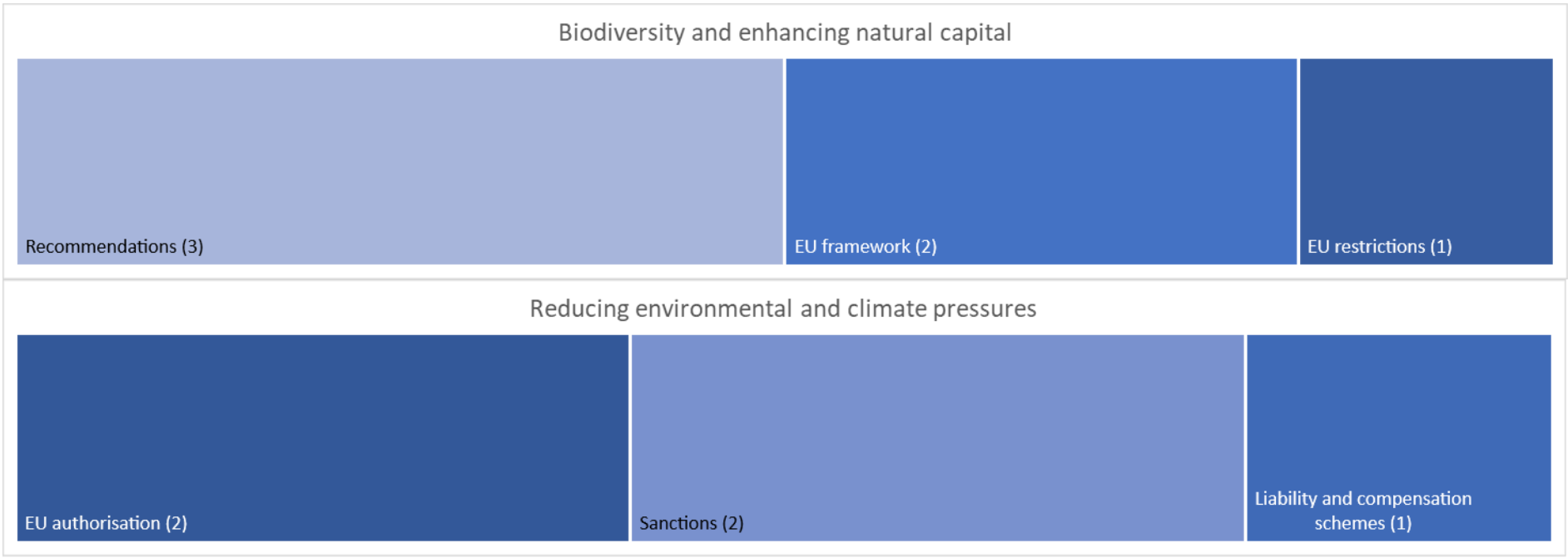
Figure 5-5 Types and number of policy mechanisms used to apply the PPP in EU policies (in the year 2023)



Source: Logika Group based on review of policy

Figure 5-6 Types and number of policy mechanisms used to apply the PPP in EU policies by 8th EAP priority objective (in the year 2023)





Source: Logika Group based on review of policy

Command and control is the most commonly used legislative intervention to implement EU environmental policy and therefore the PPP is most commonly implemented through command and control mechanisms, specifically the use of standards (used in 22 policies to apply the PPP). The category of standards includes performance specifications (12 policies contributing to climate change and zero pollution as regards water, air and chemical risk management) as well as limit values (10 policies contributing to zero pollution as regards water and air). Limit values are used to apply the PPP in policies contributing to zero pollution (water[112] and air policy areas[113]). Standards relating to environmental performance are used to apply the PPP across a broader range of policy areas including climate change[114] and chemical risk management[115], in addition to water[116] and air[117]. Standards are often used in combination with other legal interventions to apply the PPP, including targets (4 policies, all within the climate change policy area[118]), permit conditions (2 policies: IED, MCPD), and more broadly together with EU frameworks to guide Member State implementation (3 policies: ND, AAQD, IED).

Restrictions are also commonly used to implement EU environmental policy and accordingly is the second most commonly used intervention to apply the PPP (17 policies). They are used mainly for policies within the circular economy (8 policies[119]) and zero pollution policy areas (6 policies[120]). Restrictions are also used to apply the PPP in the case of the F-gas Regulation and ODS Regulation (climate change), and the Regulation on Invasive Species (natural capital).

EU frameworks to guide Member State implementation are also commonly used to implement EU policy and accordingly is the third most commonly used intervention for applying the PPP, including for policies contributing to zero pollution (11 policies[121]), climate change (Energy Taxation Directive), circular economy (Waste FD), and enhancing natural capital (Nature Directives).

Targets are another commonly used legislative intervention, relevant to several policy areas (climate change, circular economy, and zero pollution). These are most often national targets which are determined at EU level and specific to a sector (10 policies[122]). Another example of the PPP being applied via national targets which have been determined at EU level is the NEC Directive, which sets Member State specific rather than sector specific emission reduction commitments. Nationally determined targets are less commonly used to apply the PPP (3 policies[123]).

The policy mechanisms included within **MBI**s include tradeable permit schemes, sanctions, liability and compensation schemes and extended producer responsibility (EPR). There are also a number of MBIs that do not involve prices, but rather supporting

112 ND, SSD, UWWTD, Bathing Water Directive, Drinking Water Directive, EQS Directive

113 AAQD , IED, MCPD, Euro Standards Regulation

114 CO2 emission performance standards on new cars and vans, Ecodesign Directive, EED , EPBD, FQD, RED

115 CMR Directive, Chemical Agents Directive

116 Groundwater Directive, Water Reuse Regulation

117 FQD, PVR Directives, Sulphur Content of Liquid Fuels Directive

118 CO2 emission performance standards on new cars and vans, EED, EPBD, RED

119 Batteries Directive, Landfill Directive, Ship Recycling Regulation, Waste Shipments Regulation, Single-use plastics Directive, Plastic Bags Directive, RoHS Directive, Ship-source pollution Directive

120 REACH, Cosmetics Regulation, Fertiliser Regulation, Mercury Regulation, POPs Regulation, Export and import of hazardous chemicals Regulation

121 MSFD, WFD (water), ND, Floods Directive, AAQD, NEC Directive, IED, Eurovignette Directive, END, Pesticides Directive, Seveso

122 CO2 emission performance standards on new cars and vans, EED, EPBD, RED, LULUCF, WFD (waste), ELV Directive, Directive on packaging and packaging waste, WEEE Directive, FQD

123 AFI Regulation, END, Pesticides Directive

markets e.g. through labelling and transparency measures. Prominent examples of MBI to apply the PPP relate to climate priorities (under the EU ETS and Energy Taxation Directive), to circular economy and waste management policies (e.g. landfill tax and plastic bag fee to implement the Waste Framework Directive or Plastic Bags Directive), or sanctions incurred via the Environmental Liability Directive.

For this fitness check, the use of subsidies and incentives has been reviewed in the context of EU funding[124] and state aid. EU funding and state aid contain provisions are designed to ensure consistency with the PPP. For EU funds consistency with the PPP is achieved primarily by applying the DNSH principle as well as tracking expenditure allocated to clean-up actions (section 4.2.1.1). For state aid, where exemptions apply, specific articles require Member States to comply with the PPP for aid to be declared compatible (section 4.2.1.2).

Alongside policies, we find that the PPP is implemented via the three strategies we reviewed for the fitness check. Under the Biodiversity Strategy, the Commission and the Member States are committed to promoting MBIs (specifically tax systems and pricing) that reflect environmental costs, including biodiversity loss to encourage changes in national fiscal systems to shift the tax burden from labour to pollution, under-priced resources, and other environmental externalities. Under the Forestry Strategy and Soil Strategy for example, the role of the ELD and IED in managing environmental damage are emphasised but no specific commitment specified.

Assessment of which policy mechanisms are more effectively used to apply the PPP

We reviewed the extent to which the different policy mechanisms are most commonly used to implement the PPP for the three cost categories. The ratings used to categorise policy provisions for the state of play provide an indication for the extent to which the PPP is applied for each of the cost categories. The ratings 'green' and 'amber' used for the state of play (section 4.2) were used to identify where a policy provision is addressing a cost which is met (fully, largely or partially) by the polluter (compared to the ratings 'red' or 'white').

For the three cost categories a total of 175 legislative interventions were reviewed as largely or partially incurring a cost borne by the polluter across the three cost categories. There are a greater number of command and control legislative interventions used to apply the PPP (Figure 5-7). Command and control mechanisms regulate the actions of the polluter, incurring compliance costs which are borne by the polluter thereby effectively implementing the PPP (e.g. costs to implement best available techniques under the IED are incurred as a result of the permit holder needing to demonstrate compliance with emission limit values).

MBI are less commonly used to apply the PPP. MBI provide an economic incentive for polluters to reduce pollution, thereby effectively applying the PPP (e.g., under the EU ETS, carbon pricing provides an economic incentive for operators to reduce their carbon emissions).

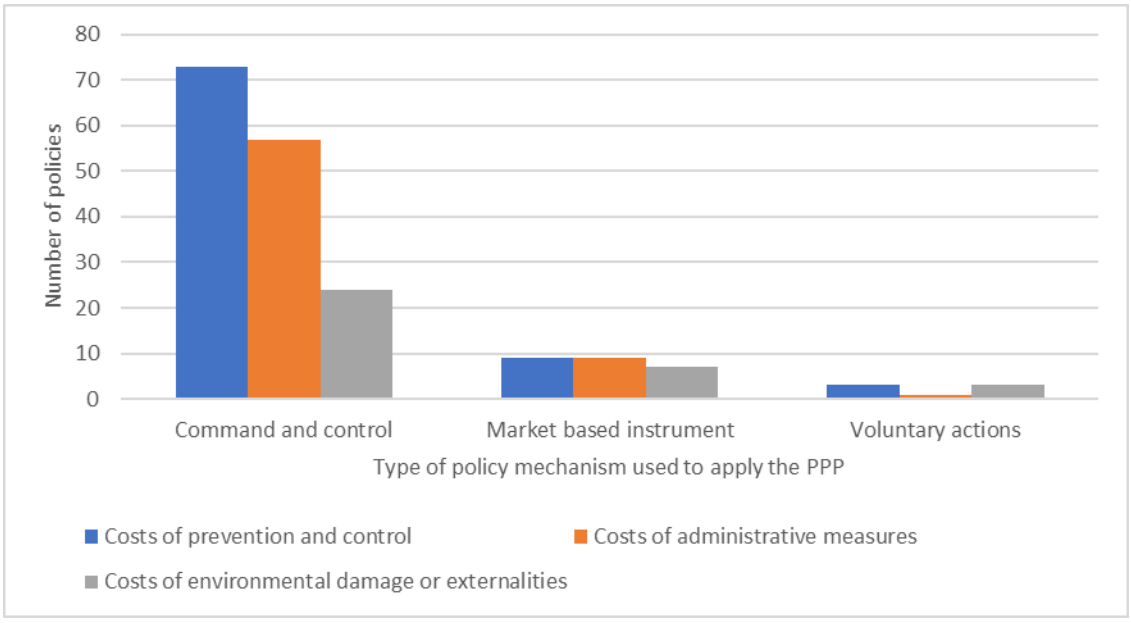
MBI include the use of penalties (where the threat of a penalty incentivises the polluter to take action). The assessment of policy mechanisms distinguishes between the use of penalties to enforce implementation of a policy and the use of penalties to apply the PPP. While policies commonly contain provisions for Member States to use effective, proportionate and dissuasive penalties to enforce implementation of environmental legislation, only five policies were found to use penalties to apply the PPP in the context of addressing the costs of pollution, as follows:

124 Horizon 2020, funding under the Common Agricultural Policy, Cohesion policy funds, LIFE+, InvestEU, and the Recovery and Resilience Facility (RRF)

- Single-use plastics Directive: Extended Producer Responsibility schemes shall include the use penalties to address infringements.
- Extractive Waste Directive - Operators are required to establish an emergency plan to prevent major accidents and minimise the extent, actual or potential, of the environmental damage. Penalties apply in the case of infringements.
- Safety of Offshore Oil and Gas Operations - Financial liability established for the prevention and remediation of environmental damage.
- Environmental Criminal Directive: Polluter may be required to restore nature to its previous condition or compensate for clean-up costs
- Environmental Liability Directive: Costs for undertaking remedial action may be incurred retrospectively where liability is established. The provisions to establish liability for environmental damage are explicit, including for industrial emissions, discharges to groundwater and surface water, water abstraction, chemical risk management for manufacture, use, storage, and transportation.

Three strategies were found to contain recommendations to implement the PPP which were categorised as voluntary actions and rated 'amber'.

Figure 5-7 Type of policy mechanisms used to apply the PPP by cost category (in the year 2023)



Source: Logika Group based on review of policy

The extent to which the policy mechanisms have incurred a cost directed at the polluter together with how they are contributing to environmental improvements provide an indication for how effectively the PPP is applied. This is reviewed for EQ2b on how policy mechanisms used to apply the PPP provide environmental protection and contribute to the improvement of the environment.

Conclusions on EQ1b

The ratings used to categorise policy provisions for the state of play were used to identify where a policy provision is addressing a cost which is met (fully, largely or partially) by the polluter. The extent to which the policy mechanisms have incurred a cost directed at the polluter together with how they are contributing to environmental improvements provide an indication for how effectively the PPP is applied. This is examined for EQ1d and EQ2.

A total of 107 policy provisions were identified as applying the PPP in EU policy. The categorisation of provisions according to the three typologies shows:

- In some cases, more than one type of legislative intervention is used to apply the PPP (thus the total number described exceeds the total number of policies in scope of the fitness check), e.g., in the case of the IED where permits are used together with EU limit values.
- Command and control mechanisms that regulate the polluter's actions are most commonly used to implement environmental policy, and so are most commonly used to apply the PPP in EU policy (81 policy provisions identified as implementing the PPP, 76% of the total).
- MBIs that place a cost on externalities are less common (23 policy provisions identified as implementing the PPP, 21% of the total). MBIs often involve prices and examples include tradeable permit schemes, sanctions, liability and compensation schemes, EPR and subsidies. MBIs also serve to support markets e.g., through labelling and transparency measures. Prominent examples of MBI to apply the PPP relate to climate priorities (under the EU ETS and Energy Taxation Directive), to circular economy and waste management policies (e.g., landfill tax and plastic bag fee to implement the Waste Framework Directive or Plastic Bags Directive), or sanctions incurred via the Environmental Liability Directive.
- Penalties to enforce legislation do not typically apply the PPP, rather they are used to enforce the requirements of the legislation with no specific mention of how costs of environmental damage shall be addressed by the polluter as a result of the breach.
- Of the voluntary actions reviewed there is no mandate resulting in costs which are borne by polluters, suggesting they are not an effective mechanism to apply the PPP.

Working draft

5.2.1.3. EQ1c. To what extent is the PPP implemented by Member States for the legislation covered in 1a?

To answer this question the provisions used to apply the PPP in EU policy have been reviewed to identify first, where there is a significant degree of Member State choice in how they implement the PPP. Second, in such cases, the risks of inconsistent application which is associated with a higher degree of Member State choice of the PPP was reviewed. As before, the effective application of the PPP was assessed based on the extent to which the provisions implemented incur a cost that is borne by the polluter. National approaches to implementation of EU policy national policies themselves are not in scope. Note, we do not suggest that a greater degree of Member State choice is ineffective per se, and we later review this an important aspect of the effective functioning of a specific policy and is in line with the principle of subsidiarity (EQ11).

The degree of Member State choice was reviewed based on the following characteristics:

- The type of legal instrument to implement the policy, i.e. whether it is a regulation, directive or strategy. The use of a directive establishes a common goal together with a framework to guide implementation but ultimately it is for the Member State to identify measures and adopt and implement them.
- Nationally derived targets, where the Member State decides the scale of ambition which ultimately determines the extent to which the PPP is applied (e.g. END which does not set limit or target values for environmental noise, which is for the competent Member State authorities to decide).
- Voluntary participation (where the policy mechanism to apply the PPP is defined but participation is optional).

Conclusions identify EU policy with significant choice in how Member States apply the PPP and the potential this has to influence the effectiveness of its application. The focus is on the current situation (2023). The extent to which differences in Member State implementation of the PPP are effectively contributing to environmental improvements was examined for EQ2b.

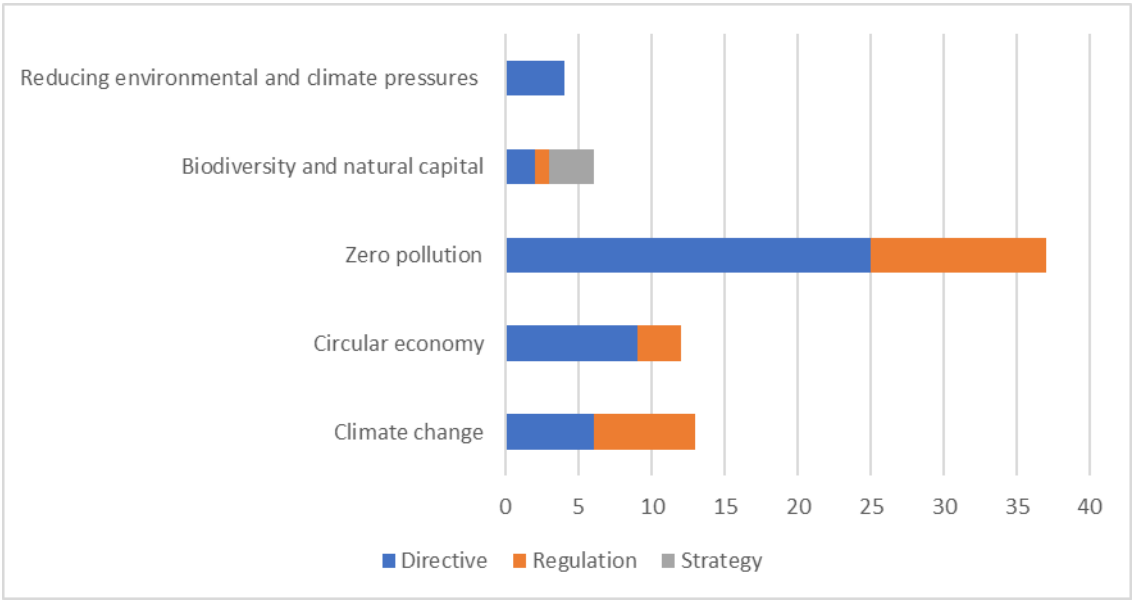
Key finding(s)	Robustness
Member State and regional differences in implementation of the PPP have occurred depending on the stringency of the measures adopted by the Member State to apply the PPP. Differences can be minimised by setting a minimum level of environmental ambition at EU level that determines the scale of cost incurred by the polluter, particularly where command and control instruments are used to apply the PPP.	Strong
For many of the command and control instruments reviewed (e.g. WFD waste, WFD water, AAQD, NEC Directive), **such Member State and regional differences in implementation of the PPP occur based on the design of programmes of measures** irrespective of standards or targets set. Abatement options included in plans may refer to compliance with related EU policy which can minimise Member State differences in how the PPP is applied (e.g., under the regulations that set EU restrictions or authorisations such as REACH).	Strong
For **MBI, there is a greater degree of flexibility afforded Member States in the use and design of schemes which has led to differences in the way they are used** to apply the PPP between Member States and between sectors. The use of minimum rates of excise duty can minimise differences (e.g., Energy Taxation Directive).	Strong
The revenue generated from environmental taxes varies between environmental domain and Member State. Among other things, the ranges are indicative of a varied approach to applying the PPP.	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Type of legal act used

Figure 5-8 shows a majority of the policies are adopted by directive (64%, 46 policies), and the remainder via regulation (36%; 26 policies). In addition, a small number of strategies were reviewed as contributing to the 8th EAP biodiversity and natural capital priority objective (3 examples, not included in the total of policies reviewed).

Figure 5-8 Share of legal instruments used by policies, grouped by 8th EAP priority objective (in the year 2023)



Source: Logika Group based on review of policy

Differences in Member State implementation of the PPP via EU policies

The extent to which the flexibility afforded Member States under a directive impacts on implementation of the PPP varies by policy. We find that the degree of Member State choice in how they implement the PPP is generally minimised where the policy establishes a minimum level of environmental ambition that determines the scale of costs incurred by the polluter. In the case of command and control instruments this is achieved by targets (e.g. target collection rates under the WFD waste), standards (e.g. fuel quality standards under several climate and air quality policies), and permit conditions (e.g. compliance with best available techniques (BAT) under the IED). For MBI, there is a greater degree of flexibility afforded Member States in the use and design of schemes which has led to differences in the way they are used to apply the PPP between Member States and between sectors. For example, costs of wastewater management to industry vary considerable amongst Member States, with operational costs of water in German industries amounting to EUR 21 billion annually comparted to industries in France and Italy spending only 2-3 billion annually[125]. The use of minimum rates of excise duty can minimise differences (e.g. Energy Taxation Directive).

The ways in which EU policy minimises the differences in Member State implementation of the PPP is outlined below.

Table 5-2 :Provisions that minimise Member State differences in applying the PPP via EU policies

Policy	Summary of provisions that minimise Member State differences
EU Emissions Trading System Directive	The cap on GHG emissions that helps create a market price for the externality associated with GHG emissions is determined at EU level. This contributes towards an EU price for carbon to create a common

125 Study on EU integrated policy assessment for the freshwater and marine environment, on the economic benefits of EU water policy and on the costs of its non implementation

Policy	Summary of provisions that minimise Member State differences
	carbon market between Member States, providing consistency between Member States in how the PPP is implemented.
Energy Taxation Directive	Sets minimum rates of excise duty for select products. Member State differences in implementation of the PPP occur where rates are more stringent than those adopted by the policy. Evaluation of the ETD (SWD(2019) 329 final)[126] finds that the minimum rates that apply are low and therefore the use of minimum rates is not effective in achieving consistency in the rates applied by Member States. A revision of the ETD is planned and negotiations are underway following the proposal that was tabled in 2021[127].
Ecolabel Regulation	The requirements of the initiative are adopted by regulation, and we identified no scope of Member State flexibility in how the PPP is applied via the scheme, however participation in the scheme is voluntary. The extent to which participation is encouraged is dependent on the Member State.
Waste Framework Directive	Sets EU mandatory targets for recycling and recovery. However, design and implementation of initiatives that implement the PPP are determined at municipal level. Member State and regional differences in implementation of the PPP occur depending on the stringency of the initiatives (e.g. in the case of taxes or pollution charges).
Marine Strategy Framework Directive	Design and implementation of measures to achieve or maintain Good Environmental Status of EU marine waters that implement the PPP is determined at national level. No provisions to ensure consistency between Member State implementation were identified by the review of policy. Member State differences in implementation of the PPP occur depending on the stringency of measures adopted.
Water FD and sister legislation	The use of objectives (e.g. good status) set in the Water FD and of standards set in sister legislation (GWD and EQS Directive) ensure a consistent degree of ambition in the types of measures adopted by polluters. The design and implementation of programmes of measures to achieve or maintain good chemical and good ecological status of water bodies and then the MS also has some degree of flexibility about how to apply PPP (e.g. water pricing) at river basin level. Member State and regional differences in implementation of the PPP occur based on the design of programmes of measures irrespective of the standards set. Abatement options included in plans may refer to compliance with related EU policy where there is limited Member State choice in how the PPP is applied (e.g. under the regulations that set EU restrictions or authorisations such as REACH).
Nitrates Directive	ND measures are adopted and implemented at Member State or local level meaning that the way the PPP is applied varies considerably, as reflected in the varying compliance costs for farmers between Member States. Compliance costs for farmers and Member State differences are being reviewed as part of an ongoing evaluation (COM(2023)638)[128].
Floods Directive	Design and implementation of flood risk management plans are at local level. No provisions to ensure consistency between Member State implementation were identified by the review of policy. Member State differences in implementation of the PPP occur depending on the stringency of measures adopted.

126 https://commission.europa.eu/system/files/2020-04/swd_2019_0329_en.pdf

127 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0563

128 https://commission.europa.eu/system/files/2023-10/COM_2023_638_1_annexes_EN.pdf

Policy	Summary of provisions that minimise Member State differences
Ambient Air Quaity Directives	The use of emission limit values and target values ensure a minimum degree of ambition in the types of measures adopted by polluters. Design and implementation of air quality plans required in case of their exceedance are used to implement the PPP and are determined at local level. Standards ensure a minimum degree of ambition in the types of measures adopted and compliance costs incurred but Member State differences in implementation of the PPP occur based on the design of plans irrespective of the standards set. Abatement options included in plans may refer to compliance with related EU policy where there is limited Member State choice in how the PPP is applied (e.g. compliance with fuel quality standards).
National Emission Reduction Commitments Directive	Sets national emission reduction commitments. Design and implementation of national air pollution control programmes that implement the PPP and are at national level. The NEC Directive also identifies minimum measures needed by the agricultural sector to contribute to NH_3 emission reductions. National commitments and specified measures ensure a minimum degree of ambition in the types of measures adopted and compliance costs incurred but Member State differences in implementation of the PPP occur based on the design of programmes irrespective of the commitments set. Abatement options included in plans may refer to compliance with related EU policy where there is limited Member State choice in how the PPP is applied (e.g. compliance with permit conditions under the IED).
Industrial Emissions Directive	Permit conditions demonstrating compliance with BAT are used to implement the PPP and are determined at national level. However, conditions must be set according to BAT conclusions adopted by Commission Implementing Decisions that identify relevant techniques and ranges of limit values. Derogations may be granted where an assessment shows that complying with BAT conclusions would lead to disproportionately higher costs compared to the environmental benefits due to the geographical location or the local environmental conditions or the technical characteristics of the installation. Derogations may therefore reduce the compliance costs borne by the polluter thereby resulting in different outcomes for how costs of pollution are addressed by the polluter. A 2021 study on the implementation of the IED found 133 Article 15(4) derogations were granted between 2017 and 2018 for 98 installations in 15 Member States (Belgium, Bulgaria, Czechia, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Portugal, Romania, Spain and Sweden). The largest number of derogations were granted in Sweden, Czechia and Italy and for the glass and paper and pulp IED activities. While the use of derogations will affect how costs of pollution are borne by the polluter, the way in which the PPP is applied is consistent (where there is a framework to ensure derogations are granted where there is evidence of disproportionate costs).
Eurovignette Directive	Establishes a framework for Member States that have introduced road charges (tolls or vignettes). The extent to which tolls are used is left to the Member States discretion meaning there is varying degrees to which the PPP is implemented via the Directive but this is limited as only three Member States do not apply any road charge.
Environmental Noise Directive	Noise quality targets and noise action plans that implement the PPP are determined at national level. Member State differences in implementation of the PPP occur depending on the stringency of measures adopted. The use of Member State discretion to set targets means there is greater degree of ambition in the types of measures adopted may vary. Not only, based on very recent survey, many Member States do not have obligations to implement measures, even

Policy	Summary of provisions that minimise Member State differences
	if they are decided as part of action plans. More ambitious targets require more stringent measures in the action plans which are likely to incur greater costs that are borne by the polluter(s). Abatement options included in plans may refer to compliance with related EU policy where there is limited Member State choice in how the PPP is applied (e.g. compliance with Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems – policy not in scope of the fitness check).
Pesticides Directive	Design and implementation of the measures adopted by national action plans that implement the PPP are determined at national level. Action plans include nationally determined quantitative objectives and targets to reduce risks and impacts of pesticide use. Member State differences in implementation of the PPP occur depending on the stringency of measures adopted. The use of Member State discretion to set targets means the degree of ambition in the types of measures adopted may vary (affecting how the PPP is applied).
Seveso	Provides a framework for identifying, preventing and managing risk of major accidents involving dangerous substances. Member State differences in implementation of the PPP occur depending on the stringency of measures adopted.
Nature Directives	Provides a framework for appropriate assessment procedure to protect habitats that determines how the PPP is implemented. Implementation of the procedure is decided at local level and determines the stringency of measures adopted which in turn influences the degree to which the PPP is implemented.

Differences in revenue from environmental taxes

Underpinning the implementation of EU policies is Member State use of environmental taxes. An overview of the EU policies that refer to the use of fees or charges to enable cost recovery is presented in the table below together with a description of the types of taxes used by Member States. We also identify EU policies that establish a framework for the use of taxes.

Table 5-3 Types of environmental taxes

Tax category	Type of taxes included in the category[129]	Main links with EU policy
Energy (including fuel for transport)	• Energy products for transport purposes (Unleaded petrol, Leaded petrol, Diesel, Other energy products for transport purposes (e.g. LPG, natural gas, kerosene or fuel oil)) • Energy products for stationary purposes (Light fuel oil, Heavy fuel oil, Natural gas, Coal, Coke, Biofuels, Electricity consumption and production, District heat consumption and production, Other energy products for stationary use) • Greenhouse gases • Carbon content of fuels • Emissions of greenhouse gases (including proceeds from emission permits recorded as taxes in the national accounts)	• ETD - *framework for the taxation of energy products including electricity, motor and most heating fuels* • *Carbon pricing instruments complement the EU ETS and ES Regulation*
Transport (excluding	• Motor vehicles import or sale (one off taxes) • Registration or use of motor vehicles • Recurrent (e.g. yearly taxes)	• Eurovignette – *Framework for Member States that introduce road charges (tolls or vignettes).*

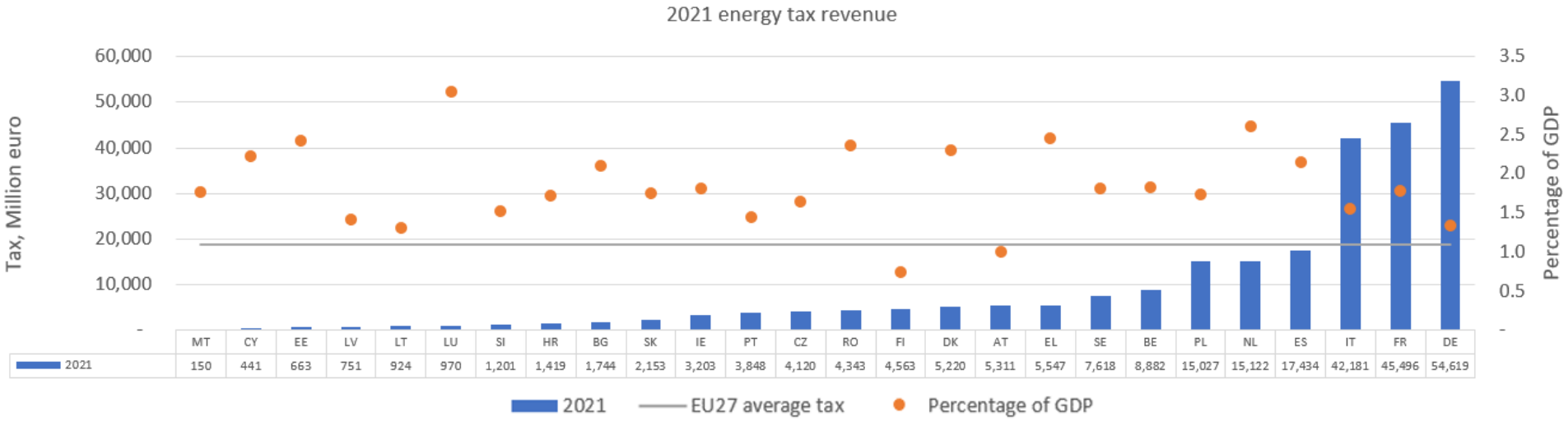
129 https://ec.europa.eu/eurostat/cache/metadata/en/env_ac_tax_esms.htm

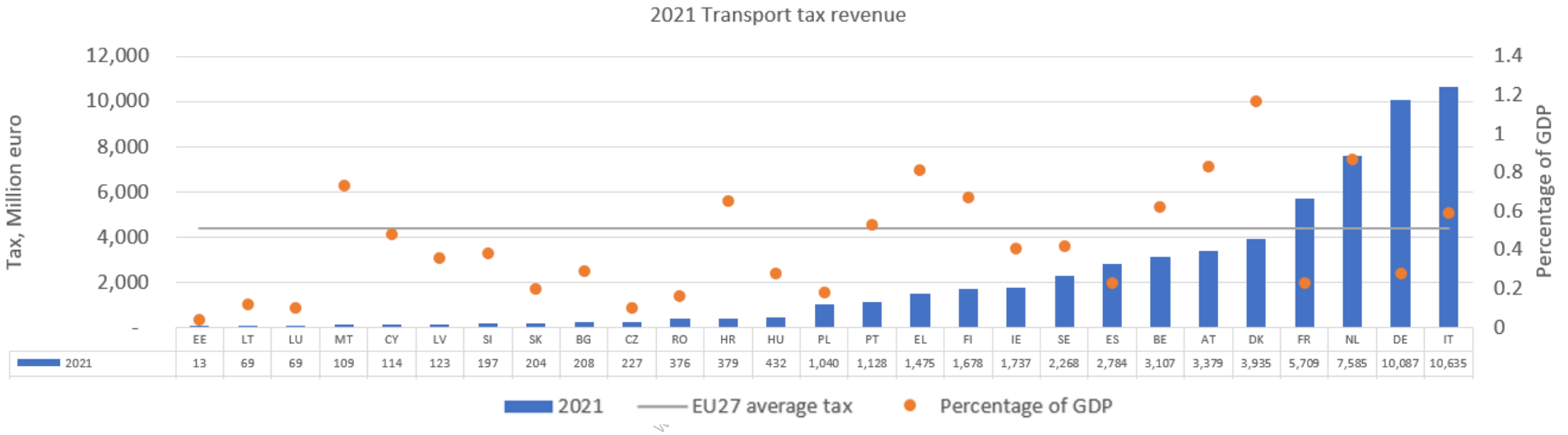
Tax category	Type of taxes included in the category[129]	Main links with EU policy
fuel for transport)	• Road use (e.g. motorway taxes) • Congestion charges and city tolls (if taxes in national accounts) • Other means of transport (ships, airplanes, railways, etc.) • Flights and flight tickets • Vehicle insurance (excludes general insurance taxes)	
Pollution	• Measured or estimated emissions to air (NO_x, SO_x, other pollutants excluding CO_2), ODS (e.g. CFCs or halons) • Measured or estimated effluents to water (including of oxydisable matter - BOD, COD, or other) • Effluent collection and treatment, fixed annual taxes • Non-point sources of water pollution • Pesticides (based on e.g. chemical content, price or volume) • Artificial fertilisers (based on e.g. phosphorus or nitrogen content or price) • Manure • Waste management (Collection, treatment or disposal – including for individual products (e.g. packaging, beverage containers, batteries, tyres, lubricants) • Noise (e.g. aircraft take-off and landings)	• WFD waste • Landfill Directive • Single-use plastics Directive • Plastic Bags Directive • Directive on packaging and packaging waste • WFD water • GWD • EQSD • UWWTD • ND • AAQD • NEC Directive • Pesticides Directive
Resources	• Water abstraction • Harvesting of biological resources (e.g. timber, hunted and fished species) • Extraction of raw materials (e.g. minerals, oil and gas) • Landscape changes and cutting of trees	• WFD water

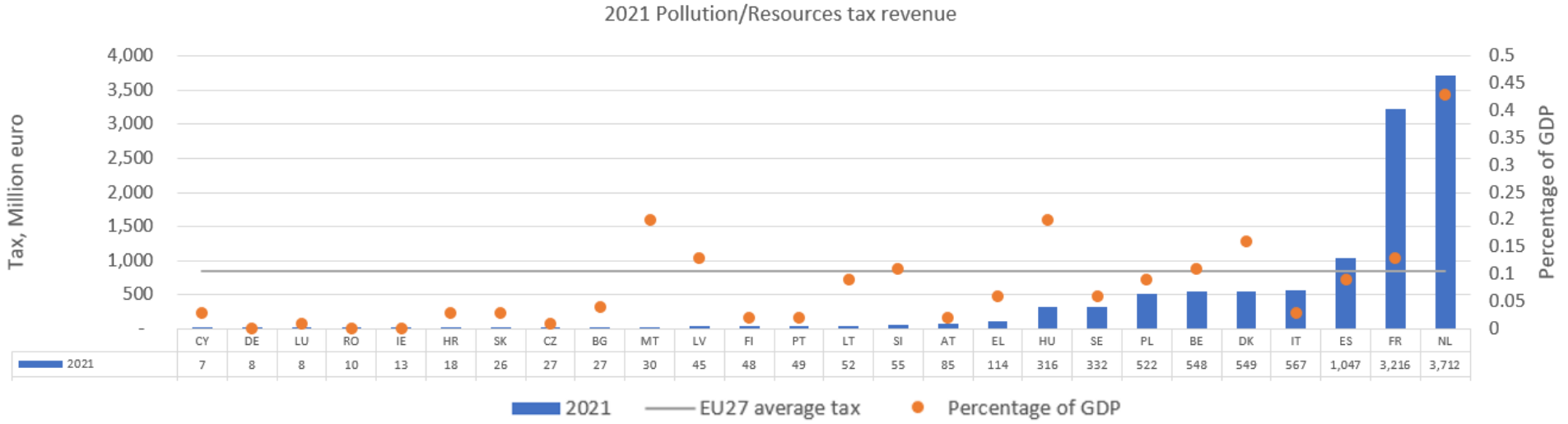
The revenue generated from environmental taxes varies significantly between environmental domain and Member State but overall comprise a small (accounting for 2.2 % of GDP and about 5.5 % of total tax revenues in the EU in 2021) and this share is declining over time (European Commission 2023). Among environmental taxes, revenue from energy taxes accounted for 78 % of total environmental tax revenue in 2021, whereas revenue from transport taxes accounted for 18 % and revenue from resource and pollution taxes accounted for 3.5 %. One of the reasons why revenue from energy taxes is proportionately to high is that it includes carbon taxes and revenues from EU ETS emission allowances (although it is noted that carbon taxes are regarded as a borderline case between energy and pollution taxes but that they are recorded as energy taxes in EU statistics because they are levied on energy products and have usually been introduced as a substitute for other energy taxes).

National differences in environmental tax revenue generated are discussed below relative to national GDP. This typically ranges between 1.5% and 2.5% for energy taxes levied (compared to an EU27 average of 1.76%); 0.01% and 0.2% for pollution taxes levied and 0.1% and 1% for transport taxes levied. Using this indicator, the main differences between Member States occur for energy taxes levied (where Finland, Austria, Lithuania, Germany, Latvia, and Portugal all sit below this range and the Netherlands and Luxembourg sit above it). Among other things, the ranges are indicative of a varied approach to applying the PPP.

Figure 4-12: Member State environmental tax revenues for the year 2021 and share of GDP







Source: Logika Group based on Eurostat data (online data codes: env_ac_tax)

Conclusions on EQ1c

An overview of Member State differences in implementing the PPP and the provisions used to minimise the differences in Member State implementation of the PPP is presented in Table 5-2. In broad terms, examples where Member State choice in implementation may affect the effective application of the PPP include the Energy Taxation Directive, the Ecolabel Regulation, Waste FD, MSFD, Water FD, ND, Floods Directive, AAQD, NEC Directive, IED, Eurovignette Directive, END, Pesticides Directive, Seveso, and the Nature Directives. In such cases, additional provisions often set a minimum level of ambition for how the PPP is applied to mitigate the risk of inconsistencies between Member States. Examples where no provisions to enable consistency between Member State implementation were identified include the Floods Directive, END, Pesticides Directive, and Nature Directives.

For many of the command and control instruments reviewed (e.g. WFD waste, WFD water, AAQD, NEC Directive), Member State and regional differences in implementation of the PPP occur based on the design of programmes of measures irrespective of standards or targets set. Abatement options included in plans may refer to compliance with related EU policy which can minimise Member State differences in how the PPP is applied (e.g. under the regulations that set EU restrictions or authorisations such as REACH).

For MBI, there is a greater degree of flexibility afforded Member States in the use and design of schemes which has led to differences in the way they are used to apply the PPP between Member States and between sectors. Underpinning the implementation of EU policies is Member State use of environmental taxes. The revenue generated from environmental taxes varies between environmental domain and Member State and the range of revenue generated by environmental taxes may be indicative of such differences. The use of minimum rates of excise duty can minimise differences (e.g. Energy Taxation Directive).

The extent to which differences in Member State implementation of the PPP are effectively contributing to environmental improvements is examined for EQ2b.

5.2.1.4. EQ1d. To what extent are costs of pollution met by polluters?

This question reviewed national expenditure on environmental protection (NEEP) by governments, corporations and households as a proxy for the extent to which corporations and households, in particular, are covering costs of pollution. NEEP is compared to investment needs to examine the extent to which cost of pollution are being met by polluters. The focus of the analysis is on the current situation (2023).

In addition, this question reviewed administrative and compliance costs of EU policy to ascertain the scale of costs met by businesses as a proxy for polluters in many (but not all) cases. Cost data are gathered primarily for provisions where there is high degree of application of the PPP (i.e. the cost to implement the provision is largely or partially borne by the polluter, rated 'green' or 'amber' for the state of play). Data are grouped by 8th EAP priority objective. Costs data (quantitative and qualitative) was extracted from existing policy evaluations and their support studies. Where no existing policy evaluation is available, no cost data have been compiled at policy level.

Key finding(s)	Robustness
NEEP by EU27 Member States was estimated at €340 billion in 2022, which is the best proxy of how much the polluter is paying for prevention and control (with some elements of administrative costs and remediation included in the figure). NEEP data shows that **corporations and households are paying for the majority of national expenditure on environmental protection** compared to national governments. At Member State level, spending has been stable as a percentage of GDP over the evaluation period.	Medium

Key finding(s)	Robustness
Costs to businesses of implementing EU policy (distinct from the costs of the application of the PPP within these policies – which is not available) provide an indication of how the costs of pollution are met by polluters. Significant costs identified include: • For climate change policies, the most significant compliance costs are incurred by the EU ETS and borne by polluting businesses. By sector, estimated annual costs range from EUR 1.5 billion (for iron and steel) to EUR 30 million (for paper). • For circular economy policies, the main compliance costs to businesses include capital costs for waste management infrastructure and are not directly borne by the polluter. • For zero pollution policies, costs are not directly borne by the polluter. Significant compliance costs are incurred via measures needed to comply with the limit values and standards set by EU policy, incurred for example by the AAQD (EU27 annual estimate of EUR 68 billion) and UWWTD (EU27 annual estimate of €18 billion). • There is insufficient data to assess the significance of compliance costs for the natural capital and biodiversity policies reviewed. • For horizontal policies, the most significant compliance costs relate to mitigation costs under the ELD and EIA Directive. Where applied, costs are largely borne by the polluter which is consistent with the application of the PPP.	Medium
Typically, **administrative costs identified in policy evaluations and impact assessments are borne by competent authorities and EU institutions**. Whilst inconsistent with the application of the PPP provide evidence of overhead costs of implementing the PPP via EU policy.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

National expenditure on environmental protection

Environmental investments and environmental protection expenditure (NEEP) is used to monitor national spending on prevention, reduction, and elimination of pollution and any other degradation of the environment by households, corporations and government. The Environmental Protection Expenditure Accounts (EPEA) and classification of environmental protection activities (CEPA) provides a framework for monitoring this expenditure and defines the types of environmental protection activities and expenditure in scope, including pollution abatement, waste and wastewater management, protection of biodiversity and related research and development, education and training activities[130]. NEEP includes expenditure on:

- "inputs for environmental protection activities (energy, raw materials and other intermediate inputs, wages and salaries, taxes linked to production, consumption of fixed capital) [including pollution abatement to achieve compliance with legal requirements];
- capital formation and acquisitions less disposals of land (investments);
- household expenditure on environmental protection products;

130 NEEP is reported by Classification of environmental protection activities (CEPA). The following categories exist: CEPA 1 — Protection of ambient air and climate; CEPA 2 — Wastewater management; CEPA 3 — Waste management; CEPA 4 — Protection and remediation of soil, groundwater and surface water; CEPA 5 — Noise and vibration abatement; CEPA 6 — Protection of biodiversity and landscapes; CEPA 7 — Protection against radiation; CEPA 8 — Environmental research and development; and CEPA 9 — Other environmental protection activities.

- transfers for environmental protection (subsidies and other current transfers (e.g., regular payments to support international aid programmes), investment grants, international aid, taxes earmarked for environmental protection, etc.)" (EEA, 2020)

Specifically, national expenditure on environmental protection is compiled from the sum of the following components:

- total output (environmental protection market output, environmental protection non-market output and environmental protection ancillary output),
- gross fixed capital formation (GFCF) and net acquisition of non-financial, non-produced assets for environmental protection (EP) activities,
- minus intermediate consumption of EP services by specialist producers (corporations specialist producers and general government producers of EP services)
- VAT and other taxes less subsidies on EP services
- imports of EP services (minus exports of EP service)
- transfers received by the rest of the world from general government minus transfers paid by the rest of the world to general government, corporations and households

The relevance of NEEP data to the types of costs incurred by the EU policies mapped is to the 8th EAP priority objectives (PO), described below. One way of understanding NEEP is as largely being environmental expenditure that is not driven by a business case i.e., if a firm invests in energy efficiency to improve its profitability this is in theory not included in the figures.

Table 5-4 Mapping of NEEP measures and activities to the 8th EAP PO

8th EAP PO	Policy area	Type of environmental protection activity and expenditure
Climate (PO 1+2)	Climate change mitigation	Protection of ambient air and climate (CEPA 1) combines climate and air, measures and activities include: • Prevention of pollution through in-house modifications (cleaner production processes) • Treatment of exhaust gases and ventilation air from combustion of fuels or processes • Monitoring and measurement pollutant concentrations in exhaust gases and quality of air • Other (regulation, education, provision of information)
Circular economy (PO 3)	Waste management	Waste management (CEPA 3) measures and activities include: • Prevention of pollution through in-house modifications (cleaner production processes) • Collection and transport of waste (including separation of waste) • Treatment and disposal of hazardous and non-hazardous waste • Monitoring and measurement of waste generation, hazardous waste and storage of waste • Other (regulation, education, provision of information)
Zero pollution (PO 4)	Water	Two categories of reporting, (i) wastewater management (CEPA 2) covers wastewater, including the collection, treatment of wastewater; monitoring and regulation activities; septic tanks; and (ii) protection and remediation of soil and water (CEPA 4) covers groundwater management (combined with soil management under biodiversity and natural capital below). CEPA 2 measures and activities include: • Prevention of pollution through in-house modifications (cleaner production processes) • Sewerage networks (operation, maintenance and repair) • Wastewater treatment (mechanical, biological and advanced treatments)

8th EAP PO	Policy area	Type of environmental protection activity and expenditure
		• Treatment of cooling water CEPA 4 measures and activities include: • Prevention of pollutant infiltration (including sealing of soils of industrial plants, runoff and leak management, strengthened storage, transportation of pollutant products) • Cleaning up of soil and water bodies (including soil decontamination, dredging of pollutions, and clean up of oil spills) • Protection from erosion and other degradation of soil and water • Prevention and remediation of soil and groundwater salinity Both CEPA 2 and 4 include: • Monitoring and measurement pollutant concentrations in wastewater, surface water, and groundwater • Other (regulation, education, provision of information)
	Air	Combined with climate, see above.
	Noise	• Noise and vibration abatement (CEPA 5) measures and activities include: • Preventive in-process modifications at the source • Construction of anti-noise/anti-vibration facilities • Monitoring and measurement of noise and vibration • Other (regulation, education, provision of information)
	Chemicals risk management	Relevant measures and activities are included above for water, air and noise.
Biodiversity and natural capital (PO 5)	Biodiversity, nature and land	Protection of biodiversity and landscape (CEPA 6) measures and activities include: • Protection and rehabilitation of species and their habitats • Protection of natural and semi-natural landscapes • Monitoring and measurement for censuses, inventories, databases of flora and fauna • Other (regulation, education, provision of information) • Soil activities are combined with groundwater, see zero pollution for the water policy area above.
Reducing pressures (PO 6)	Horizontal policies	Other environmental protection activities (CEPA 9) measures and activities include: • General environmental administration, management and regulation (including preparation of declarations or requests for permission, internal environmental management or certification process, regulation by the government) • Education, provision of information
Note: The following measures and activities are included in CEPA but not in scope of the fitness check: Protection against particle radiation (CEPA 7) and research and development (CEPA 8) Source: EEA (2020)[131]		

In 2022, the combined EU27 NEEP total was estimated at €340 billion. On average 2% of EU Member States GDP was contributing to environmental expenditure[132]. At Member State level,

131 EEA (2020) Classification of Environmental Protection Activities and Expenditure (CEPA) and Classification of Resource Management Activities (CReMA) – Explanatory notes. EEA 2020/03 Technical Note. https://ec.europa.eu/eurostat/documents/1798247/12177560/CEPA+and+CReMA+explanatory+notes+-+technical+note.pdf/b3517fb9-1cb3-7cd9-85bd-4e3a3807e28a?t=1609863934103

132 Eurostat defines GDP as "the sum of the final uses of goods and services (all uses except intermediate consumption) measured in purchasers' prices, minus the value of imports of goods and services, and the sum of primary incomes distributed by resident producer units". https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Gross_domestic_product_(GDP)#:~:text=As%20an%20aggregate%20measure%20of,between%20output%20and%20intermediate%20consumption.

the NEEP as a share of GDP varies (above 3% in Austria, Belgium and Romania) and between 1% and 1.5% in Cyprus, Denmark, Greece, Hungary, Finland, Lithuania, Luxembourg, Latvia, Spain. In Ireland it is below 1%. As would be expected there is significant variation in terms of total value spent (ranging from EUR 80 000 million in Germany, to less than a million in Bulgaria, Cyprus, Estonia, Greece, Croatia, Hungary, Ireland, Lithuania, Luxembourg, Latvia, Malta, Slovenia, Slovakia).

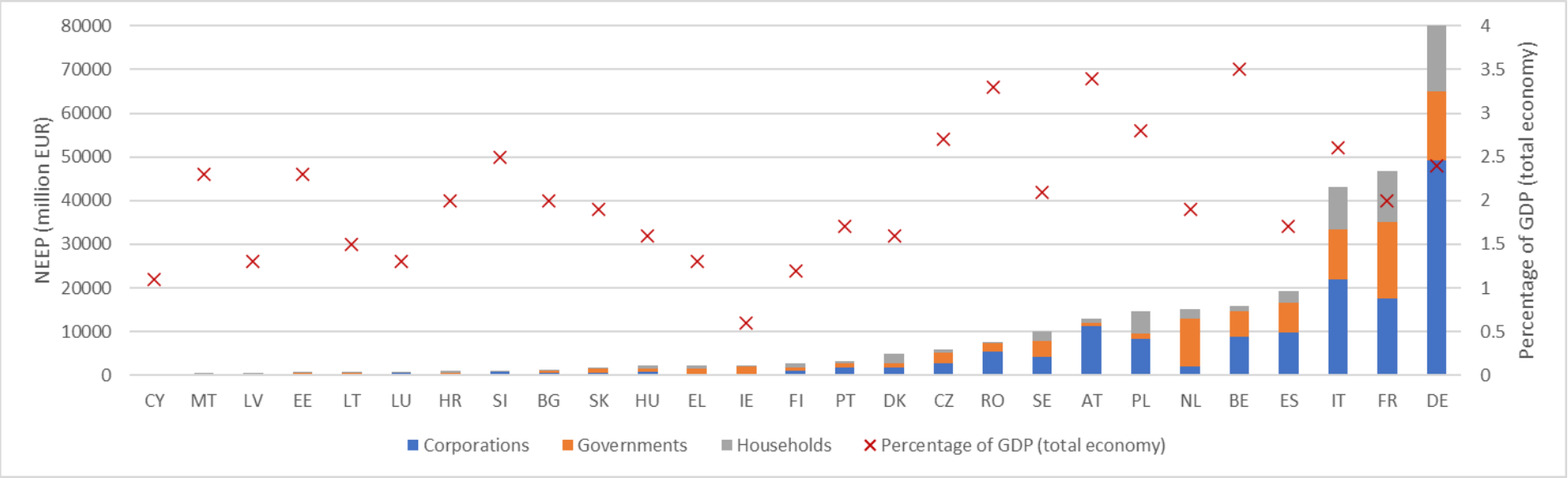
At EU27 level, the largest proportion of spending is by the corporate sector (EUR 180.2 billion; 53% of the total in 2022), including current and capital expenditure by corporations that offer environmental protection services (e.g. waste or wastewater management), and by corporations that do not sell environmental services on the market but which undertake environmental protection activities in-house and for own use, to limit the negative environmental effects of their main production activity (e.g. a refinery or a water supply company that treats its exhaust gases or effluents).

The NEEP demonstrates a significant share of expenditure spent at national level on environmental protection, indicating that the PPP is applied in practice to some extent. Differences at Member State level may be indicative of a variety of factors, including differences in how the PPP is applied across Member States (as outlined for EQ1c). The extent to which these differences have impacted on the extent to which the PPP is effective in delivering environmental improvements is reviewed for EQ2b.

It is not clear from NEEP data which economic sectors are contributing to the overall spend presented. Jantzen (2015)[133] estimate that EU annual environmental expenditures of industry was in the range of € 35 billion to € 45 billion for 2004, 2007 and 2010 (before adjusting for inflation). This estimate was based on data for mining, manufacturing, power, refineries, chemical sector and base metal, i.e. a subsector of the corporate sector used to present NEEP data. This would imply that industry are contributing to a majority of the NEEP reported for the corporate sector.

133 Jantzen (2015) Environmental expenditures in EU industries, time sries. https://wayback.archive-it.org/12090/20230313102704/https://ec.europa.eu/environment/enveco/economics_policy/pdf/studies/Costs%20of%20environmental%20legislation.pdf

Figure 5-9 National expenditure on environmental protection



Note : Total NEEP for Cyprus is EUR 230.5 million (not visible in chart).

Source: Eurostat [ENV_AC_EPNEIS1]

Comparison between NEEP and total EU green spending

There are limitations to using NEEP data to understand how the PPP is applied in EU policy. Namely, the granularity of NEEP data does not provide clear understanding of the types of clean up actions. Moreover, they do not fully align with the 8th EAP priority objectives, which does not specify the objective for sustainable use and protection of water and includes horizontal objective for reducing environmental and climate pressures).

While not directly comparable, the share of NEEP is smaller than the overall estimated EU27 average green spend per environmental priority which also takes into account EU funding. EU27 annual average green spend is estimated as follows (in 2022 prices):

- **Climate action**: EUR 782 billion (of which EUR 772 billion is explicitly for mitigation)[134].
- **Water:** EUR 63 billion (taking into account recent cost analysis for evaluating the WFD water[135], SSD[136] and the UWWTD[137])
- **Circular economy**: EUR 30 billion[138].
- **Pollution prevention and control**: EUR 4 billion[139].
- **Nature and biodiversity**: EUR 24 billion[140].

Working draft

The share of NEEP is smaller still compared to estimated EU27 future green investment needs (e.g. investment needs that informed the developed of NextGenerationEU (SWD(2020) 98))[141], or indeed the scale of financing needs to deliver the Biodiversity 2030 strategy, which including baseline expenditure is estimated at EUR 48.15 billion annually between 2021 and 2030 (IEEP, 2023). Green investment needs are currently under review in preparation for the next period of the MFF but are not available at the time of drafting this report.

Costs to businesses of implementing EU environmental policy

Administrative and compliance costs of EU policy were also reviewed to ascertain the scale of costs met by businesses, as a proxy for "polluters" in many cases. Costs are grouped by 8th EAP priority objective.

Climate change

The most significant costs to businesses of implementing EU climate policies are incurred by the EU ETS and the implementation costs of the technologies needed to meet the cap on carbon (detail presented in Table 4-22). Sectors affected by significant compliance costs included steel, cement, refineries, chemicals, fertilisers, glass, paper and aluminium. Administrative costs for the EU ETS are borne predominantly by businesses and regulated by accompanying regulation to the EU ETS Directive (Monitoring and Reporting Regulation (MRR) and Accreditation and Verification Regulation). Costs are incurred through data monitoring, reporting and verification and are estimated at EUR 2 200 per installation and are assessed as not significant in the related

134 It is estimated that additional investments of about "EUR 620 billion annually will be needed to meet the objectives of the Green Deal and of our REPowerEU plan, with an additional 92 billion euros needed to address the objectives of the Net-Zero Industry Act over the 2023-2030 period". European Commission 2023 Strategic Foresight Report

135 https://commission.europa.eu/publications/fitness-check-water-framework-directive-and-floods-directive_en

136 https://op.europa.eu/en/publication-detail/-/publication/04ad5015-438d-11ed-92ed-01aa75ed71a1/language-en#

137 https://environment.ec.europa.eu/system/files/2022-10/Impact%20assessment%20accompanying%20the%20proposal.pdf

138 https://op.europa.eu/en/publication-detail/-/publication/4d5f8355-bcad-11e9-9d01-01aa75ed71a1#

139 Clean Air Outlook (europa.eu)

140 https://ieep.eu/wp-content/uploads/2022/12/final_report.pdf

141 Identifying Europe's recovery needs (europa.eu)

policy evaluation. For other policies however, administrative costs are borne by competent authorities and EU institutions (e.g. ES Regulation, AFI Regulation).

Table 4-22: Compliance and administrative costs data extracted for climate policies

Policy	Overview of compliance and administrative costs
EU ETS	The most significant implementation costs borne by businesses is via the technologies implemented to meet the cap on carbon. The compliance costs depend on the carbon price, the level of free allocation, and the amount of emissions released during production. Based on these factors, sectors where compliance costs are expected to greatest (based on emissions) are steel, cement, refineries, chemicals, fertilisers, glass, paper and aluminium. Average annual estimated compliance costs for operators for phase 4, is summarised below[142]: Iron and Steel: direct carbon costs of ~ € 1.5 billion. Cement: compliance costs of ~ € 680 million. Refineries: direct carbon costs of ~ € 950 million. Chemicals: direct carbon costs of ~ € 290 million. Fertilisers: compliance costs of ~ € 250 million. Glass: direct carbon costs of ~ € 90 million. Paper: compliance costs of ~ € 30 million. Aluminium: direct carbon costs of ~ € 70 million. The extent of cost pass-through varies by sector and is reviewed for EQ4b. Compliance costs for auctioning under the EU ETS are also relevant to the way the PPP is applied. A registration fee is required to participate in auctioning under the EU ETS which generally ranges between EUR 1 200 and EUR 2 500 per annum (cost differing depending on the privileges of the membership purchased). These costs are not significant compared to costs to implement the technologies needed to meet the cap on carbon. Administrative costs relate to fees for the use of the registry which are paid to Member States to offset their administrative costs. These costs vary depending on the size and the complexity of the installation concerned. Typical costs incurred per installation are EUR 1 100 for data collection and reporting (EUR 300) and verification (EUR 800) [143].
ES Regulation	Compliance and administrative costs for businesses were not identified. Existing policy evaluation noted that there is an indirect cost of implementation of policies and measures incurred by economic sectors but that there was insufficient evidence to quantify the costs[144].
AFI Regulation	Costs to businesses are incurred by the operator rather than the user (the user being the polluter)[145]. Administrative costs were estimated for competent authorities only. The costs to public authorities arise mostly from the requirements for Member States to review and update their national policy frameworks (NPFs) and subsequently report on the implementation. (€126,000 per Member State).
Ecodesign Directive	Compliance costs range between €50 000 and €100 000 per with additional per energy using product with additional testing costs for appliances estimated to be between €500 and €1 500 per product model family. The evaluation concluded that compliance costs are expected to pass onto the consumer and that the overall impact

142 https://climate.ec.europa.eu/system/files/2016-11/impact_assessment_en_0.pdf, Annex 7

143 https://climate.ec.europa.eu/system/files/2016-11/impact_assessment_en_0.pdf, Annex 7

144 Ricardo et al (2016) Supporting study for the Evaluation of Decision No 406/2009/EC (Effort Sharing Decision)

145 Ricardo et al (2021), Impact assessment support study

Policy	Overview of compliance and administrative costs
	on the prices of energy using products was not significant (given that the prices of household appliances are generally falling).[146] Note for the overview of costs presented in this analysis, these costs are included in the estimated compliance costs presented for the AAQD under the zero pollution ambition priority objective.
Ecolabel	Application for the EU Ecolabel demands the fee of EUR 200 – 350 for micro-enterprises; EUR 200 – 600 for SMEs and companies from developing countries; EUR 200 – 2000 for all other companies. A maximum annual fee for use of the Ecolabel has been capped at: EUR 18 750 for micro-enterprises, SMEs and businesses, and applicants from developing countries; EUR 25 000 for all other companies. Note for the overview of costs presented in this analysis, these costs are included in the estimated compliance costs presented for the AAQD under the zero pollution ambition priority objective.
EPBD	Compliance costs are expected to be met by cost savings from energy savings over time. The main cost incurred therefore is the upfront investment costs (for which the Commission is mobilising €150 billion from the EU budget to implement the minimum energy performance standards, between 2023 and 2030, and a further €72.2 billion from the proposed Social Climate Fund for the period 2025-2032 to support households, notably those living in worst performing buildings).
ETD	The 2020 evaluation yield limited information on the regulatory costs linked to the ETD.[147] The costs of implementing the PPP are determined at Member State level based on national action (reviewed for EQ5).
F-gas Regulation	The total average annual compliance cost of EU F-gas using industries in the 2015-2019 evaluation period were estimated to be EUR 2 169 million per annum. Compliance cost includes record keeping, training, labelling, documenting compliance, registry and reporting and verification.
ODS Regulation	For the period 2010-2017, the import/export licensing based on single shipments for bulk gases incurred the greatest costs (€1.9 million). Reporting obligations (€1.05 million) and registration requirements for laboratories (€ 0.5 million) also incurred high costs.
RED	Compliance costs for how the PPP is applied were not significant. There is no available overview of the administrative costs placed on producers. [148]

Note: Costs incurred by CO_2 emission performance standards on new cars and vans the EED are significant but are included in cost estimates for air quality acquis and it was not possible to identify individual policy costs.

Transition to a circular economy

The most significant costs to businesses of implementing EU policies contributing to the transition to a circular economy are incurred by capital costs for waste management infrastructure related to collection and recycling (as evidenced by the investment needs to meet the Waste FD targets). These are estimated to be EUR 2 416 million per annum (between 2021 and 2027) [149]. These costs are borne by both businesses responsible for waste management and competent authorities. The costs are not directly borne by the polluter.

Another example are the compliance costs borne by businesses to implement the Batteries Directive and cover the costs to collect and recycle portable batteries (EUR 118 million per annum) [150]. No costs data available for the Batteries Regulation adopted in 2023 but costs to

146 CESS (2012) Evaluation of the Ecodesign Directive (2009/125/EC).

147 https://commission.europa.eu/system/files/2020-04/swd_2019_0329_en.pdf

148 https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2016:0416:FIN:EN:PDF

149 https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en#publications

150 https://ec.europa.eu/environment/pdf/waste/Published%20Supporting%20Study%20Evaluation.pdf

businesses are expected to have increased given the extended scope of the Batteries Regulation and more stringent requirements on battery manufacturers.

Under the Ship Recycling Regulation, estimated costs to ship owners related to the implementation of the Hong Kong Convention requirements estimated for the year 2020 are EUR 2.6 million (Hong Kong Convention requirements will enter into force for the year 2024 and include administrative measures that underpin the Regulation). However, these costs are covered by the revenue generated by selling ships for recycling (EUR 510 million)[151].

While fees and taxes levied are common MBIs used to implement the provisions of relevant EU policy (e.g. landfill tax and plastic bag fee), implementation is based on national action and costs. The costs of compliance for national action are examined for EQ5 which looks at differences between Member States.

Where administrative costs are borne by the operator, they are generally not significant compared to compliance costs (e.g. costs to conduct inventories for new ships, certificates under the Ship Recycling Regulation). In other cases, they were estimated for competent authorities and EU institutions (e.g. Waste FD, Batteries Directive, Plastic Bags Directive, and the Ship Recycling Regulation) only as the administrative costs to industry were found to be insignificant. The PPP is not applied where costs are borne by actors other than the polluter. No description of specific costs to administer the PPP was identified in the policy evaluation or impact assessments reviewed.

Zero-pollution ambition

The most significant costs to businesses of implementing EU policies contributing to the zero pollution ambition are incurred by measures needed to comply with the limit values and standards set by EU policy. In sum:

- Water FD: €13.8 billion per year (based on 2019 data to implement measures reported in plans for 2016-2021 timeframe) (based on 2019 data to implement measures reported in plans for 2016-2021 timeframe). This includes capital investment and operation and maintenance which are often not directly borne by the polluter.[152]
- DWD: Under the DWD, the estimated total annual cost for supplying drinking water in the EU in 2014 amounted to ~EUR 46.5 billion. Costs are not directly borne by the polluter.
- UWWTD: EUR 18 billion per year (based on state of implementation described for 2019 evaluation) (Wood et al, 2019)[153]. Costs are not directly borne by the polluter.
- SSD: compliance costs were reviewed based on hypothetical changes expected by the Directive. A hypothetical shift of the sludge currently used in agriculture towards (mono-)incineration could increase costs for farmers by €41–488 million/yr, and, for mono-incineration only, by €391-488 million/yr[154].
- AAQD: EUR 68 billion per year (estimated for the year 2020, including costs met by polluter of complying with CO_2 emission performance standards, non-road mobile machinery regulation, and maritime transport policies, EED, and Directive on Sulphur

151 https://circabc.europa.eu/ui/group/636f928d-2669-41d3-83db-093e90ca93a2/library/1b0121e5-ce34-4af5-8272-79ed4587b2ee/details?download=true

152 https://commission.europa.eu/system/files/2020-04/swd_2019_0439_en.pdf

153 Wood et al. (2019) Service request supporting the Evaluation of Directive 91/271/EEC concerning urban waste water treatment. https://circabc.europa.eu/ui/group/1c566741-ee2f-41e7-a915-7bd88bae7c03/library/f961a8a1-c794-41db-9409-6f146842dac9/details?download=true

154 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52023SC0158

Content of Certain Liquid Fuels, Eco-design Directive and the Energy Labelling Directive, NEC Directive for agriculture and IED) (detail presented in Box 5-1).

- END: Implementing the noise measures proposed in some local and national action plans varies by sector (Airports EUR 438 million; Road EUR 667 million; Rail EUR 82 million) (based on reporting for the 2011-2016 reporting period as presented for the 2022 evaluation).[155]
- REACH: The main costs to businesses are incurred where restrictions apply and associated annual costs at EU27 level are EUR 1.7 billion per year (detail presented in Box 5-2)..

These costs are borne by businesses to some extent. For the Water FD, AAQD and END, costs to business include: (i) administrative costs; (ii) pollution abatement costs; and in the case of the Water FD (iii) taxes and fees for the cost recovery of water services and activities with a significant impact on the environment; and (iv) in certain cases, opportunity costs. However, because the policies are framework directives, no data can be specifically attributed to it – e.g. compliance costs for the AAQD are based on compliance with related policies as listed above.

Box 5-1 Estimated compliance costs for businesses to comply with AAQD limit values

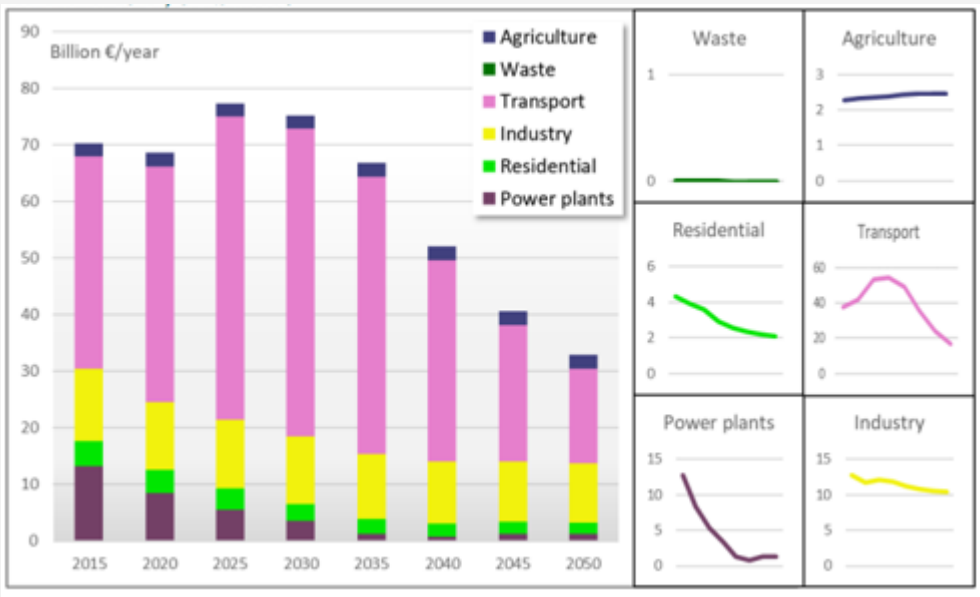
The 2022 impact assessment for the revision to the AAQD modelled the baseline compliance costs for the air pollution measures[156]. Estimated costs for the year 2020 were estimated to be ~EUR 68 billion for the EU27, as presented in the figure below the sectoral split shows estimated compliance costs for:

- Transport: ~EUR 40 billion per year (including cost of complying with CO_2 emission performance standards, non-road mobile machinery regulation, and maritime transport policies).
- Power plants: ~EUR 8 billion per year (including cost of complying with EED, and Directive on Sulphur Content of Certain Liquid Fuels).
- Residential: ~EUR 5 billion per year (including cost of complying with Ecodesign Directive and the Energy Labelling Directive)
- Agriculture: ~EUR 2 billion per year (including cost of complying with Annex II measures of the NEC Directive)
- Industry: ~EUR 10 billion per year (including cost of complying with the IED)
- Compliance costs for waste management are comparatively insignificant.

155 Circabc (europa.eu)

156 Study to support the impact assessment for a revision of the EU Ambient Air Quality Directives https://op.europa.eu/en/publication-detail/-/publication/a05c2e91-54db-11ed-92ed-01aa75ed71a1/language-en

Figure 4-28: Total air pollution control costs of emission control measures by sector for EU27, GAINS model

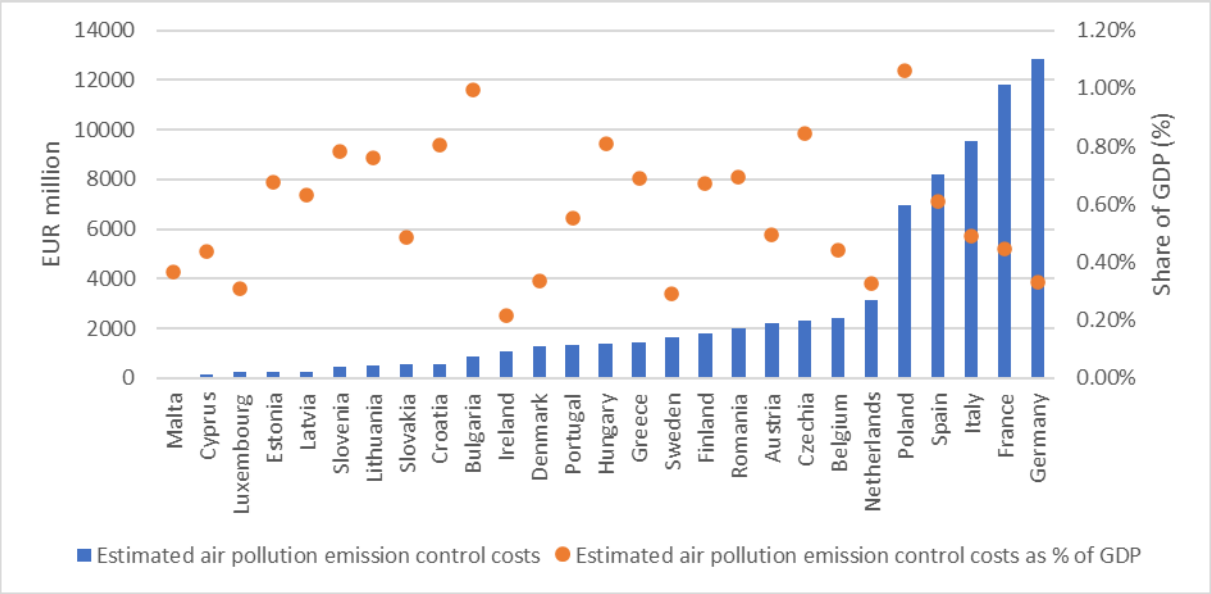


Source: European Commission, 2022[157]

Figure 5-10 presents estimated annual air pollution emission control costs by Member State as a share of GDP to enable comparison. As a share of national GDP, the costs are highest in Poland (EUR 6 957 million; 1.06% of GDP) and Bulgaria (EUR 855 million; 1% of GDP). The costs are also comparatively high (between 0.6 and 0.8% of GDP) in 11 Member States (Spain, Latvia, Finland, Estonia, Greece, Romania, Lithuania, Slovenia, Croatia, Hungary and Czechia). The cost estimates show comparatively high costs of compliance for Germany (EUR 12 845 million), France (EUR 11 818 million), Italy (EUR 9 526 million) and Spain (EUR 8 227 million) compared to particularly low costs of compliance estimated for Malta (EUR 64 million). Combined, the high costs for Germany, France, Italy and Spain account for 56% of the EU27 total.

157 Study to support the impact assessment for a revision of the EU Ambient Air Quality Directives https://op.europa.eu/en/publication-detail/-/publication/a05c2e91-54db-11ed-92ed-01aa75ed71a1/language-en

Figure 5-10 Annual air pollution control costs of emission control measures by Member State



Source: Logika Group based on European Commission (2022)[158]

Box 5-2 Compliance costs for businesses to implement REACH

Costs of registration: Registration incurs a fee, which offsets the costs for Competent Authorities, ECHA and the European Commission in administration. The costs for preparation of Application for Authorisation are incurred by the applicants (i.e. the user), alongside a fee payable to ECHA, to offset administration costs. Enforcement is undertaken by Member State CAs, at their cost (European Commission, 2018). Cost incurred to register substances that exceed 1 tonne per year per company with ECHA (i.e. the application fee). The cost is incurred by the company and the associated administrative charges are the same under REACH and CLP. Cost is determined based on the size of the company as follows: large enterprises (EUR 19 900), medium enterprises (EUR 13 900), small enterprises (EUR 7 960). An alternative administrative charge can be calculated at 2.5 times the financial gain of the enterprise (ECHA).

Evaluation costs to generate data for dossier evaluations (2009-2016) was estimated at €200 million (involving 106 FTE staff employed by ECHA to undertake dossier and substance evaluations assessment and decision making) (European Commission, 2018).

Cost of applications for authorisation was estimated per use per applicant to be an average of EUR 120 300 in 2016 (European Commission, 2018).

Costs of restrictions: Main cost drivers are substitution with new chemicals. Total substitution costs linked to restrictions €290 million per year. These amount to EUR 1.7 billion per year[159]

Enforcement costs: Annual 2018 estimated costs are EUR 228 million (per 1 to 10 tonne of substances) and €1 136 million (per 10 – 100 tonne of substances) (European Commission, 2018).

Source: European Commission (2018)[160], ECHA[161]

158 European Commission (2022) Study to support the impact assessment for a revision of the EU Ambient Air Quality Directives.

159 https://op.europa.eu/en/publication-detail/-/publication/7d89214d-7fbc-11eb-9ac9-01aa75ed71a1/language-en

160 European Commission, 2018, Commission General Report on the operation of REACH and review of certain elements, Section 6.1 'Effectiveness', p. 40. Available at: resource.html (europa.eu)

161 https://echa.europa.eu/support/small-and-medium-sized-enterprises-smes/administrative-charges

The main administrative costs borne by businesses are incurred by registration/permitting applications (REACH, CLP, IED, MCPD) and site inspection (IED) and are generally paid for by businesses through cost recovery charges such as application fees or inspection fees. The application fee under REACH and CLP ranges between EUR 19 900 and 7 960 depending on the size of the enterprise. The main administrative costs are incurred by permitting and registration and the total associated costs borne by MCP operators were estimated to be €9m per year (2012 prices) and not estimated for the operator in the case of the IED. Other administrative costs incurred by the polluter under the IED are the costs of a site inspection which on average involve 3 days of inspection time per installation, amounting to a total cost of €80 million per year to regulators. Under the Water FD, AAQD and NEC Directive, administrative costs are borne by the competent authorities.

Protecting, preserving and restoring biodiversity and natural capital

One of the main compliance costs to apply the PPP for EU policies protecting, preserving and restoring biodiversity and natural capital is expected to be incurred via the Appropriate Assessment under the Nature Directives. However, it is not possible to quantify the significance of associated costs because no data was included for the 2019 fitness check of the Nature Directives[162]. Estimated costs to implement the proposed Restoration Law provides some high-level indication of the scale of costs needed to meet the ambition set by the Biodiversity Strategy[163]. However, these estimates do not cover the costs of compliance to implement the National Restoration Plans which would be instrumental to applying the PPP and ensuring the compliance costs are met by the polluter.

Costs of administrative and enforcement measures under the IAS Regulation are also significant, ranging from EUR 17 000 to EUR 40 million per Member State per annum (totalling EUR 75 million over a four-year period between 2015 and 2018). There is a legal requirement for Member State competent authorities to recover all control related costs (i.e. administrative costs borne by competent authorities to enforce environmental controls). However, the extent to which these costs have been recovered by Member State authorities was not reviewed by the evaluation. Therefore, it is not possible to conclude on the extent to which the costs are met by the polluter.

Horizontal policies reducing environmental and climate pressures related to production and consumption

The most significant costs borne by businesses relate to remediation and mitigation costs under the ELD and EIA Directive. For both policies, administrative costs were reviewed for competent authorities only, as administrative costs for industry were found to be insignificant. In sum:

- Under the ELD, costs are incurred as a result of remediation action required (on average ~ EUR 42 000 and totalling EUR 179 million based on 2012 and 2013 data)[164]. For the 2016 evaluation, the total costs incurred by the polluter were based on 137 cases where the costs incurred were less than EUR 1 million each amounted to EUR 5 821 238. In addition, five cases were reported incurring a total cost of EUR 173 711 841. The remediation costs are on average for one environmental liability case around EUR 42 000. Limited information on administrative costs. Costs are likely incurred by competent authorities for setting up and maintenance of systems but these were not estimated for

162 FITNESS CHECK of the EU Nature Legislation (Birds and Habitats Directives), Brussels, 16.12.2016 SWD(2016) 472 final, p 47 nature_fitness_check.pdf

163 https://op.europa.eu/en/publication-detail/-/publication/db3e5d55-310c-11ee-946a-01aa75ed71a1/language-en

164 European Commission, 2016, REFIT Evaluation of the Environmental Liability Directive, Section 6.3 'Efficiency', p. 43. Available at: untitled (europa.eu)

the evaluation. Where reported, costs vary significantly between Member States (Belgium EUR 55 000; Bulgaria EUR 135 613; Spain EUR 20 000).

- Under the EIA Directive, the main costs borne by businesses are incurred where screening requires revised mitigation action to address the environmental impacts identified (total costs for EU developers are estimated at € 558 to 846 million per year). For the EIA Directive, cost data was extracted from a 2012 impact assessment, recognising the limitation that the data is not up to date. Cost of screening and scoping estimated at on average EUR 850 per EIA[165]. Cost of preparing the environmental report estimated at approximately EUR 32 715 per EIA. The average costs for developers depend on the size of the project and are estimated at 1 % of the total project cost or approximately EUR 41 000 per EIA (including costs for preliminary studies, screening and scoping, information on environmental impacts [accounting for 80% of total], revision of EIA if needed). Overall, the EIA costs for EU developers are estimated at EUR 558 to 846 million per year.

For the ECD, the 2020 evaluation of the 2008 Directive concluded that "no considerable increase in costs attributable to the Directive could be established across the EU or in particular Member State" and that the evaluation questions on costs and benefits were not relevant.[166]

For the SEA Directive, based on a 2019 evaluation[167], the main costs of the SEA process are from the preparation of the environmental report which are borne by the authorities and not relevant to the application of the PPP. Costs vary depending on the size of the plan/programme. Costs data from 2019 show that the cost of SEA varies from two to three thousand up to several hundred thousand euro per assessment. Administrative costs to businesses were found to be insignificant.

Conclusions for EQ1d

NEEP data shows that corporations and households are paying for the majority of national expenditure on environmental protection compared to national governments. This provides some evidence that the PPP is applied. But the main limitation of the NEEP data is the limited granularity of expenditure data does not provide clear understanding of the types of clean up actions.

The total EU27 NEEP was estimated at €340 billion in 2022, compared to an estimated EUR 903 billion in annual green spending by EU 27 (including EU funding). Figure 5-9 shows that at Member State level, there is variation in NEEP as a percentage of GDP. This may be indicative of the differences between Member States in their application of the PPP or may be an indication of the differences in pollution between Member States.

While there are limitations regarding reporting of NEEP and its use to understand how the PPP is applied in EU policy, a basic comparison indicates that the total level of NEEP accounts for 38% of total EU annual green spending and it provides the best available overall estimate of spending on prevention and control (but also includes spending on administrative obligations and remediation) and that corporations and households are paying for the majority of this.

165 European Commission (2012). Impact Assessment Accompanying the document proposal amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012SC0355&from=EN

166 European Commission, 2020, EVALUATION of the DIRECTIVE 2008/99/EC of the European Parliament and of the Council of 19 November 2008 on the protection of the environment through criminal law (ENVIRONMENTAL CRIME DIRECTIVE), Section 5 'Implementation/State of Play', p. 33. Available at: environmental_crime_evaluation_report.pdf (europa.eu)

167 European Commission (2019). Evaluation of the Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. https://circabc.europa.eu/ui/group/3b48eff1-b955-423f-9086-0d85ad1c5879/library/d479c54e-d1c2-4f7f-a40e-4e0b41f6ff39/details?download=true

Compliance costs borne by business to implement EU policy where the PPP is applied in the policy provisions have been reviewed to provide additional context for how costs of pollution are met by polluters. Based on a review of compliance costs to businesses for a selection of the policies in scope of the fitness check, the most significant EU27 compliance costs are estimated at ~EUR 187 billion per annum. While not exclusive to the polluter, nor comprehensive in scope, it covers the most significant costs incurred by businesses and provides an additional dimension for understanding how polluters are meeting the costs of pollution in the EU. Available data is summarised below by policy area.

Table 5-5 Overview of annual EU27 compliance costs borne by businesses for EU policy

Policy grouped by policy area	Cost (EUR million)	
	By policy	By policy area
Total significant compliance costs borne by businesses for climate policy area*		**35 768**
EU ETS	3 860	
F-gas	2	
ODS	3	
Total significant compliance costs borne by businesses for waste management policy area		**2 537**
WFD waste	2 416	
Batteries Directive	118	
SRR	3	
Total significant compliance costs borne by businesses for zero pollution ambition policy area		**148 265**
WFD water	13 800	
DWD	46 500	
SSD (upper estimate used)	488	
UWWTD	18 000	
AAQD**	68 000	
END	1 187	
REACH	290	
Total significant compliance costs borne by businesses for biodiversity and natural capital policy area		***Not quantified***
Nature Directives	*Not quantified*	
Total significant compliance costs borne by businesses for horizontal policies		**852**
EIA Directive (upper estimate used)	846	
ELD	6	
Total significant compliance costs borne by businesses for selection of EU policies		**187 441**

Note: *Costs identified for the EPBD refer to EU investments rather than costs borne by the polluter and are excluded from the above summary. ** Includes costs of CO_2 emission performance standards, non-road mobile machinery regulation, and maritime transport policies, EED, and Directive on Sulphur Content of Certain Liquid Fuels, Ecodesign Directive and the Energy Labelling Directive, NEC Directive for agriculture and IED).

5.2.1.5. EQ1e. Has implementation of PPP improved over time?

To answer this question changes in legal references to PPP in recitals, and/or articles, and changes to the policy mechanisms that apply the PPP over the appraisal period (2014-2023) were reviewed, to determine how the application of the PPP has evolved in legislation. Potential planned changes to policies in 2023/2024 were also reviewed to determine how these may influence the application of the PPP in the future. Drawing on findings for EQ1b and EQ1c, the analysis also examined how the changes may have influenced the effective application of the PPP based on the type on policy mechanism used or the degree of Member State choice in how they implement the PPP.

Key finding(s)	Robustness
Policy revisions in the appraisal period (2014-2023) have had limited impact on the way the PPP is referenced in EU policy. Changes in the legal text that amend the way the PPP is applied were identified in only 4 policies (Waste FD, Extractive Waste Directive, EQS Directive, and the Eurovignette Directive). The limited changes to the legislation identified are not necessarily reflective of how implementation of the PPP has changed over time.	Strong
The EGD has triggered the planned revision of a significant number of policies and proposals for new policies/initiatives (37 in total). Simply increasing environmental ambition can be argued to increase the coverage of the PPP. However, amongst these many changes include those that will strengthen the way the PPP is applied in EU policy (regardless of the level of ambition).	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	WIP	WIP

Changes in the legal text during the 2014-2023 appraisal period

It is noted that references to the PPP were made in policies adopted back in 1990s (directives on landfill, and packaging and packaging waste) through to current day (suggesting no clear correlation between the year of policy adoption and reference made to the PPP). Of the 21 policies that refer explicitly to the application of the PPP for the year 2023 (identified for EQ1a), changes in the legal text that amend the way the PPP is applied were identified in only 4 policies (Waste FD, Extractive Waste Directive, EQS Directive, and the Eurovignette Directive).

A total of 12 legal texts were revised during the appraisal period including policies, strategies and EU funding programmes and state aid rules[168]. In three pieces of legislation, references to the PPP were introduced by the latest update (Ship Recycling Regulation (2013), Biodiversity Strategy (2020) and EU ETS (2023)). In all three cases, reference to the PPP was introduced via the recitals, thus reinforcing the PPP as an underlying principle but where the legal obligation to apply the PPP is in the TFEU and not the individual policy.

A review by policy of how the changes have influenced the application of the PPP is below. Taking the same approach as described for the state of play, the revisions to EU funding programmes

168 EU ETS Directive, ES Regulation, CO2 emission performance standards on new cards and vans, NEC Directive, Eurovignette Directive, Horizon 2020 Regulation (EU) 2021/695, CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development; Regulation (EU) 2021/2116 and Regulation (EU) 2021/2115 and Regulation (EU) 2021/2117), Cohesion policy funds under the Common Provisions Regulation (EU) 2021/1060, LIFE + Regulation (EU) 2021/783, InvestEU Regulation (EU) 2021/523, Recovery and Resilience Facility Regulation (EU) 2021/241 and State Aid Regulation (EU) 2015/1588

and state aid rules is also included in the review in relation to their role in safeguarding the environment, rather than playing a role in addressing costs of pollution.

EU ETS Directive

The ETS is currently in phase 4 (spanning 2021 – 2030) (Directive (EU) 2023/959 and Directive (EU) 2023/958), with 3 earlier phases spanning (2005 – 2020). For this fitness check, the cap on GHG emissions has been identified as the key mechanism used to apply the PPP as it enables a market price for the externality associated with GHG emissions. The development of the cap on GHG emissions shows how the application of the PPP has evolved under the EU ETS (Table 5-6).

The 2015 Evaluation of the EU ETS[169] (evaluating Phase 3) concluded that the allocation of free allowances was incompatible with the PPP as set out in Article 191(2) of the TFEU). During the initial 3 phases, the policy has slowly evolved to address the excess of allowances in the system (due to inaccurate estimates of emissions baselines and free allowances intended to protect the competitiveness of certain at-risk industries). Excess of allowances in the system meant it was not possible to create an effective carbon price and address the market failure. This has improved in phase 3 with the price of emissions allowances increasing, creating a greater incentive for decarbonisation.[170] However, a large portion of emission allowances are still allocated for free to protect at risk industries against carbon leakage. Under phase 4, the Carbon Border Adjustment Mechanism (CBAM) (COM(2023)330)[171] has been introduced, requiring companies in these sectors to pay for allowances to cover all of their emissions. By addressing the excess of allowances, the application of the PPP has strengthened. The revision of the ETS Directive under phase 4 and the CBAM have influenced the way the PPP is applied and by addressing the excess of allowances, the application of the PPP has strengthened.

In addition to the cap on GHG emissions, the change in scope under phase 4 of the EU ETS has extended the scope and enhanced the overall ambition of the policy thereby influencing the way the PPP is applied. In phase 4, the EU ETS covers GHG emissions from aircraft operators (Directive (EU) 2023/958). From 2024, the scope is extended further still to include emissions from maritime transport, installations for the incineration of municipal waste above a certain threshold as well as CO_2 emissions from fuel combustion in buildings, road transport and additional sectors (mainly small industry not covered by the existing EU ETS).

Table 5-6 Development of the cap on GHG emissions under EU ETS

Timeframe	Description of change	Implications for the PPP
Phase 1 (2005-2007),	A cap on allowances was introduced which was determined at national level. Allowances to industry were free and the scope of industrial activity and pollutants was limited to CO_2 emissions from power generators and energy intensive industries, and the penalty for non-compliance was €40/tonne.	Free allocations to industry weakened the economic incentive for certain polluters to address costs of pollution, weakening the application of the PPP. Penalty applied to incentivise polluter to address pollution.
Phase 2 (2008-2012),	The cap was lowered, NO_x was incorporated in the system and the share of free allocation was reduced slightly. The	Strengthening of both cap and penalties led to stronger application of the PPP.

169 Page 116 https://climate.ec.europa.eu/system/files/2016-11/review_of_eu_ets_en.pdf

170 https://ember-climate.org/data/data-tools/carbon-price-viewer/

171 https://commission.europa.eu/system/files/2023-06/COM_2023_330_1_EN_ACT_part1_v5.pdf

Timeframe	Description of change	Implications for the PPP
	penalty for non-compliance was increased to €100/tonne.	
Phase 3 (2013 – 2020)	The cap on emissions was strengthened (determined at EU level rather than national level). Phase 3 also saw the default method of allowance allocation modified to auctioning. Some free allowance allocation based on benchmarks remained as protection for industries at risk of carbon leakage.[172]	Amendments to the cap on emissions led to stronger application of the PPP.
Phase 4 (2021-2030)	In Phase 4, auctioning is the default method of allowance allocation. Companies require permits to cover the GHG emissions they produce, and auctioning these allowances creates a carbon price and therefore an incentive to reduce GHG emissions and meet the overall cap on emissions.	Phasing out free allocations strengthens the application of the PPP and the effectiveness of the cap. Extended scope to include all industrial installations, the aviation sector, buildings, road and maritime.

Effort sharing targets

For this fitness check, the legally binding national level GHG emissions reduction targets set for non-ETS sectors has been identified as the key mechanism used to apply the PPP as it requires these sectors to take action to reduce GHG emissions. The extent to which targets have developed is key to understanding how the application of the PPP has evolved for Effort Sharing sectors. Targets were first introduced by decision (for the period 2013-2020), requiring Member States to limit annual GHG emissions by setting national targets and collectively deliver a reduction of 10% in total EU emissions in effort sharing sectors compared to 2005 levels. Revisions to the targets and flexibilities were introduced for the 2021-2030 period, adopted by regulation. As legal instruments, both regulation[173] and decision[174] are legally binding, thus the change in legal act is not expected to have influenced the extent to which the PPP is applied in EU policy is dependent on national implementation of the policy in any way. However, the revision sets binding national targets for each Member State to reduce greenhouse gas emissions in sectors not covered by the ETS. These targets are based on the Member States' share of the EU's total non-ETS emissions and are designed to ensure a fair distribution of effort among the Member States. By setting targets at EU level, the ambition of the main policy mechanism used to apply the PPP is potentially strengthened by establishing a more level playing field between Member States and sectors. The effect of setting EU derived targets compared to nationally derived targets cannot be evaluated as the changes entered into force in 2023.

Reduction of national emissions (NEC) Directive 2016/2284/EU:

The PPP is applied principally via the attainment of EU determined national targets (emission reduction commitments). Underpinning this is the EU framework established by the Directive to guide Member State implementation of the legislation and ensure their commitments are met. The revision entailed more stringent commitments (transposing the reduction commitments for 2020 agreed by the EU and its Member States under the 2012 revised Gothenburg Protocol under the Convention on Long-range Transboundary Air Pollution (LRTAP Convention)). The revision

172 https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/development-eu-ets-2005-2020_en

173 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:regulation

174 https://eur-lex.europa.eu/EN/legal-content/glossary/decision.html#:~:text=A%20decision%20is%20a%20binding,EU%20treaties%20(primary%20law).

included the introduction of minimum content for the development of the National Air Pollution Control Programmes (NAPCPs) (including specific measures targeting the agricultural sector and emissions to reduce NH_3, and the need to identify sectors responsible for policies and measures adopted by the NAPCP). As noted for EQ1c, national emission reduction commitments and specified measures have facilitated a minimum degree of ambition in the types of measures adopted and compliance costs incurred by the polluter, although ultimately, implementation is dependent on Member State design of programmes.

The NEC Directive also refers to the use of EU funding and the need for the Commission to facilitate access to Union funds to support with the implementation of abatement measures (namely Horizon Europe for research and innovation, cohesion funds for structural and investment support, agricultural support under the CAP, and LIFE) (Article 7). The extent to which this is consistent with the PPP is ambiguous as there is a risk that the use of EU funds to support implementation of abatement measures is shifting the costs of pollution away from the polluter and back to society. The use of EU funds to support clean up action in this regard are assessed for EQ3.

Eurovignette Directive

The Directive establishes a framework to guide Member State implementation and sets a reference level for external-cost charges. The PPP is applied via road charges (tolls or vignettes) and the Directive is intended to recover costs incurred from the user, including

Working draft

- Infrastructure costs, i.e. costs of construction, operation, maintenance and development of the infrastructure network.
- External costs, i.e. the cost of congestion, air pollution, noise and climate change generated by vehicles (e.g. charges vary according to the vehicles CO_2 emissions and may vary to reduce congestion among other things)

Since 1999, the Directive was intended to move towards the application of the PPP. With the 2022 revision, Member States were required to apply external-cost charging to heavy-duty vehicles at least for air pollution, on networks covered by an infrastructure charge. Moreover, time-based charges for trucks were to be phased out; Member States may then decide to phase in distance-based charges, thus strengthening the way the PPP is applied by charging the kilometres driven. Moreover, since the 2022 revision (Directive (EU) 2022/362), the provisions are intended to further apply the PPP to cover costs for climate change by variating charges with the vehicles' CO_2 emissions, thereby strengthening the way the PPP is applied. The revision entered into force in 2022, meaning some initial effects of the changes in policy may be apparent. From 2026, Member States that apply tolls will be required to charge for air pollution as well as CO2 emissions.

As reviewed for EQ1c, whether tolls are used is left to the Member States discretion, meaning that despite changes to the way the PPP is applied by the policy, the extent to which it has led to strengthened implementation of the PPP is dependent on Member State implementation.

EU funding

The PPP is primarily applied via proofing whereby general EU rules for using public money for environmental protection[175] that stipulate:

- Aid cannot be granted if the beneficiary of the aid could be held liable for the pollution

175 Revised in 2022

- Undertakings generating waste should not be relieved from the costs of waste treatment.
- Aid should go beyond Union standards for environmental protection, increase environmental protection when no standards exist or prepare for future EU standards

Within the appraisal period there have been two programming periods for EU funds (2014-2020 and 2021-2027). Underpinning the extent to which proofing mechanisms have evolved was the introduction of the Do No Significant Harm Principle (DNSH) in 2020 for the 2021-2027 programming period[176]. DNSH aims to ensure that economic activities do not significantly harm the EU's environmental objectives[177]. Although not explicitly referenced in the policy provision establishing the DNSH principle, it was found to be relevant to some degree in implementing the PPP and applies to all of the funds reviewed.

The European Green Deal adopted the green oath to "do no harm" reflected in the Commission Communication on the European Green Deal in 2019. Further references to the DNSH are included in the EU Taxonomy Regulation, laying down the foundations for the six environmental objectives that are also to be assessed in the context of EU investments[178].

Despite the differences between the PPP and the DNSH principle (PPP is shifting the cost of pollution on the polluter, whereas the DNSH is aimed at vetting projects and beneficiaries), both aim to minimise the harmful environmental practices and maximise the conditionality requirements to meet certain environmental targets anchored in the EU respective funding programmes.

State aid rules

As reviewed for the state of play (section 4.2.1.2), since 2022 state aid rules require Member States to comply with the PPP for aid to be declared compatible. Notably, the Guidelines on State aid for climate, environmental protection and energy (CEEAG) explain that aid cannot be considered compatible where it supports the costs which the polluter must bear in accordance with the PPP.

Moreover, in 2023 the General Block Exemption Regulation (EU) 651/2014 (GBER) was revised to provide among others for:

- Increased possibilities to provide aid enabling Environmental protection and energy,
- Increased threshold for aids targeting Environmental protection and RDIs,
- Prolonged timeline for GBER (until 2026 included) which will support regulatory stability,
- Increased notification thresholds (i.e. maximum aid amounts above which the benefit of the block exemption does not apply and therefore the aid needs to be notified to the Commission),
- Alignment between GBER and other legislations, such as Guidelines on State aid for climate, environmental protection and energy 2022.

Planned changes to EU policy in progress for the year 2023

176 Art. 17 of Regulation (EU) 2020/852

177 The six environmental objectives set out in the EU's Sustainable Investment Regulation (2020/852) are: climate change mitigation, climate change adaptation, the sustainable use and protection of water and marine resources, the transition to a circular economy, pollution prevention and control, and the protection and restoration of biodiversity and ecosystems.

178 See e.g. explanation in the RRF technical guidance on the DNSH principle or the explanatory note on its application under cohesion policy

The EGD has triggered a further planned changes for a total of 37 policies in scope of the fitness check. In these cases either: an impact assessment is underway to support a planned proposal; a proposal has been published and negotiations between the Council and Parliament are underway; or an agreement has been reached between the Council and Parliament and the date for adoption set for the year 2023 or 2024.

The 37 policies are listed below. Those in bold are discussed in more detail as regards their potential to strengthen the way the PPP is applied in EU policy. The focus of this additional analysis was determined based on the significance of the changes to implementing the PPP (where specific policy provisions have been identified which are likely to impact on how costs are borne by the polluter).

Table 4-8: Planned revision to policies in scope of the fitness check

Policy area	Policy reference	Planned revision
Climate Change	Eco-design Directive 2009/125/EC	Ecodesign for Sustainable Products Regulation
	Alternative Fuels Infrastructure (AFI) Directive 2014/94/EU	Alternative Fuels Infrastructure (AFI) Regulation (EU) 2023/1804, adopted in September 2023)
	Energy Efficiency Directive (EED) 2012/27/EU	Energy Efficiency Recast (political agreement reached 24 July 2023 and new legislation adopted in September 2023)
	Energy Performance of Buildings Directive (EPBD) 2018/844/EU	Recast (proposal in 2021 - no political agreement)
	Energy Taxation Directive 2003/96/EC	Recast (proposal in 2021 - no political agreement)
	Fluorinated greenhouse gases Regulation (EU) No 517/2014	Recast (proposal in 2022 - no political agreement)
	Ozone depleting substances (ODS) Regulation (EC) No 1005/2009	Recast (proposal in 2022 - no political agreement)
	Renewable Energy Directive (RED) 2018/2001/EU	Recast (proposal in 2021 - no political agreement)
	Fuel EU Maritime Regulation (EU) 2023/1805	New policy
	ReFuelEU Aviation (EU) No 2023/2405	New policy
Waste and Recycling	Waste FD 2008/98/EC	Proposal for recast 2023 (no political agreement)
	Batteries Directive 2006/66/EC (and revision under adopted Regulation)[179]	Legislation adopted (July 2023)
	End of life Vehicles Directive 2000/53/EC	Proposal for recast 2023 (no political agreement)
	Waste Shipments Regulation (EC) No 1013/2006	Proposal for recast 2021 (no political agreement)
	Directive 94/62/EC on packaging and packaging waste	Proposal for recast 2022 (no political agreement)

179 Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC

Policy area	Policy reference	Planned revision
Water	Water FD 2000/60/EC	Proposal for recast 2022 (no political agreement)
	Urban Waste Water Treatment Directive (UWWTD) 91/271/EEC	Proposal for recast 2022 (no political agreement)
	Bathing Water Directive 2006/7/EC	The policy is under review and a revision is planned
	Drinking Water Directive (EU) 2020/2184	Proposal for recast 2018 (Member States had until 12 January 2023 to transpose into national legislation)
	Environmental Quality Standards Directive 2013/39/EU	Proposal for revision in October 2022 (no political agreement)
	Groundwater Directive 2006/118/EC	Proposal for revision in October 2022 (no political agreement)
	Ship-source pollution Directive 2005/35/EC	Policy is under review and a revision is planned
Air Quality	**Air Quality Directives (AAQD) 2008/50/EC and 2004/107/EC**	Proposal for a recast Ambient Air Quality Directive published on 26 October 2022.
	Industrial Emissions Directive (IED) 2010/75/EU	Proposal for revision in April 2022. A (no political agreement was reached in November 2023 but the legislation has not been formally adopted.[180]
	Medium Combustion Plant Directive (MCPD) (EU) 2015/2193	Revision of ELVs for new plants to regulate CO emissions, by January 2023. MCP Directive will be reviewed every ten years
Chemicals Risk management	Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation (EC) No 1907/2006	Policy is under review and a revision is planned
	Classification, Labelling and Packaging Regulation (EC) No 1272/2008	Policy is under review and a revision is planned
	Carcinogens and Mutagens Directive 2004/37/EC	Fourth update of the policy proposed by the Commission in September 2020
	Chemical Agents Directive 98/24/EC	Revision of the Directive announced by the Commission in October 2022
	Cosmetics Regulation (EC) No 1223/2009	Policy under review, Commission launched public consultation in March 2022, future revision planned
	Mercury Regulation (EC) 2017/852	Revision proposed by Commission in July 2023
	Persistent Organic Pollutants Regulation (EU) 2019/1021	Amendments of the Policy proposed by the Commission in October 2021
	Pesticides Directive 2009/128/EC	Revision announced by the Commission in September 2022
Nature, biodiversity,	EU soil strategy (COM/2021/699) and Law on Soil Monitoring	New policy

180 https://www.consilium.europa.eu/en/press/press-releases/2023/11/29/industrial-emissions-council-and-parliament-agree-on-new-rules-to-reduce-harmful-emissions-from-industry-and-improve-public-access-to-information/

Policy area	Policy reference	Planned revision
soil and land	Nature restoration law	New policy
Horizontal	Environmental Liability Directive (ELD) 2004/35/EC	Commission required to launch an evaluation by April 2023 and are considering a possible revision of the Policy
	Environmental Crime Directive (ECD) 2008/99/EC	Provisional agreement reached in a trilogue meeting, endorsed by JURI commitment on 11 Dec 2023, will be adopted 2024

Note: EU funding is subject to cyclical updates for each programming period and is not comparable with the planned revisions outlined above, thus EU funding legislation is not included in the table.

How these planned revisions may impact on the application of the PPP in EU policy are discussed below.

- **FuelEU Maritime Initiative** (new rules will apply from 1 January 2025): The main objective of the FuelEU Maritime initiative, as a key part of the EU's Fit for 55 package, is to increase the demand for and consistent use of renewable and low-carbon fuels and reduce the GHG emissions from the maritime sector, while ensuring the smooth operation of maritime traffic and avoiding distortions in the internal market. This initiative will introduce measures to prevent and control pollution from the maritime sector, incurring costs that will be borne by the polluter where costs of pollution were not previously regulated at EU level.
- **ReFuelEU Aviation Regulation**: The regulation aims to increase the supply and uptake of sustainable aviation fuels (SAF) at Union airports to reduce the environmental footprint of aviation. The mandating of SAF supply will present a cost to aviation fuel suppliers, which is expected to be passed on to the aircraft operators and ultimately passengers. The increased supply and uptake of SAF will result in reduced GHG emissions and air pollution. As above, this initiative will introduce measures to prevent and control pollution from the aviation sector incurring costs that will be borne ultimately by the polluter. Furthermore, in the Aviation sector the PPP is covered not only through ReFuelEU Aviation, but also through other several legislative pieces such as the Regulation on the deployment of alternative fuels infrastructure (AFIR – 2023/1804), Airport Charges Directive (2009/12/EC) and the EU ETS Aviation (2023/958). Regarding the latter - the aviation sector included in 2012 - Aircraft Operators must pay the full cost of the fossil kerosene emissions. Lastly, in the Commission proposal for the revision of the Energy Taxation Directive (which is now being negotiated by the co-legislators), a tax for both fossil kerosene and Sustainable Aviation Fuels has been proposed.
- **Batteries Regulation:** Under the agreed revision, battery passports are required to maximise the exchange of information and enable tracking of batteries. The economic operator that places the battery on the market is responsible for information contained in the passport. These amendments seek to facilitate better implementation and enforcement of EPR.
- **Packaging and packaging waste:** The proposal for revision means that by end of 2024, EU countries should ensure that producer responsibility schemes are established for all packaging, covering the financing or financing and organisation of the return and/or collection of used packaging and/or packaging waste and its channelling to the

most appropriate waste management option, as well as for reuse or recycling of the collected packaging and packaging waste. This aims to facilitate better implementation and enforcement of EPR.

- **Waste FD**: Introduces mandatory and harmonised EPR for textiles across the EU. The EPR would entail costs for producers/importers placing textiles on the EU market, which may be passed on to consumers. The costs are expected to account for approximately 0.6% of the total cost of the product (or €0.12 per t-shirt), while providing €3.5-4.5 billion annual returns for collection, sorting, re-use and recycling investment. The EPR is a key policy mechanism to strengthen the obligation on polluters to prevent and control pollution, as well as taking remedial action and adopt environmental liability (as identified for EQ1a).
- **UWWTD:** The 2022 revision requires producers to pay for the cost of removing micro-pollutants from waste water via an EPR scheme. As above, the EPR is a key mechanism to strengthening the obligation on polluters to prevent and control pollution, as well as taking remedial action and adopt environmental liability (as identified for EQ1a).
- **AAQD:** The proposal (published October 2022 and negotiations are in progress)[181] introduces the right to health damage compensation (to address challenges the public face in this regard, e.g. CJEU proceedings for C-61/21). This requires competent authorities to pay compensation to those who have suffered damage to health from air pollution. It would therefore carry mitigation costs for those who are held accountable for breaches of air quality standards (access to justice and compensation for health damage suffered from air pollution is currently not addressed in the Directive). Such a revision seeks to strengthen the way EU air quality acquis applies the PPP in relation to costs for environmental liability.
- **IED:** Key features of the revision that may relate to how the PPP is implemented include strengthened permit controls on air and water emissions. This aims to l facilitate a more consistent approach to implementing the PPP between Member States and regions and expand coverage of intensive farming and industrial activities. These strengthened existing measures to control and prevent pollution will incur costs borne by the polluter where pollution is currently resulting in environmental externalities.
- **Environmental Crime Directive**: the proposal introduces the recommended optional accessory sanction of an obligation to reinstate the environment within a given time period, provided that the damage is reversible, or, where the damage is irreversible, the obligation to compensate costs linked to the damage to the environment. Moreover, the clean-up of the environmental damage has to be considered as a mitigating factor which is also strengthening the implementation of the PPP.

Conclusions on EQ1e

As well as many significant changes to environmental policy, that means that the PPP applies to more ambitious policy, there are a limited number of changes specific to the way the PPP has been applied in EU policy during the appraisal period. Of the 21 policies that refer explicitly to the application of the PPP for the year 2023 (identified for EQ1a), in 3 pieces of legislation references to the PPP were introduced by the latest update (Ship Recycling Regulation (2013), Biodiversity Strategy (2020) and EU ETS (2023)). In all three cases, reference to the PPP was introduced via the recitals, thus reinforcing the PPP as an underlying principle but where the legal obligation to

181 Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on ambient air quality and cleaner air for Europe (recast). COM/2022/542 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A542%3AFIN

apply the PPP is in the TFEU and not the individual policy. Changes in the legal text that amend the way the PPP is implemented were identified in only 5 policies (Waste FD, Extractive Waste Directive, EQS Directive, IED, and the Eurovignette Directive).

The planned revision of a further 33 policies and the introduction of 4 new policies/ initiatives relevant to the application of the PPP in EU policy was triggered by the EGD. The planned revisions are expected to strengthen the way the PPP is applied. In particular, via extended scope of measures to prevent and control pollution (e.g. proposals for initiatives to regulate the maritime and aviation sectors), better enforcement of EPR (including for the Batteries Regulation, Packaging and Packaging Waste Directive, for textiles under the Waste FD and UWWTD), and access to health damage compensation (e.g. for AAQD).

5.2.1.6. Stakeholder feedback for EQ1

While some respondents noted in their open response text that the absence of specific measures and implementation requirements in relevant legislation and individual legal acts is a barrier to effective implementation of the PPP, our findings show that despite the limited legal references to the PPP in EU policy, there is a wide range of policy provisions used to apply the principle (EQ1a). In some cases, the implementation gaps referred to by respondents relate to specific policy areas not in scope of the fitness check including customs law, intellectual property law, e-commerce law and nuclear energy.

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Examples of effective policies that implement the PPP were identified by a number of respondents to the public consultation, including the EU ETS and IED, (notably for the latter it is the combination of the IED and BAT conclusions that are perceived as effective (and efficient implementation of the PPP by the industrial community. This is consistent with our review for EQ1a that identifies policy provisions for these policies to ensure costs of pollution are largely met by the polluter.

Respondents to the public consultation are largely of the opinion that market-based/economic instruments and command and control measures are more effective than voluntary approaches. This is aligned with findings presented for EQ1b, that voluntary actions are not commonly used to apply the PPP. Findings for EQ1c further show that initiatives involving voluntary participation are at risk of inconsistent implementation at national and local levels. Participants did not hold significantly differing views on the effectiveness of MBI vs command and control instruments in implementing the PPP: 61% (162) of respondents indicated that market-based/economic instruments were sufficiently (26%, 69) or fully (35%, 93) effective. Slightly fewer respondents – 56% (150) indicated that command and control measures were sufficiently or fully effective (27%, 72 – 'fully effective'; 29%, 78 – 'sufficiently effective'). Findings of our analysis are more nuanced whereby the use of MBI is effective for addressing costs of environmental damage, but subject to implementation decisions taken at national or local level whereas command and control instruments are effective for addressing costs of pollution prevention and control on the basis that implementation costs are incurred by the polluter.

Respondents to the public consultation raised concerns that the use of exemptions and derogations permitted under EU policy has prevented the application of the PPP (e.g., "Many EU directives contain exemptions or derogations that prevent the full internalisation of negative environmental externalities. Article 8(4) of the ELD exempts the polluter from most of the damages caused to the environment if the pollution is permitted through an operating permit. Article 15(4) of the IED provides a cost-benefit assessment for derogating from stricter emission limits. Article 4 of the Water Framework Directive (WFD) exempts the water bodies from achieving good status

and extending the good status date even beyond 2027."). This complements our findings as regards the use of derogations resulting in potentially less stringent application of the PPP by Member States (EQ1c). One public authority respondent raised concerns regarding the national implementation of the PPP owing to political challenges in implementing it.

As regards improvements to the implementation of the PPP throughout the appraisal period, respondents to the public consultation in water, waste, and wastewater sectors noted that failure to introduce EPR in several recent policy revisions is a lost opportunity for strengthening the implementation of the PPP. Examples given by respondents are the IED, DWD and Sustainable Use of Pesticides Directive. This is consistent with our findings where we have identified comparatively limited evidence of improved implementation between 2014 and 2023.

Some workshops' participants noted the lack of application of the PPP in specific areas/sectors due to gaps in legislation. Participants provided examples of sectors (drinking water supply, shellfish farming, transport, ship recycling, energy, etc.) where the PPP has not been fully or correctly applied.

Few interviewees provided examples where, in their opinion, the **implementation of the PPP has been improved**. These examples covered policies in the areas of cement industry, waste, and single-use plastics. Some interviewees referred **to specific gaps or lack of the application of the PPP** in specific legal acts, such as the Energy Taxation Directive, REACH, the Environmental Liability Directive, and the Water Framework Directive. Many respondents indicated **general issues**, such as identifying and defining the polluters that have affected the effectiveness of various PPP instruments and the focus of the existing PPP measures on supporting the linear business models instead of encouraging businesses to move towards sustainable and circular business models.

Furthermore, the respondents indicated sectors/policy areas where the PPP has not been (sufficiently) applied. Several sectors were mentioned by the interviewees, including **aviation, maritime shipping, drinking water, wastewater management, waste generation, agriculture and aquaculture**.

5.2.2. EQ2 The extent to which the PPP is effective in delivering efficient environmental improvements

To answer this question, first we compared pollution trends relevant to 8th EAP priority objectives (as an indicator of environmental improvements) and national expenditure on environmental protection (as a proxy for the extent to which corporations and households, in particular, are paying the costs of pollution). Second, we reviewed how the different legal instruments are contributing to trends in both pollution and expenditure on environmental protection to examine the extent to which the PPP is effective in delivering efficient environmental improvements in practice.

Points of comparison: Progress is measured against the national expenditure on environmental protection compared with environmental trends for 8th EAP priority objectives and associated damage costs.

5.2.2.1. EQ2a. To what extent has the PPP contributed to the reduction of pollution?

To determine the extent to which the PPP has contributed to the reduction of pollution, we compare pollution trends for headline indicators used to track progress for the 8th EAP priority objectives with national expenditure for environmental protection (NEEP)[182]. This comparison is used to establish broad trends between pollution and costs of pollution.

The EEA monitor certain selected headline indicators, which enable progress to be tracked towards the 8th EAP priority objectives.[183] The trends of most relevance to each priority objective are introduced and discussed below. Most of the data was extracted from the EEA headline indicator website and reflects the available data as of December 2023.[184] We have based our analysis on 8th EAP headline indicators, where possible, to align with the approach taken for the grouping of policies (section 1.2.3). There is no equivalent EEA headline indicator for chemical risk management or noise quality and therefore no pollution trends have been presented for these policy areas. The EEA headline indicators to monitor progress towards 8th EAP priority objective 6 on environmental and climate pressures do not correspond to the policies grouped under this policy area for the fitness check and no pollution trends have been presented for this PO either. Table 4-9 provides an overview of the indicators used for the analysis in this question.

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Table 4-9 Headline indicators for each 8th EAP priority objective

Priority Objective		Indicators used to describe pollution trends
1 and 2	Climate Change Mitigation and Adaptation	Total greenhouse gas emissions in Europe (tonnes CO_2e)
3	A regenerative circular economy	Total waste generation (tonnes)
4	Zero pollution and a toxic free environment	Nitrates in Groundwater Premature deaths attributable to exposure to $PM_{2.5}$
5	Biodiversity and ecosystems	Common Bird Index

Note: Policies grouped for PO6 Environmental and climate pressures related to EU consumption and production were not included in this analysis

To compare how expenditure has changed over time at EU level, NEEP is presented as a total value of expenditure by corporations and households, and as a percentage of EU27 GDP. Member State coverage of NEEP data were incomplete between 2014 and 2017. To present an EU27 total, we interpolated expenditure data based on data available for the years 2018 to 2022[185]. Pollution trends for each of the above indicators were also indexed to enable a comparison with the NEEP to show how it has evolved with changes in economic growth. In addition to the broad pollution trends compared with NEEP data, we compiled supplementary quantitative data on pollution trends together with a qualitative description of the environmental pressure. This evidence is presented in Appendix 2.

This approach is intended show the broad trends in how the PPP is effective in delivering efficient environmental improvements. To examine the extent in more concrete terms, the extent to which the PPP applied via EU policy has led to a price signal which has contributed to the reduction in

182 EQ1d explains the relevance of NEEP data to monitoring costs of pollution

183 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022DC0357

184 https://www.eea.europa.eu/en/topics/at-a-glance/state-of-europes-environment/environment-action-programme. [Accessed 6 February 2024]

185 NEEP by corporations was interpolated between 2014-2017 for Czechia, Denmark, Germany, Croatia, Cyprus, Latvia, Hungary, Netherlands, Austria, Slovakia and Sweden, and between 2014-2015 for Italy. NEEP by households was interpolated between 2014-2017 for Czechia, Denmark, Germany, Greece, Cyprus, Latvia, Lithuania, Hungary, Netherlands, Austria, Slovakia and Sweden, and between 2014-2015 for Italy.

pollution over the appraisal period is examined for specific policy mechanisms under EQ2b. Additional analysis on the extent to which the application of the PPP has impacted on marginal price elasticities is included in the accompanying issue paper on taxes.

Key finding(s)	Robustness
As a share of GDP, expenditure on environmental protection by corporations and households has increased very slightly throughout the appraisal period at the same time as pollution trends have improved (for selected EGD headline indicators). This shows that the costs of pollution are partially being addressed by polluters but there is no clear correlation with broader pollution trends which suggests that expenditure on environmental protection are not a determining factor on achieving the environmental improvements at EU27 level.	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Comparison with NEEP trends

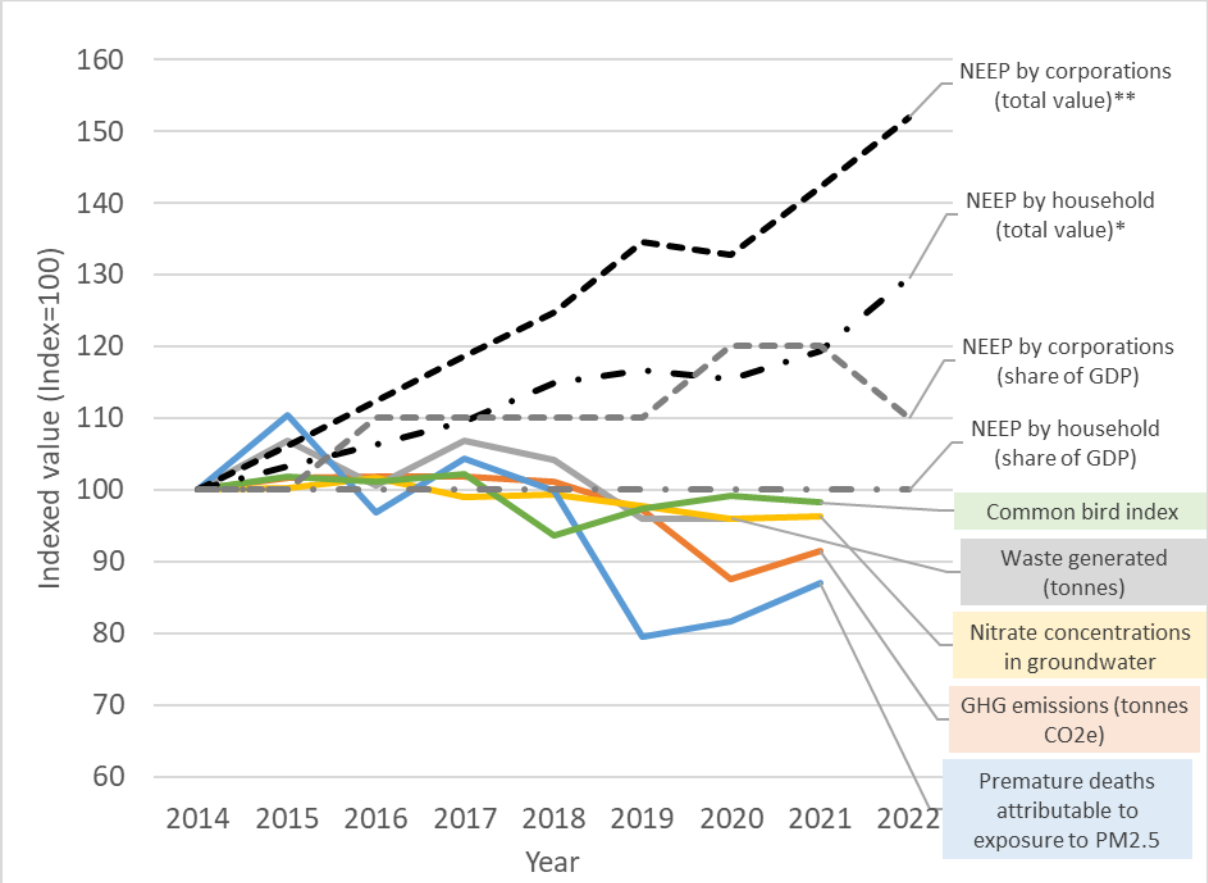
The total value of NEEP by corporations and households has increased overtime. Compared to GDP, the value of NEEP by corporations has increased less dramatically and by households it has it has remained constant. The increase in index value of NEEP by corporations as a percentage of GDP observed in 2020 is likely to have occurred as a result of the COVID-19 pandemic, given the sizeable, albeit temporary contractions in GDP.

Compared with environmental trends presented for 8th EAP headline indicators, the following has been observed:

- A noticeable reduction in GHG emissions and the number of premature deaths attributable to exposure to $PM_{2.5}$.
- The indexed values for waste generated and nitrate concentrations in groundwater show a more subtle degree of improvement.
- The common bird index shows a fairly static trend, implying limited improvement has been achieved according to this indicator.
- The extent to which costs are being addressed by the polluter may be facilitating a reduction in pollution; however, it is also noted that the costs are an indication of the scale of pollution costs. Overall, there is no clear correlation with the value of NEEP as a share of GDP, which suggests that expenditure on environmental protection are not a determining factor on achieving the environmental improvements at EU27 level.

While we can infer that the costs are generally being incurred to a greater extent by corporations and households, the data does not show which economic sectors or activities are bearing these costs, nor which specific environmental domains are benefitting from the costs paid. Moreover, the pollution trends are influenced by more than national expenditure on environmental protection, rather they are an indication of the in-combination effect of EU and national environmental acquis. To better understand the extent to which an increase in NEEP has contributed to the reduction of pollution requires a more detailed examination of the policy mechanisms used to implement the PPP (as reviewed for EQ2a for selected examples).

Figure 5-11 Indexed NEEP by corporations and households compared to indexed pollution trends for selected 8th EAP headline indicators



Note : Data interpolated for NEEP between 2014 and 2017. Data interpolated for waste generated for intermittent years to enable comparable presentation of trend with other indicators used (2015, 2017, 2019).

Source: Logika Group, based on Eurostat (NEEP [ENV_AC_EPNEIS1]; GHG emissions [ENV_AC_AIBRID_R2]); Waste generated [ENV_WASGEN] ;Common bird index [ENV_BIO$_3$]) and EEA (Nitrate concentrations[186] ; Premature deaths[187]

Conclusions on EQ2a

As a share of GDP, expenditure on environmental protection by corporations and households has increased very slightly throughout the appraisal period at the same time as pollution trends have improved (for selected EGD headline indicators). The scale of improvement varies by headline indicator, with more prominent evidence of improvement apparent for climate and air pollution.

This shows that the costs of pollution are partially being addressed by polluters but there is no clear correlation with broader pollution trends which suggests that expenditure on environmental protection are not a determining factor on achieving the environmental improvements at EU27 level. Moreover, expenditure on environmental protection does not show which economic sectors or activities are bearing these costs, nor which specific environmental domains are benefitting from the costs paid.

186 https://www.eea.europa.eu/data-and-maps/daviz/nitrate-in-groundwater-and-rivers-1#tab-chart_2

187 https://www.eea.europa.eu/en/analysis/indicators/health-impacts-of-exposure-to

To examine the evidence in more concrete terms, the extent to which the PPP applied via EU policy has led to a price signal which has contributed to the reduction in pollution over the appraisal period is examined for specific policy mechanisms under EQ2b. The analysis focusses on policy areas where implementation of the PPP has improved over time based on the analysis undertaken for EQ1e.

5.2.2.2. EQ2b. How do policy mechanisms used to apply the PPP provide environmental protection and contribute to the improvement of the environment?

The purpose of this question is to review how EU policy is implementing the PPP to contribute to the improvement of the environment. The analysis is grouped according to the types of legal instruments used to apply the PPP which are defined for EQ1b (Table 5-1). They are command and control instruments, market-based instruments (MBI) and voluntary actions. Based on their relevance to implementing the PPP in EU policy (as reviewed for EQ1b), the focus of this analysis is on command and control instruments and MBI.

To review how the legal instruments are expected to contribute to the improvement of the environment, we focussed on the policy provisions used to implement the PPP as defined for the state of play and reviewed sector analysis together with evidence compiled from existing policy evaluations, focussing on policy areas where implementation of the PPP has improved over time based on the analysis undertaken for EQ1e. We then reviewed the extent to which implementation is impacting the overall trends described for EQ2a.

Key finding(s)	Robustness
The PPP is effectively contributing to environmental improvements via command and control instruments that contain policy provisions to address costs of pollution prevention and control. This finding is based on existing policy evaluation where it is demonstrated that prevention and control costs are borne by the polluter at the same time as reductions in pollution are achieved. But there remains an issue with allowable residual pollution (leading to environmental damage costs) as well as issues of non-compliance that result in environmental externalities where costs are not borne by the polluter.	Strong
The PPP is effectively contributing to environmental improvements via MBI where a price signal is established that places a value on pollution. This finding is based on the extent of revenue generated by environmental taxes and evidence compiled from existing policy evaluation where it is demonstrated that said price signals are achieving reductions in pollution. Except under the EU ETS where there is a standard EU carbon price, there is variation between Member States in the expected effectiveness of MBI to deliver environmental improvements owing to the varied use of taxes and pollution charges and varying degrees of ambition when used.	Strong
The PPP is less effectively contributing to environmental improvements via MBI where sanctions are used to address costs of pollution. Based on the example of the ELD, the challenge impeding effectiveness is the varied approach to implementation when establishing environmental liability which has led to a varied implementation of the PPP between Member States and sectors.	Strong
There are co-benefits arising from the implementation of the PPP at company level whereby the PPP is spurring innovation including technological advances.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Command and control instruments

The findings for EQ1b show that the most commonly used type of legal instrument to implement the PPP in EU policy is command and control. Command and control instruments are consistent with the PPP where the relevant implementation (prevention and control) costs are borne by polluter (OECD, 2008). In such cases, policy evaluation finds that environmental benefits are being delivered by the policy and implementation costs are often borne by the polluter[188].

Market based instruments

MBI are consistent with the PPP where an economic incentive is provided to the polluter to not pollute (OECD, 2008). Meaning that the use of MBI to implement the PPP has a positive influence on the overall trends in pollution reductions where the price signal is reflecting the value of an economic activity, including the value of environmental externalities. To review effectiveness of MBI, we thus review the extent to which pricing of pollution is adequately captured by MBI used to implement the PPP.

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The findings for EQ1b show that MBI that place a price on pollution (and particularly on environmental externalities) are the second most commonly used type of policy mechanism to implement the PPP in EU policy. This review focusses on prominent examples of MBI used to apply the PPP where implementation of the PPP is understood to have improved overtime (reviewed for EQ1e), including carbon pricing under the EU ETS and the Energy Taxation Directive, waste management pricing via pollution charges and taxes (as used to implement EU waste management policies), or sanctions under the ELD.

As a separate point, we note that Member State systems of environmental taxation include tax expenditure, which can include tax relief, the application of reduced rates and refunds. Particularly when applied to corporate income tax, relief for environmental protection may influence the price signal. For example, reduced corporation tax for investment in clean technologies, where the price signals have provided an incentive.

The use of auctions and taxes to address pollution costs: Example of EU ETS and Member State carbon taxes

The EU ETS is the main carbon pricing instrument in the EU, followed by carbon taxes. There is a range of evidence to show that carbon pricing is effective in reducing emissions. We have reviewed the effectiveness of the EU ETS as well as a selection of Member State carbon taxes.

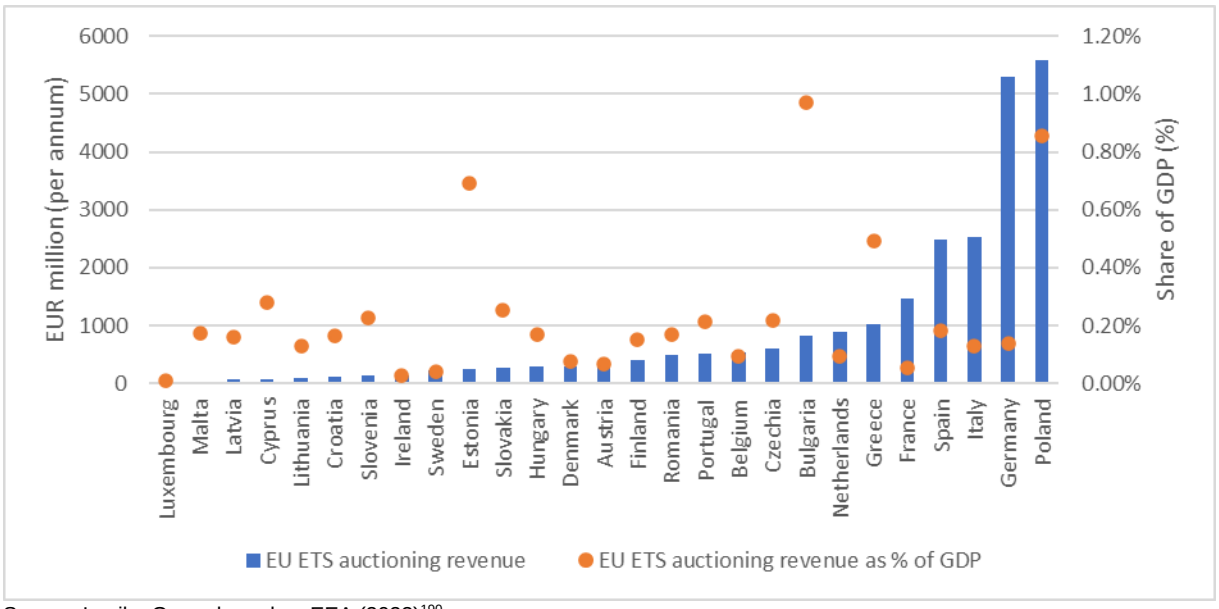
Under the EU ETS, auctioning revenue is an indication of the costs borne by the polluter to implement the PPP. Figure 5-12**Error! Reference source not found.** shows this revenue as a total value and as a share of GDP to enable comparison between Member States.

188 Examples of relevant policy evaluation in this regard were identified as part of the evidence review summarised in Annex 1. Pertinent examples include: 2019 fitness check of air quality acquis (SWD(2019)427); evaluation of the fuel quality directive (2017); evaluation of END (2016); fitness check of chemical risk management acquis (2019); evaluation of regulation for plant protection products (2020); Alternative Fuels Infrastructure – evaluation (2019); evaluation of the energy efficiency directive (2016); evaluation of the energy taxation directive (SWD(2019)329); evaluation on F-gas Regulation (2022); evaluation on the IED (2020); fitness check of water acquis (2019); fitness check of nature directives (2019); evaluation of the batteries directive (2019); end-of-life vehicles directive evaluation (SWD/2021/0060); evaluation on waste shipments (SWD(2020)26).

As a share of national GDP, auctioning revenue ranges between 0.01% (Luxembourg) and 0.97% (Bulgaria), with the majority of Member States between 0.1 and 0.2% (13 Member States). It is highest in Greece (0.5%), Estonia (0.7%), Poland (0.9%) and Bulgaria (1%). As a total value, costs are significantly greater in Germany (EUR 5 306) and Poland (EUR 5 594 million) compared to other Member States (accounting for 21% and 22% of the total EU27 revenue generated, respectively). In the case of Germany, the revenue generated is comparable to other Member States as a share of its national GDP (0.14%), which suggests that while costs are high, they are proportionate to economic activity and the associated costs of pollution. In the case of Poland, the revenue generated is a higher share of the national GDP compared to other Member States (0.85%), which suggests that the costs are high in Poland, Bulgaria and Estonia compared to other Member States. This is consistent with the energy mix in these countries and the challenges highlighted for the country in achieving a just and fair transition[189].

At the other end of the spectrum, auctioning revenue is lowest in Luxembourg (EUR 8 million; accounting for 0.01% of GDP). This reflects the comparatively low industrial activity in Luxembourg, for which the associated costs of pollution are also expected to be low.

Figure 5-12 Member State auctioning revenue under the EU ETS (2021 revenue)



Source: Logika Group based on EEA (2023)[190]

As presented in Appendix 2, the decrease in overall GHG emissions over the appraisal period can be mainly attributed to EU ETS sectors, in particular between 2017 and 2020. Emissions from the effort sharing sectors have not shown much change since 2014, and emissions from LULUCF have increased. Analysis in the European Environment State and Outlook 2020 report supports this, and states that emissions covered by the EU ETS decreased more rapidly up to 2017 than sectors not covered by the ETS. Two thirds of the emission reductions observed between 2005 and 2017 were accounted for by the ETS and one third was non-ETS sectors. ETS emissions reductions have largely been caused by improvements in carbon-intensity and energy efficiency in the heat and power sector. Of the effort sharing sectors, improvements since 2005 have been

189 https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7413

190 EEA (2023) Use of auctioning revenues generated under the EU Emissions Trading System. https://www.eea.europa.eu/en/analysis/indicators/use-of-auctioning-revenues-generated

mostly visible for buildings, non-ETS industry and waste management. Transport emissions have increased consecutively since 2013.[191]

The OECD (2021) find that the most effective approach to carbon pricing is combining a partial ETS with the use of taxes. Nonetheless, in the EU, the EU ETS is the main instrument used in this regard, achieving a 37% reduction in GHG emissions from electricity and heat generation and industrial production since 2005 (COM(2023)654)[192]. In 2022, overall emissions in the EU ETS amounted to 1 362.1 million tonnes CO_2eq (a reduction of 1.8% compared to 2021 emission levels amounting to 1 364.9 million tonnes CO_2eq). Industrial installations were responsible for 6.5% of this reduction while emissions from electricity and heat generation increased by 2.4%. This increase in emissions from electricity and heat generation has occurred following the energy crisis in Europe which has led to a higher use of fossil fuels in electricity generation. However, since 2005, emission reductions from electricity and heat generation are far more significant than those achieved by industry (38% reduction compared to 3% for industry). One of the key factors that explains this difference is the limited use of free allowances for electricity and heat generation compared to industry (Carbon Market Watch, 2023)[193].

Isermeyer et al (2019) find that the advantages of carbon pricing policies which comprise a large number of emitters (such as the EU ETS) are that they provide a price signal to producers and consumers which incentivises development and implementation of technologies to reduce emissions. There is good evidence of these co-benefits where the implementation of the PPP has spurred technological advancements thereby addressing other market-failures and externalities such as path-dependency, knowledge spillovers, network externalities or learning-by-doing. Carbon pricing has been found to spur innovation and investment in low-carbon technologies, such as carbon capture and utilisation or electrolytic hydrogen (Aghion et al., 2016; Calel and Dechezleprêtre, 2016). Also in the case of the EU ETS, other market-failures and externalities are addressed including 'path-dependency, knowledge spillovers, network externalities or learning-by-doing require additional instruments, e.g. direct research and development (R&D) support or support for infrastructure and technology adoption and deployment' (Dechezleprêtre et al., 2022). Furthermore, revenue generated for the next generation of EU own resources[194] via the Emission Trading System (ETS) and its planned extended scope will fund the Social Climate Fund (external to MFF)..

There are factors that undermine the effectiveness of carbon pricing as a mechanism to provide a price signal which include price volatility (in the case of the EU ETS) and uncertainty in abatement costs (for carbon taxes) (OECD, 2021). The OECD find that price volatility can hinder investment in low and zero-carbon technologies. Price volatility under the EU ETS varies each year but has reduced in 2023 as indicated by the narrower price range (between EUR 75.04 in January and EUR 96.33 in February compared to the range in 2022, peaking in February (EUR 97.51) and dropping to EUR 57.91 in March following Russia's invasion of Ukraine). Under the EU ETS, the impact this price volatility has on investment is mitigated by the cap on carbon emissions and more recently by the market stability reserve. From this, we find that risk of price volatility having a negative impact on the effectiveness of carbon pricing under the EU ETS are

191 Page 162 - https://www.eea.europa.eu/soer/publications/soer-2020

192 Report from the Commission to the European Parliament and the Council on the functioning of the European carbon market in 2022 pursuant to Articles 10(5) and 21(2) of Directive 2003/87/EC. https://climate.ec.europa.eu/system/files/2023-10/COM_2023_654_1_EN_ACT_part1_CMR%2BSWD.pdf

193 Carbon Market Watch (2023) The Emissions Artistocracy. cmw_report-2.pdf (carbonmarketwatch.org)

194 https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2021-2027/revenue/next-generation-eu-own-resources_en

limited. Analysis by ESMA (2022)[195] supports this, noting that the observed evolution of carbon prices and volatility seem to have followed market fundamentals.

The use of pollution taxes and other charges: Example of waste management policies

To review the effectiveness of pollution taxes and other charges under EU waste management policies we first review the extent of their use in terms of scale and coverage. We then compare use with broader waste management trends to examine whether there is a positive correlation between the two.

Extended polluter responsibility (EPR) applies in most EU waste management policies and is considered central to the effective application of the PPP in waste management. Guidance on the use of EPR highlights that EPR implements the PPP by requiring the economic agent responsible for production to avoid pollution (Bio by Deloitte, 2014)[196]. In theory, EPR requires producers to internalise treatment and disposal costs, thereby providing an economic incentive to producers to avoid pollution. Thus, the use of EPR holds the producers responsible for the environmental impacts of their products taking a whole life cycle approach, including the end-of-life management.

Often, EPR is applied via MBI designed to incentivise the producer of waste to reduce waste according to the waste hierarchy (i.e. prioritising the prevention of waste, followed by reuse, recycling, energy recovery and lastly disposal). Based on evidence compiled by the EEA and ETC CE (2022)[197], the EEA (2023)[198] report that the most common MBI used to implement EU waste management policies is the landfill tax (applied by 22 Member States). Less common, are incineration taxes (applied by nine Member States). Tax rates are determined at national level and range between EUR 11 and 95 per tonne of landfill (in Slovakia and Latvia respectively). On average incineration taxes are set at a lower level than landfill taxes (EU 27 average of ~EUR 20-30/tonne of incinerated waste compared to ~EUR 40-50/tonne of landfill).

As a measure of their effectiveness, IEEP (2021) [199] calculate the rates of internalisation for waste management and find that they vary from 0.01% in Romania to just over 20% in Malta, with 17 Member States below a rate of 5%, and 11 below 1%. Noting that they only represent costs internalised via taxation and no other policy provisions, these estimates align with the varying levels of application of the PPP across EU Member States. Notably in the case of waste management, these estimates do not include costs (such as taxes) collected by municipal authorities.

195 ESMA (2022) Emission allowances and associated derivatives. https://www.esma.europa.eu/sites/default/files/library/esma70-445-38_final_report_on_emission_allowances_and_associated_derivatives.pdf

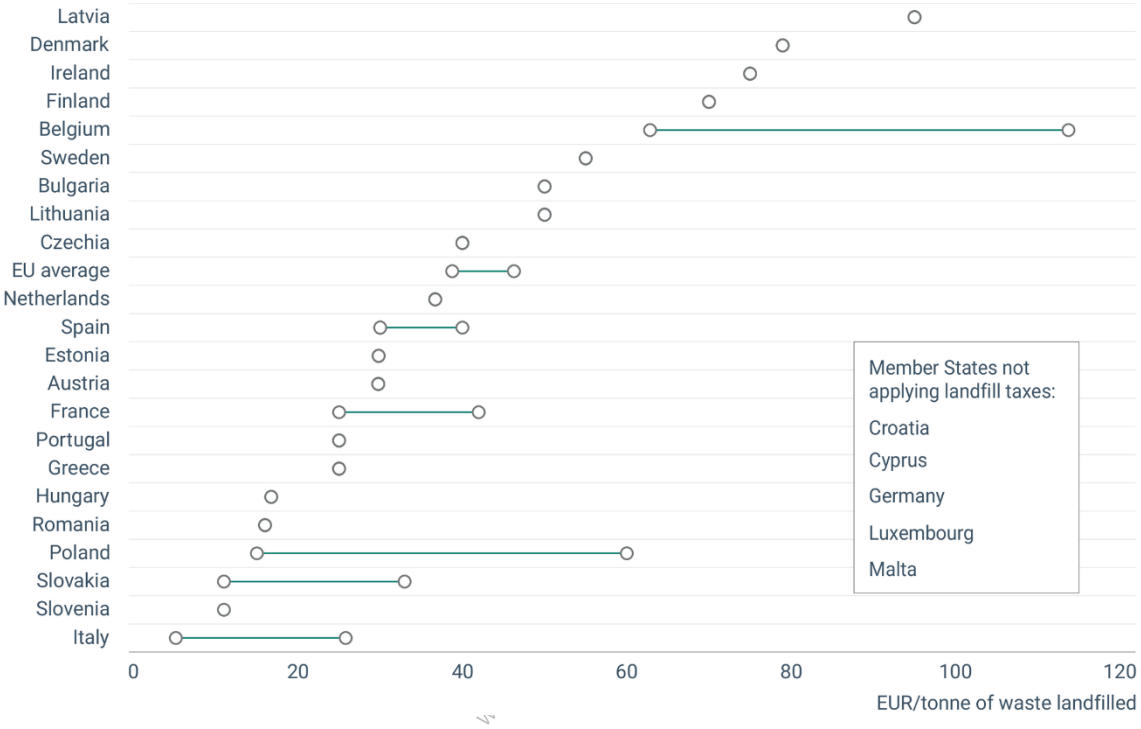
196 Bio by Deloitte et al (2014) Development of Guidance on Extended Producer Responsibility.

197 EEA and ETC CE (2022), EEA early warning assessments related to the 2025 targets for municipal waste and packaging waste (https://www.eea.europa.eu/publications/country-profiles-early-warning-assessments) accessed 6 June 2023.

198 EEA (2023) Economic instruments and separate collection systems — key strategies to increase recycling. https://www.eea.europa.eu/publications/economic-instruments-and-separate-collection

199 European Commission (2021). Green taxation and other economic instruments: Internalising environmental costs to make the polluter pay. https://environment.ec.europa.eu/system/files/2021-11/Green%20taxation%20and%20other%20economic%20instruments%20%E2%80%93%20Internalising%20environmental%20costs%20to%20make%20the%20polluter%20pay_Study_10.11.2021.pdf

Figure 5-13 Overview of taxes on the landfilling of municipal waste in EU Member States, 2023



Source: EEA (2023)

Figure 5-14 Overview of taxes on the incineration of municipal waste in EU Member States, 2023



Source: EEA (2023)

In keeping with the principle of EPR, pollution charges in the form of waste collection fees are increasingly being used by Member States to incentivise the waste producer to reduce waste generation and sort their waste (pay-as-you-throw schemes, PAYT). Figure 5-15 shows that the majority of Member States have a PAYT system (21 Member States). Moreover, it is noted that where no PAYT system is in place (Cyprus, Greece, Malta, Latvia, Poland and Portugal), plans are underway to introduce one in Cyprus, Greece and Malta. Another MBI used to implement waste management policies are separate collection systems that require the waste producer to separate their waste at source (primarily used for bio-waste, followed by paper and cardboard, plastics, wood, glass, metals, textiles and waste electrical and electronic equipment). Collection systems vary widely across but also within countries. The convenience and type of waste collected are used as indicators to review implementation of the systems adopted.

In general terms, the effectiveness of taxes to reduce pollution can be measured in terms of trends for recycling, landfilling and incineration (indication of where the use of MBI have incentivised a change in waste management). The OECD find that PAYT systems typically have a positive impact on recycling rates (2019)[200]. From this, it can be inferred that the higher the share of the population covered by a PAYT system, the higher the recycling rates. Based on the information presented in Figure 5-15, a comparison at EU level shows:

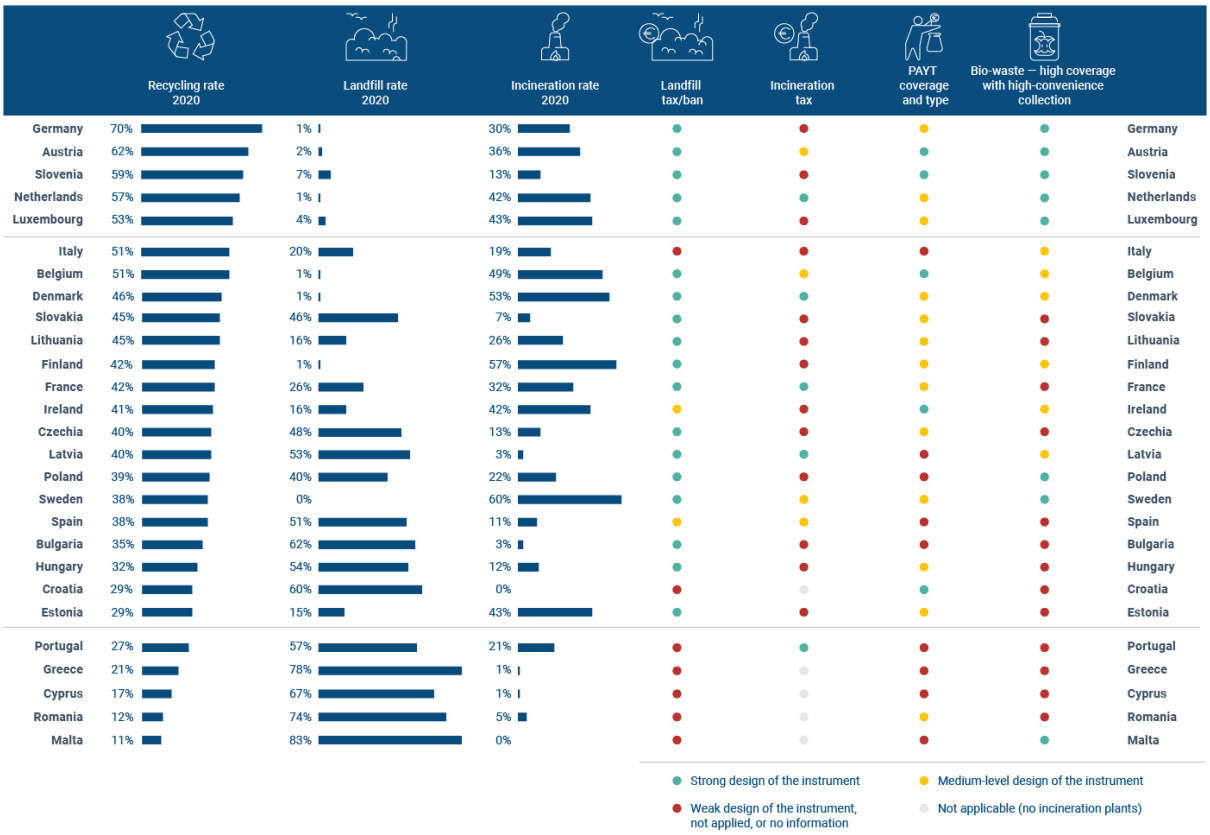
- Member States with the highest recycling rates (53-70%) are Germany, Austria, Slovenia, the Netherlands and Luxembourg. These Member States have implemented:
    - A well-designed landfill tax or ban, or combination of both
    - High-convenience systems for the separate collection of bio-waste with a high share of the population able to access them
    - Established PAYT schemes (although the share of the population able to access them varies)
- Member States with the lowest recycling rates (11-27%) are Malta, Romania, Cyprus, Greece and Portugal. These Member States have not implemented a well-designed landfill tax or ban.
- The impact of incineration taxes on the rates of recycling, landfilling and incineration is ambiguous where a Member State has high rates without using MBI (for example Italy) and vice versa (for example Sweden).

Another example of the effectiveness of taxes to reduce pollution is the tax on plastic bags which has led to a reduction of 55 bags per person per year (where the average person used 74 bags per annum in 2019 before the tax was introduced, down to 17 per person per annum in 2022) (Swedish Environmental Protection Agency)[201].

200 OECD (2019), Waste management and the circular economy in selected OECD countries: evidence from environmental performance reviews, OECD Environmental Performance Reviews, OECD Publishing, Paris (https://doi.org/10.1787/9789264309395-en).

201 https://www.sustainableplastics.com/news/sweden-plans-abolish-plastic-bag-tax-2024

Figure 5-15 Recycling, landfill and incineration rates for municipal waste and key policy instruments used



Source: EEA (2023)

There is strong evidence to show that the use of EPR in EU waste policies is providing a price signal that has contributed to environmental improvements. There are issues where the post-consumption cost is insufficient, or where the costs are passed on to the consumer thereby weakening the price signal for producers to avoid pollution (Bio by Deloitte, 2014).

The use of taxes and pollution charges to address pollution costs: zero pollution ambition

There is significant variation across the EU of the degree air and water pollution is taxed. Examples of the charges and taxes that apply at national level are outlined below.

Table 5-7 Taxes and pollution charges that implement the PPP at national level

National level intervention	Approach to implementing the PPP
Act No. 201/2012 Coll. on air protection (Czech Republic)	The Act requires the operators of stationary industrial emissions sources to pay a fee per tonne of PM_{10}, SO_2 and NO_x emitted. Fees were applicable prior to 2012, although the impact of the fees during this period was limited as they were not at a level that created motivation for polluters to change their practices[202].
Act No. 254/2001 Coll. (Water Act; Czech Republic)	The Water Act places an obligation on entities to pay a fee for discharging waste water into surface waters. *"The fee must be paid if the discharged waste water exceeds given limits (of concentration and weight). The fees differ per pollutant*

202 https://ieep.eu/wp-content/uploads/2022/12/CZ-Air-Pollution-Fee-final.pdf p. 8

National level intervention	Approach to implementing the PPP
	(for example, if nitrogen exceeds its given limit the fee amounts to CZK 30 / kg, if phosphor exceeds its given limit the fee amounts to CZK 70 / kg and if mercury exceeds its limits the fee amounts of CZK 20 000 / kg)."[203][202]
Gesetz über Abgaben für das Einleiten von Abwasser in Gewässer (effluent tax, Germany)	Since 1981, Germany has levied an effluent tax on the discharge of effluent to water bodies. The tax levied depends on the harmfulness of the effluent. Among others, the tax applies to emitting industrial operators. Revenues from the tax are ringfenced for action to maintain or improve water quality; in 2018 the tax generated a revenue of €266m [203][202].
Act No. LXXXIX of 2003 on Environmental Pollution Charges (Hungary)	The Act introduced a charge on emissions of NO_x, SO_2 and non-toxic dust in 2003. The charge is paid by point-source emitters and mainly effects industry and the power sector; domestic emitters and district heating are exempt from the charge. The charge generated a revenue of 5.6bn HUF in 2019[203][202].
Wastewater fees (Poland)	Since 2002, Poland has charged fees for discharge of sewage to water or soil in efforts to internalise the costs to discharging entities, and to use fee revenues to compensate the environmental impacts[203]. The costs for industrial sewage discharge are dependent on the types of water pollutants[204].
Environmental tax for wastewater collection and treatment (Slovenia)	A tax on industrial and municipal wastewater came into force in 2012. The tax to be paid is based on the sum of the units of environmental load, achieved by direct or indirect discharge of wastewater or discharge of wastewater through public sewers into water. Tax revenues are paid into a water fund and are intended for use in water issues[203].
Sulphur tax (Sweden)	Since 1991, Sweden has implemented a tax to reduce emissions of SO_2 from combustion of peat, coal, coke and other solid and gaseous fuels. Where industrial operators are able to reduce emissions by cleaning or binding SO_2 to the ash, polluters can receive a tax rebate proportionate to the abated SO_2 emissions[203]. Hammar and Löfgren (2001) find the tax resulted in 59% of the reduction in sulphur emissions from manufacturing bertween 1989 to 1995, Moreover, the sulphur tax has achieved co-benefits to environmental improvements by inducing technological progress on both the demand and supply side, and there is also a small effect from substitution between heavy and light fuel oil (Andersen, 2017)[205].
NO_x tax (Sweden)	Sweden has implemented a tax on NO_x emissions from stationary combustion facilities in efforts to combat acidification. Revenues from the tax are reimbursed back to plants proportional to their energy use i.e. plants with low emissions compared to energy production are net beneficiaries of funding, while plants with high emissions but low energy output are net payers[203]. Höglund-Isaksson and Sterner (2009) conclude that NO_x emissions have declined in regulated installations by 50% since the introduction of the tax in 1992 with particular reductions achieved by the metal and forestry industries. Pedersen (2017) refers to evidence compiled by the national authorities (SEPA) that concludes there are some distributional effects of the NO_x tax between different industries where abatement costs are greater and emissions higher (notably in the case of forestry and plastic and chemical sectors). However, where distributional effects have occurred more than 99% of the revenue is reimbursed to the affected industries.

203 https://environment.ec.europa.eu/system/files/2021-10/Taxes%2C%20charges%20and%20fees.pdf p. 13.

204 https://ieep.eu/wp-content/uploads/2022/12/PL-Wastewater-Fee-final.pdf

205 Pedersen, AB (2017) NOx and SO2 taxes in Sweden. https://ieep.eu/wp-content/uploads/2022/12/SE-NOx-SO2-Tax-final.pdf:

National level intervention	Approach to implementing the PPP
Fertiliser tax (Sweden)	A fertilizer tax was applied between 1984 and 2009. It served to reduce excessive use of fertiliser. It was found to reduce N consumption in fertiiser by 6% per annum Andersen (2017).
Cadmium tax (Sweden)	A fertilizer tax was applied between 1984 and 2010. Per hectare of arable land is the contamination by fertilizers reduced from 1,4 g Cd/ha/y in 1985 to 0.07 gCd/ha/y in the year 2000. (Hasund, 2003) [206]

The use of sanctions to address pollution costs: Example of the ELD

Overall, we find that it is difficult to review the effectiveness of sanctions to address pollution costs in quantitative terms owing to incomplete data at Member State level. Rather we review factors found to reduce the overall effectiveness of the ELD to provide a qualitative narrative for how the use of sanctions to address pollution costs is contributing to environmental improvements in the case of the ELD.

Where pollution has led to environmental damage, environmental liability may be established under the ELD. However, the restrictive interpretations of key provisions of the ELD by some Member States, competent authorities and national courts — in particular of the definitions of biodiversity damage and water damage — have led to limited cases of environmental liability: five Member States have not reported a single ELD case since 2007 and 13 Member States have reported seven cases or less since the same date (Stevens & Bolton et al., np)[207]. Most Member States (17) do not make installations liable for environmental damage if the level of pollution is compliant with the conditions set by their permit under the IED (ECA, 2021). Environmental damage caused as a result of failure to comply is not explicit in the legislation. Several policies refer to the ELD to address such costs, where failure to comply has led to significant environmental damage, meaning that they have to pay for remediation but this is separate to the issue of enforcement.

Costs of pollution prevention and control have not been internalised by all operators, also because of the absence of an EU-wide mandatory financial security system for ELD liabilities. This has resulted in public money– in some cases significant amounts of money – being used to prevent and/or remediate an imminent threat of, or actual, environmental damage (Stevens & Bolton et al., np). The internalisation of prevention and control costs is however increasing, as a growing number of Member States are introducing mandatory financial security systems for ELD liabilities, in particular for Annex III liabilities (those related to pollution caused by operators under the IED, responsibilities for waste management, and Seveso III establishments). Also, an increasing number of operators is voluntarily purchasing environmental insurance policies that provide cover for ELD liabilities.

An additional factor that has contributed to the inefficient implementation of the ELD is the tendency of competent authorities to enforce national non-ELD legislation over national ELD legislation. This is often owed to the ease of enforcement of national non-ELD legislation, as this often includes easily applied numeric thresholds for establishing land/soil and water damage rather the complex significance criteria of the ELD (Stevens & Bolton et al., np).

206 Hasund (2003) Experiences with taxes / levies on fertilisers and biocides in Sweden. https://foes.de/pdf/swedenstudy.pdf

207 Stevens & Bolton LLP, RPA Europe and Logika (not published). Study in support of the evaluation of the Environmental Liability Directive and its implementation. Report prepared for the European Commission DG Environment.

Conclusions on EQ2b

The PPP is effectively contributing to environmental improvements via command and control instruments that contain policy provisions to address costs of pollution prevention and control. This finding is based on existing policy evaluations where it is demonstrated that implementation costs are borne by the polluter at the same time as reductions in pollution are achieved.

A challenge for the effective implementation of the PPP via command and control instruments to deliver environmental protection occurs in the case of environmental externalities. These occur as a result of allowable residual pollution and pollution in cases of non-compliance. These costs are often not addressed by policy provisions contained in command and control instruments, rather we find that command and control instruments are working with MBI to address such issues. The extent to which this combined approach is effectively contributing to environmental improvements is varied depending on the effectiveness of the MBI, which is often determined by Member State ambition.

The PPP is effectively contributing to environmental improvements via MBIs where a price signal is established that places a value on pollution. This finding is based on the extent of revenue generated by environmental taxes and evidence compiled from existing policy evaluation where it is demonstrated that said price signals are achieving reductions in pollution. We find significant variation between Member States in the expected effectiveness of MBI to deliver environmental improvements owing to the varied use of taxes and pollution charges and varying degrees of ambition (and hence price signals) when used.

The PPP is less effectively contributing to environmental improvements via MBI where sanctions are used to address costs of pollution. Based on the example of the ELD, the challenge impeding effectiveness is the varied approach to implementation when establishing environmental liability which has led to a varied implementation of the PPP between Member States and sectors.

5.2.2.3. Stakeholder feedback for EQ2

As part of the public consultation, stakeholders were asked to assess the effectiveness of specific legal instruments to implement the PPP (Q6). Responses are largely aligned with the findings presented here for EQ2. In sum:

- More than half of the respondents considered MBI (20%, 53 – 'fully effective'; 34%, 91 – 'sufficiently effective') and command and control law (53%, 140: 25%, 66 – 'fully effective'; 28%, 74 – 'sufficiently effective') most effective approaches.
- Respondents (52%, 140) were largely of the opinion that voluntary approaches were less effective at remedying the remaining pollution (24%, 64 – 'not effective at all'; 28%, 76 ¬– 'insufficiently effective').

Position papers submitted in response to the public consultation referred to the issue that costs of environmental externalities are not effectively addressed by the PPP when applied via command and control instruments. For example in the cases of diffuse pollution or legacy pollution, where the challenge is identifying who the polluter is. One example given was for the chemical sector where it is difficult to trace the source of chemicals, making it challenging to enforce the "duty of care" and "extended producer liability" principles upon companies."

When asked about the extent to which polluters are paying for the costs of pollution in specific sectors, respondents to the public consultation often did not know the extent to which polluters bore the costs of the pollution they were responsible for. Where a response was given, the

majority of stakeholders are of the opinion that sectors are not sufficiently paying for the cost of pollution. From 10% (26 responses) to 33% (87) of the respondents answered that the polluters insufficiently bear the costs in various sectors. In addition, between 4% (10) and 19% (51) of the respondents believed that the polluters did not bear any costs of the pollution they were responsible for. In particular, several sectors were frequently mentioned in the feedback as regards factors that may have hindered the effective implementation of the PPP, including agriculture, water supply, waste management and textile. The way the PPP is applied is found to treat some sectors as polluters, while others – as those facing the pollution consequences. The waste management sector was treated both as a polluter and as a sector that copes with pollution outcomes. This opinion was reiterated in several position papers as regards textiles, agriculture, chemicals and transport. For the transport sector, stakeholders noted that the effectiveness of the PPP varies by the different modes of transport.

Many interviewees discussed such PPP instruments as the Emission Trading System (ETS), Extended Producer Responsibility (EPR) and environmental taxes. However, the stakeholders had mixed opinions about the effectiveness of these instruments. For instance, the respondents had **mixed opinions about the effectiveness of the EPR schemes**. Some of them considered it an **effective tool** for implementing the PPP, while others had serious **doubts about its effectiveness**. According to the interviewees, the scope of EPR schemes did not cover significant polluters, the EPR fees were not sufficiently harmonised in the EU Member States, and the EPR fees were too low to cover the costs of pollution. Similarly, the **attitudes to the ETS among the respondents were mixed** with some of them positively and others – negatively evaluating this instrument. The interviewees highlighted several **constraints** of the ETS: insufficient scope of the ETS with many emitting sectors not covered, availability of free emission allowances that had not incentivised the polluters to move to sustainable business models, and the price of the emissions that had not been sufficiently high to change the polluters' behaviour. The respondents viewed environmental taxes largely positively; however, they also pointed out some of the **shortcomings that reduce their effectiveness**. According to the interviewees, the **charges applied in environmental taxes (or revenues raised from environmental taxes) have been too low** to a) encourage the transition from polluting to sustainable activities and/or b) tackle the issues of environmental pollution. Some respondents believed that **derogations and exemptions weakened the effect of taxes**.

While not relevant for a (backward-looking) evaluation, it must be noted that the participants of both workshops highlighted the **legal and non-legal instruments** for effective implementation of the PPP:

- **Environmental (green) taxes** were highlighted by the workshops' participants as effective and important instruments for the PPP implementation. The participants claimed that the introduction of environmental taxes or levies on polluting activities facilitates the internalisation of the costs associated with pollution, making polluters bear the financial burden of their actions. The revenue generated from these taxes could then be used to fund environmental initiatives, promote sustainable practices, and support the transition to a greener economy.

- The participants believed that the application of **Extended Producer Responsibility (EPR)** schemes and the increase of their coverage (e.g., in terms of sectors and pollutants) could have helped define and assign responsibility to a polluter.

Contrary to the emerging findings presented for EQ2, this would suggest that stakeholders are largely of the opinion that the PPP is not effectively implemented in EU policy.

5.2.3. EQ3. Any factors limiting the effective application of the PPP

In answering this question we reviewed:

- The extent to which environmentally harmful subsidies (EHS) limit the effective application of the PPP in EU policy (Q3a);
- The extent to which EU funding is contributing to expenditure on environmental protection and clean up actions (Q3b).
- Unintended impacts of the PPP (EQ3c)
- Impacts of the PPP on market competitiveness (EQ3d)

Points of comparison: The analysis focusses on the extent to which the application of the PPP in EU policy is effectively addressing costs of pollution.

5.2.3.1. EQ3a. To what extent are EHS conflicting with the effective application of the PPP?

The extent to which EHS are conflicting with the effective application of the PPP varies by Member State. To respond to this question, the definition of EHS was reviewed in comparison with the application of the PPP. The definition of EHS is based on the draft guidance which was developed as part of the current study as a discrete task from the fitness check[208]. Owing to Member States differences in how EHS are identified, monitored and reported, there is no accurate information on the level of EHS used or which sectors are most affected by them, except in the case of fossil fuel subsidies which are reported in accordance with the Energy Governance Regulation. The analysis is based on Member State evidence compiled to inform the draft guidance developed to support Member States in identifying EHS not covered by the Governance Regulation[209] and reporting them to the Commission.

Key finding(s)	Robustness
There is **ongoing conflict between the effective application of the PPP and EHS** where the latter are subsidising environmentally harmful activities.	Strong
There is comparable reporting on Member State use of fossil fuel subsidies (required in Member State annual national energy and climate progress reports on phasing out energy subsidies). Reporting on their use and their phasing out shows variation between Member States, which suggests that **the ongoing conflict between the effective application of the PPP and EHS is varied by Member State**.	Strong
This variance depends on the use of subsidies. **There is a wide range of subsidies that may be defined as EHS and use is varied between Member States (and sectors),** meaning that there is no consistent approach at EU level to ascertain the extent to which their use is conflicting with the effective application of the PPP.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

208 Draft Guidance document for reporting of non-energy Environmentally Harmful Subsidies (EHS) (October 2023)

209 Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action EUR-Lex - 32018R1999 - EN - EUR-Lex (europa.eu)

Definition of EHS and extent to which it conflicts with the effective application of the PPP

The draft guidance defines EHS in response to two questions: Is there a subsidy? Is the subsidy significantly environmentally harmful?

Based on the WTO classification[210], a subsidy is a government measure that confers an advantage on specific consumers or producers, to supplement their income or lower their costs and includes the following categories:

(i) **Direct transfer of funds,** i.e., when the government provides direct payments or grants to third parties. These are given either in connection with a specific investment or to enable an individual/company/organisation to (partly) cover its general costs or the costs related to a specific activity. This includes low-interest or preferential loans provided by the government to producers.
(ii) **Price and income support** to keep producer prices at a higher level or consumer prices at a lower level than under fully competitive conditions or guaranteeing a minimum income level (in general or for specific groups) when there is a direct connection of a subsidy with a higher level of supply of or demand for goods or activities.
(iii) **Government provides goods or services** other than general infrastructure, or purchases goods at non-market conform terms;
(iv) **Foregone government revenue**, i.e., not collected, such as tax exemptions, rebates, refunds, deferrals or reduced rates for specific groups, activities or products.

Working draft

In response to the second question, a subsidy is considered harmful to the environment if it results in significantly increased negative environmental impacts due to the existence of the subsidy. This excludes subsidies that are purely beneficial to the environment but includes subsidies that have a significant negative impact on the environment, even if they also have significant positive impacts.

A subsidy is considered environmentally harmful if it causes significant harm to one or more of the following environmental objectives as set out in the Taxonomy Regulation: (1) climate change mitigation, (2) climate change adaptation, (3) sustainable use and protection of water and marine resources, (4) transition to a circular economy, (5) pollution prevention and control and (6) protection and restoration of biodiversity and ecosystems. Added to this, EHS is meant to capture only subsidies that cause significant harm to the environment. For the draft guidance, this is defined in the first instance in accordance with Article 17 of the Taxonomy Regulation and the principle of Do No Significant Harm (DNSH) and subsequent delegated acts.

Based on this definition, there is ongoing conflict between the effective application of the PPP and EHS where the latter are subsidising environmentally harmful activities. The extent to which this conflict is occurring at Member State level is reviewed in subsequent sections based on Member State use of fossil fuel subsidies and examples of non-energy EHS.

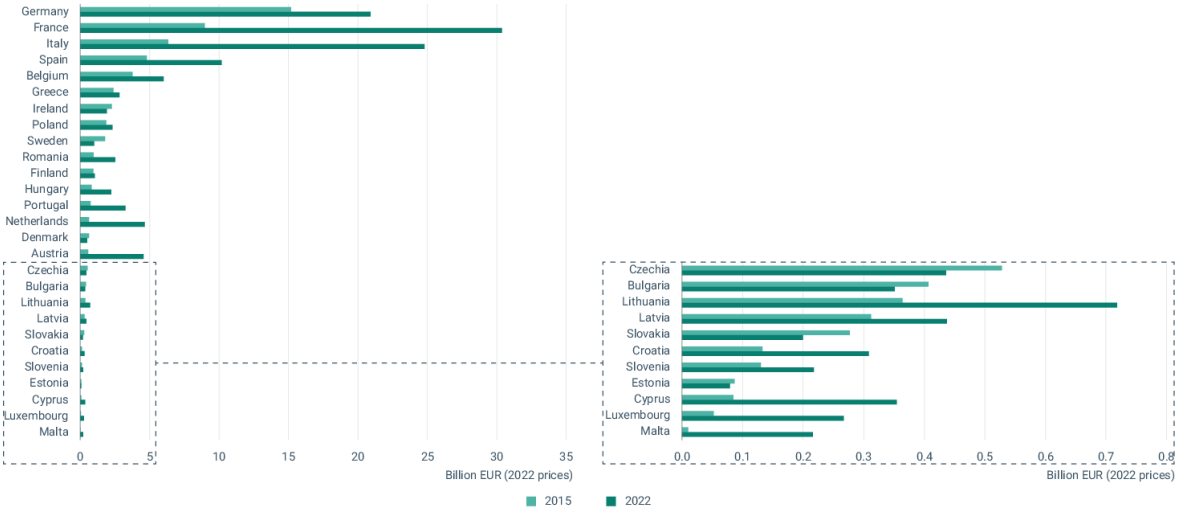
210 The definition follows the Agreement on Subsidies and Countervailing Measures (ASCM) framework developed by the World Trade Organization (WTO) and is set out at https://www.wto.org/english/docs_e/legal_e/24-scm.pdf

Fossil fuel subsidies and extent to which they conflict with the effective application of the PPP

Member States are required to include information in their annual national energy and climate progress reports on phasing out energy subsidies, particularly fossil fuels[211]. According to these reports, only a few Member States (Denmark, Germany, Ireland, Italy and Sweden) have specified when they intend to phase out fossil fuel subsidies. However, most Member States have no plans to phase out these subsidies, making it unclear how the EU will progress towards phasing out fossil fuel subsidies by 2030.

Between 2015 and 2021, fossil fuel subsidies remained relatively stable at about EUR 56 billion (2022 prices) but increased to EUR 123 billion in 2022. Figure 5-16 shows that the increase in subsidies occurred across most Member States (except Czechia, Denmark, Poland and Slovakia). The change is understood to have occurred in response to high energy prices post-COVID recovery and Russia's invasion of Ukraine where subsidies were one of the primary measures used by Member States to address the effects of high energy prices on the cost of living and production. Although the value of fossil fuel subsidies ranges significantly between Member States, as a share of GDP, the variation is less significant (differing by 1%). Fossil fuel subsidies represent the highest shares of GDP in Portugal, Greece, Cyprus, Hungary and Malta (1.3%) and the lowest share in Slovakia, Sweden, Czechia and Denmark (less than 0.2% of GDP)[212]. In actual prices, the highest share of subsidies are granted in Germany (EUR 21 billion in 2022), Italy (EUR 25 billion in 2022) and France (EUR 30 billion in 2022), which combined accounts for more than 60% of all fossil fuel subsidies granted in 2022.

Figure 5-16 : Fossil fuel subsidies in EU Member States, 2015 and 2022 (in 2022 prices)



Source: EEA (2023)[213]

211 Commission Implementing Regulation of 15 November 2022 laying down rules for the application of Regulation (EU) 2018/1999 of the European Parliament and of the Council which sets out the structure, format, technical details and process for the integrated national energy and climate progress reports. Article 6.2 states that 'Member States shall report the information on progress towards the national objectives to phase out energy subsidies, in particular for fossil fuels, referred to in Article 25(d) of Regulation (EU) 2018/1999 in accordance with the formats set out in Annex VIII to this Regulation'.

212 EEA (2023) Fossil fuel subsidy as a share of GDP in 2022. https://www.eea.europa.eu/data-and-maps/daviz/fossil-fuel-subsidy-as-a-1/#tab-chart_2

213 EEA (2023) Fossil fuel subsidies. https://www.eea.europa.eu/en/analysis/indicators/fossil-fuel-subsidies#:~:text=Fossil%20fuel%20subsidies%20remained%20relatively,and%20Russia's%20invasion%20of%20Ukraine.

Examples of EHS and extent to which it conflicts with the effective application of the PPP

Compared with the use of fossil fuel subsidies, the level of non-energy environmentally harmful subsidies is less certain, but the Commission is developing a methodology to allow Member States to report on them. In advance of this agreed methodology, Member State catalogues suggest significant levels of such subsidies which have been granted to different sectors based on national contexts. Sectors include agriculture, industry, households, industry, transport, public sector, and construction. Select examples of subsidies defined as EHS across these sectors are summarised in Box 5-3.

Box 5-3 : Examples of subsidies defined as EHS

- **Pesticide subsidies**: Changes the cost/benefit ratio of users regarding the use of those substances, making it more likely that more pesticides are used. Romania provides this subsidy.
- **Slaughter premium**: Payments subsidise per head of animal slaughtered. Germany, Greece, Croatia, Hungary, Lithuania, and Slovenia provide this subsidy.
- **Subsidies for intensive meat production**: Some countries (France, Italy, Austria, Czechia, Greece, Hungary, Ireland, Malta, Lithuania, Portugal, and Slovenia) provide payments per calf or adult cattle, encouraging the existence of this type of livestock farming.
- **Fisheries support**: Germany, France, Italy, Belgium, Denmark, Spain, Ireland, Poland, and Portugal provide support for vessel construction and purchase.
- **Reduced VAT rate for fertilisers and pesticides** (Spain provides this subsidy).
- **Concessions for energy-intensive industry with regard to electricity grid fees** (Germany provides this subsidy).
- **Reduction of tax on natural gas for industrial uses, excluding power generations** (Italy provides this subsidy).
- **Energy subsidies for legal persons** (Estonia provides this subsidy).
- **Subsidy for industrial zones** (Czechia provides this subsidy).
- **Distance allowance for commuters:** Germany provides commuters with distance allowances to subsidise work commutes, regardless of mode of transport. As this allowance does not take mode of transport into consideration and pays out more the further a commute is, it incentivises the longer commutes done by car, as it makes such journeys much cheaper and more economically viable for workers. Thus, it increases the use of cars and the increased GHG emissions associated with this uptake.
- **VAT reduction for transport activities:** Spain provides VAT reduction to transport activities which lowers the cost of transport, making more carbon-intensive modes of transport more enticing. This cost reduction is also seen by consumers who increase transport demand. Consequently, lowering the VAT on transportation costs results in more GHG emissions being emitted, due to more transport being demanded and more carbon intensive modes being used.
- **CO_2 Tax Exemption for Domestic Shipping**: In Sweden, domestic shipping is exempt from the country's CO_2 tax. As a result of this, more carbon intensive shipment modes which are often faster than less carbon intensive modes become more attractive and receive greater uptake. The increased use of these types of shipment methods results in an increase in GHG emissions.

The extent to which the use of EHS conflicts with the effective application of the PPP varies by Member State depending on the use of subsidies. As outlined above, there is a wide range of subsidies that may be defined as EHS and use is varied between Member States (and sectors), meaning that there is no consistent approach at EU level to ascertain the extent to which their use is conflicting with the effective application of the PPP.

Conclusions on EQ3a

There is ongoing conflict between the effective application of the PPP and EHS where the latter are subsidising environmentally harmful activities (e.g. fossil fuel subsidies, subsidies for non-renewable based fertilisers). There is a wide range of subsidies that may be defined as EHS and use is varied between Member States (and sectors), meaning that there is no consistent approach at EU level to ascertain the extent to which their use is conflicting with the effective application of the PPP. The best available data in this regard are for fossil fuel subsidies, which were EUR 122 billion in 2022, doubling from the previous year (due to Russia's invasion of Ukraine). Fossil fuel subsidies vary between Member State (greatest use of fossil fuel subsidies in Germany, France and Italy, while the least use is in Estonia).

5.2.3.2. EQ3b. To what extent are EU funds used to cover costs for environmental clean-up?

To respond to this question, the use of EU funds was reviewed to assess whether they are being used to pay for clean-up activities and, if so, to understand why this may be happening. Although the effective application of the PPP implies that clean-up activities are paid for by the polluter and EU funds should not be used to cover these costs, the OECD (2008) identify several exceptions where the use of public subsidies may be consistent with the application of the PPP. Thus, understanding why EU funding is being used to cover costs for environmental protection is important. To answer this question, the types of environmental activities (and their funding allocations) financed by EU funding programmes has been reviewed to examine the extent to which potential clean-up actions have been allocated EU funding for the 2021-2027 period.

Supporting evidence reviewed to inform this analysis is in Appendix 2.

Key finding(s)	Robustness
EU funding is subsidising clean up actions that potentially conflicts with the effective application of the PPP e.g. in contaminated site remediation and waste infrastructure. In such cases, reporting on expenditure does not facilitate an overview at budget programme level, rather the evidence compiled is at project level.	Strong
The use of EU funds to cover clean-up actions is often justified on socio-economic grounds. For example, funding from the ERDF and ESF+ are allocated based on classification of regional development or where LIFE supports pilot studies to trial novel techniques that facilitate commercialisation of R&D.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Definition of clean-up actions

As noted by the OECD (2008)[214], the relevance of public funds to the effective application of the PPP is that while subsidies can facilitate faster implementation of environmental policy and support with overhead costs, it can create distortions in international trade and investment. As a general rule, the OECD recommends that the application of the PPP should not be accompanied by subsidies, except in the following cases:

- In cases of rapid environmental policy implementation or especially stringent pollution prevention and control regimes to mitigate the risk of socio-economic problems arising
- In cases of R&D where new pollution prevention and control technologies or abatement techniques are required.

However, Special Report 12/2021 by the ECA concluded that there was inconsistent application of the PPP between EU funds with evidence that they have been used for environmental remediation projects, including for the clean-up of orphan pollution and instances where national legislation failed to make the polluters pay. The report details 42 projects across three EU MS (Poland, Italy, Portugal) in receipt of €180 million of EU funding and it was identified that the projects fit into one of four categories where the PPP was not applied : clean-up of industrial pollution from insolvent operators (4 projects, €33 million), decontamination of non-compliant landfills (8 projects, €27 million), clean-up of orphan industrial pollution (20 projects, €62 million) and investment in water treatment plants (10 projects, €58 million).

Among the projects investigated, ERDF and Cohesion Fund projects funded to improve the quality of drinking water were examined.[215] Whilst this funding led to improvements in drinking water quality, ECA (2021) also identified instances where European funds were used to remediate significant environmental damage from a number of Italian landfill sites. These sites were not sufficiently equipped to protect against soil, water or air pollution and between 2014-2020, €27.2 million was used for their clean-up

Moreover, 20 of the 42 projects examined relate to orphan pollution. Orphan pollution is pollution that took place in the past and where the PPP cannot be applied because the polluter is either unknown, no longer exists, or cannot be made liable. Amongst the other projects, the Commission accepted the ECA conclusion, but indicated that under shared management it is the responsibility of the Member States to select operations where the conditions recommended by European Court of Auditors should be applied. The Commission committed to in "its supervisory capacity, make the use of EU funds for cleaning pollution conditional on checks, in collaboration with the Member States, that the relevant authorities took all the necessary steps to charge the polluter for the pollution they are responsible for". Taken together, the implication is that whilst the PPP may not have been respected for the clean-up of pollution during the evaluation period, this should no longer be the case.

Funding

To build on the findings of the ECA 2021 report, the extent to which EU funding has been used for the clean-up of pollution has been reviewed at the level of EU funding programme based on a

214 The Polluter Pays Principle: Definition, Analysis, Implementation online (oecd-ilibrary.org)

215 Funds for water supply in Bulgaria, Hungary and Romania between 2007-2020 totalled €3.7 billion. The results showed that the quality of drinking water significantly improved in these Member States, attributed to the receipt of ERDF and Cohesion funds, though it was noted that significant additional funding is required to ensure all citizens in these Member States have access to safe, quality drinking water.112 These drinking water projects were usually carried out in tandem with waste water projects and specifically related to infrastructure updates.

broad categorisation of funded activity based on the Classification of Environmental Protection (CEPA)[216]. Table 5-8 lists the clean-up actions used to frame this analysis.

Table 5-8 Clean up actions grouped according to environmental media.

Environmental Media	Clean-up Action
Air and climate	Activities to control emissions of greenhouse gases, air pollutants and gases that adversely affect the stratospheric ozone layer. The purchase and installation of catalytic converters and particle filters. Treatment of exhaust gases and ventilation air – activities relating to the installation, maintenance and operation of end-of-pipe equipment for the removal and reduction of emissions of particulate matter or other air-polluting substances.
Wastewater management	Treatment of wastewater to bring water quality up to environmental standards (or other quality norms). This includes cleaning up of water bodies after pollution and the treatment of cooling water before releasing into the environment. The operation, maintenance and repair of sewerage networks.
Waste management	Treatment and disposal of waste. Treatment and disposal of non-hazardous waste. Treatment of low- and high-level radioactive waste.
Soil and water	Clean up of soils and water bodies. Soil decontamination at former industrial sites, landfills and other black spots. Dredging of pollutants from water bodies. Decontamination and cleaning up of surface water following accidental pollution. Cleaning up of oil spills on land, inland surface waters and seas Prevention and remediation of soil and groundwater salinity, including lowering of groundwater tables.
Biodiversity and landscapes	Restoration of small-scale structures (e.g., hedges, orchards) Replenishment of wild flora and fauna stocks. Environmental rehabilitation of abandoned mining and quarrying sites. Maintenance of landscapes that are the result of traditional agricultural practices. Restoration of water bodies as aquatic habitats.

Common Agricultural Policy – Funding

For 2021-2027, the CAP is financed by the EAGF (€291.1 billion) and EAFRD (€95.5 billion). EAFRD and EAGF contribute to the 10 specific objectives of the CAP which aim to improve the competitiveness of the agriculture sector, to achieve balanced territorial development of rural economies and communities, and to sustainably manage natural resources, reverse and halt biodiversity loss and decline and address climate action.[217] Around 40% of its total budget is allocated to environmental, climate-related and other management commitments (2021-2027 period).[218] The specific Climate and environmental objectives of the CAP (Article 6 Regulation (EU) 2021/2115) are:

217 European agricultural fund for rural development (EAFRD) (europa.eu)

218 European Commission (2023) Report from the Commission to the European Parliament and the Council. Summary of CAP Strategic Plans for 2023-2027: joint effort and collective ambition. COM(2023)707. https://agriculture.ec.europa.eu/system/files/2023-11/com-2023-707-report_en.pdf

1. To contribute to climate change mitigation and adaptation, including by reducing greenhouse gas emissions and enhancing carbon sequestration, as well as to promote sustainable energy.
2. To foster sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency.
3. To contribute to halting and reversing biodiversity loss, enhance ecosystem services and preserve habitats and landscapes.

Annex II of Regulation (EU) 2021/2115 sets out a list of types of interventions that can be financed by EAGF and EAFRD under the CAP[219] which have been reviewed to identify examples of potential clean-up actions funded through the CAP (Table 5-9).

Table 5-9 Potential clean up actions funded by Common Agricultural Policy Funding

8th EAP Policy Objective		Allocated funding (2021-2027) [220]	Potential clean-up actions funded
PO 1 and PO 2 Climate change		40% of CAP expenditures targeted towards climate action (€44.8 billion).	Climate mitigation and adaptation activities Reduction of greenhouse gases from agricultural activities – increasing carbon sinks, addressing emissions from mineral fertilisers and livestock, incentivising land managers to store carbon in soil and biomass. Carbon sequestration enhancement Sustainable energy use – renewable energy production
PO 3 Waste and Recycling	n/a	No clean-up actions identified.	
PO 4 Zero pollution	Air Quality	€107,000,000 allocated to clean air.[1]	
	Water	0.3% of the public CAP funding is allocated to Natura 2000 and Water Framework Directive payments.	Funding for water under the CAP is primarily allocated to water resilience activities, including water management and supporting a reduction in the reliance on chemicals. They are not directly related to pollution or clean-up, however, all farmers receiving support must create buffer strips along water courses of at least 3 metres, sometimes with provisions for small fields surrounded by water. This reduces pollution from fertilisers and pesticides.
	Noise	n/a	No clean-up actions identified.

219 European Commission, 2021, Regulation (EU) 2021/2115 on establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP strategic plans). Available at: Publications Office (europa.eu)

220 European Commission, Common Agricultural Policy – Performance. Available at: Common Agricultural Policy - Performance (europa.eu)

8th EAP Policy Objective		Allocated funding (2021-2027) [220]	Potential clean-up actions funded
	Chemicals Risk Management	See climate funding for total allocated to climate and environmental funding.	Banning use of chemicals in certain areas Adopting integrated pest management Supporting the use of non-chemical methods, e.g., precision farming Reduction of pesticide and fertiliser use – increased area of organic production
PO 5 Nature, biodiversity, soil and land		It is estimated that 16.9% of the CAP funding is contributed to biodiversity., of biodiversity funding under the 2021-2027 MFF	Restoration of soil fertility Reduced use of fertilisers and pesticides Increase organic farming area Increase in the area of environmentally sensitive permanent grasslands.

Note: Policies grouped under the heading of 8th EAP PO 6 cannot be mapped to clean up actions and are not included here.

Source: Summary of evidence compiled in Appendix 2 of this report.

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Cohesion Policy Funds

The EU Cohesion Policy (and associated funds) aims to address imbalances in countries and regions, as well as strengthening economic, social and territorial cohesion in the EU.[221] It prioritises action across several key areas, such as human capital (protecting jobs, modernising labour), business (favouring stability, competitiveness and innovation), infrastructure and energy (networks) and research and innovation to strengthen human capital and EU infrastructure.[222]

EU Cohesion Policy is delivered through four funds: ERDF, ESF+, CF and JTF. Of these, the ECA report on the application of the PPP highlighted that the ERDF and CF were the main EU funds being used for the clean-up of contaminated sites. Amongst other objectives, the fund supports environmental objectives such as the transition to a low-carbon economy through the promotion of clean energy, green and blue investment, the circular economy, and climate change mitigation and adaption.[223]

An overview of the type of clean up actions funded is presented below in Table 5-10, grouped by 8th EAP priority objective. The clean up actions are based on a review of the intervention fields used to track cohesion policy investments[224].

221 Article 3, Treaty of the European Union: Consolidated version of the Treaty on European Union (europa.eu). Inforegio - New Cohesion Policy (europa.eu)

222 EUR-Lex - pr0004 - EN - EUR-Lex (europa.eu)

223 Publications Office (europa.eu)

224 Regulation (EU) 2021/1060 of the European Parliament and of the Council of 24 June 2021 laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, the Just Transition Fund and the European Maritime, Fisheries and Aquaculture Fund and financial rules for those and for the Asylum, Migration and Integration Fund, the Internal Security Fund and the Instrument for Financial Support for Border Management and Visa Policy. Annex I Dimensions and codes for the types of intervention for the ERDF, the ESF+, the Cohesion Fund and the JTF Article 22(5) . https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R1060.

Table 5-10 Cohesion Policy Funding (2021-2027)

8th EAP Policy Objective		Allocated funding (2021-2027)	Potential clean-up actions funded
PO 1 and PO 2 Climate change		€12.7 bn 'climate change adaptation' €9 bn 'renewable energy' €21.8 bn 'energy efficiency' €5.4 bn 'smart energy systems' €18 bn 'sustainable urban mobility	• Research and innovation processes, technology transfer and cooperation between enterprises, research centres and universities, focusing on the low carbon economy, resilience and adaptation to climate change • Energy efficiency and demonstration projects for businesses • Energy efficiency renovation of existing housing stock • Construction of new energy efficient buildings • Support to entities that provide services contributing to the low carbon economy and to resilience to climate change, including awareness-raising measures • Renewable energy • High efficiency co-generation, efficient district heating and cooling with low lifecycle emissions • Replacement of coal-based heating systems by gas-based heating systems for climate mitigation purposes • Distribution and transport of natural gas substituting coal • Adaptation to climate change measures and prevention and management of climate related risks • Other measures to reduce greenhouse gas emissions in the area of preservation and restoration of natural areas with high potential for carbon absorption and storage, e.g., by rewetting of moorlands, the capture of landfill gas
PO 3 Waste and Recycling		No data identified.	• Rehabilitation of industrial sites and contaminated land
		€6.3 bn expenditure planned under 'Circular Economy'	• Research and innovation processes, technology transfer and cooperation between enterprises, focusing on circular economy • Household waste management • Commercial, industrial waste management • Promoting the use of recycled materials as raw materials
PO 4	Air Quality	No data identified.	• Air quality and reduction of noise measures
	Water	€12.7 bn for 'sustainable water'	• Provision of water for human consumption • Water management and water resource conservation • Wastewater collection and treatment
	Noise	No data identified.	• Air quality and reduction of noise measures

8th EAP Policy Objective	Allocated funding (2021-2027)	Potential clean-up actions funded
Chemicals Risk Management	n/a	• No clean-up actions identified.
PO 5 Nature, biodiversity, soil and land	€7.3 bn spending allocated to 'nature protection and biodiversity'	• Protection, restoration and sustainable use of Natura 2000 sites • Nature and biodiversity protection, natural heritage and resources, green and blue infrastructure

Note: Policies grouped under the heading of 8th EAP PO6 cannot be mapped to clean up actions and are not included here.
Source: Summary of evidence compiled in Appendix 2 of this report.

LIFE+

The Programme for Environment and Climate Action (LIFE) fund is the only EU fund specifically targeted at delivering on environmental, climate and energy objectives. It supports the EU's transition to a climate-neutral economy by 2050, with other key aims including protecting and restoring the environment (air, water, soil), halting and reversing biodiversity loss, tackling the degradation of ecosystems, sustainability, circularity, energy efficiency and renewable energy.[225] €3.4 billion of funding was allocated to the period 2014-2020, increasing to €5.4 billion for the current 2021-2027 period.[226,227] LIFE projects aim to identify specific, innovative approaches to tackle broad climate and environmental objectives. To that effect, the fund primarily finances pilot projects used to demonstrate the effectiveness of novel technologies, or novel methods targeted at improving the effectiveness of policy implementation. Additionally, projects are funded that facilitate exchange of best practice and awareness, for example to support the upscaling of pilot projects to commercially viable systems. Early-phase research and development activities are typically out of scope unless they support other LIFE projects; however, there is a clear link between LIFE and support for R&D where pilot projects are used to demonstrate the effectiveness of novel technologies.

The LIFE fund is comprised of four sub-programmes that make up the bigger 'Environment' and 'Climate Change Action' programmes: 'nature and biodiversity', 'circular economy and quality of life', 'climate change mitigation and adaptation' and 'clean energy transition'.

- The Environment programme is comprised of the sub-programmes 'Nature and Biodiversity' and 'Circular Economy and Quality of Life'. Between 2021-2027, €3.5 billion was allocated to the programme, under which the Nature and Biodiversity sub-programme received €2.1 billion (aimed at the protection and restoration of natural habitats the preservation of wild and/or protected species across the EU). Projects are also funded to support the Natura 2000 Network, and LIFE projects are further used to support a key EU policy objective of protecting and restoring the marine environment.[228] Whilst the projects funded under this sub-programme are varied in nature (e.g., training and awareness, enlargement of habitats), a proportion of funding is allocated to projects that focus on the restoration of natural sites to their original condition and conservation actions necessary to protect wild species. Recipients of funding must report on the number of actions taken

225 Programme for Environment and Climate Action (LIFE) (europa.eu)

226 Environment - LIFE : Funding : LIFE - List of NGOs 1997 - 2013 (archive-it.org)

227 LIFE programme (europa.eu)

228 Regulation (EU) 2021/ of the European Parliament and of the Council of 29 April 2021 establishing a Programme for the Environment and Climate Action (LIFE), and repealing Regulation (EU) No 1293/2013 (europa.eu)

and the type of species and habitats involved in the improvement and restoration of natural sites to facilitate monitoring of overall improvements at the EU-level.[229] The circular economy and quality of life programme received €1.3 billion of EU funding in the most recent programming period. Projects funded relating to the circular economy should focus on sustainable and resource efficient methods to design, manufacture, consume, repair and recycle commercially viable products and materials (e.g., plastics, construction materials).[123] This sub-programme also focuses on projects aiming to improve the quality of life for EU citizens, including specific actions to protect health and those with a particular focus on improving the quality of air, soil, water and soils. Initiatives to improve waste management are also funded, as well as initiatives to reduce noise levels and the use of hazardous chemicals.[123]

- The Climate Change Action programme targets projects aimed at addressing th'Climate Change Mitigation and Adaptation' and 'Clean Energy Transition' sub-programmes. €1.9 billion was allocated to both programmes. The climate mitigation and adaptation sub-programme (€947 million) supports initiatives under three main categories: actions to reduce vulnerability against climate change, initiatives to reduce greenhouse gas emissions by at least 55% by 2030 (compared to 1990 levels) and to facilitate implementation of the EU's Adaptation Strategy. The clean energy transition sub-programme directs funding towards initiatives that support the transition to sustainable energy, including by tackling regulatory and market barriers that prevent a full transition. €997 million is allocated to this sub-programme. Other projects funded include capacity building for renewable energy uptake and procurement actions to support technical delivery and monitoring of projects.

The types of activities funded by LIFE are:

- **Strategic nature projects:** supporting nature and biodiversity objectives by implementing coordinated action in EU MS.
- **Strategic integrated projects:** the implementation of environmental or climate strategies/action plans to deliver action on specific legislative requirements.
- **Standard action projects:** testing innovative solutions or facilitating exchange of best practices under the LIFE sub-programmes.

Specific projects financed by the LIFE programme address direct clean-up actions, such as the restoration of natural habitats and the preservation of wild and/or protected species. The Monitoring and Evaluation framework refers to specific indicators associated with clean-up actions, such as net improvements to soil/air/water quality and the associated changes in the area of land with improved ecological status. It must be taken into consideration, however, that LIFE projects typically fund pilot projects with the long-term aim of large-scale deployment. In that regard, the funding of direct or indirect clean-up actions does not automatically equate to a failure in the application of the polluter pays principle across the EU, but perhaps a failure to apply it consistently across the EU, as the recipients of the funding looking to tackle clean-up of pollution may not be the responsible polluting operators. Regulation EU 2021/783 on establishing a LIFE Programme describes the need for high-level environmental protection to ensure the long-term health and woellbeing of EU citizens. By investing in innovative advancements in pollution clean-up actions (and additional wider objectives), the Union can seek to protect the environment in the long-term and ensure action is taken at all levels (research, scale-up, large scale deployment) to address the climate and pollution crises we currently face.

229 indicators_tables2007.xls (live.com)

Table 5-11 summarises the type of projects and associated funding received under the LIFE programme.

Table 5-11 Potential clean up actions allocated funding under the LIFE programme (2021-2027) relevant to the 8th EAP priority objectives

8th EAP Policy Objective		Allocated funding (2021-2027)	Potential clean up actions
PO 1 and PO 2	**Climate change**	€1.994 billion	Climate Change Mitigation and Adaptation - €947 million. Clean Energy Transition - €997 million.
PO 3	**Waste and Recycling**	€1.345 bn under Circular Economy and Quality of Life, which targets waste and recycling	Innovative solutions contributing recycled materials, components or products with additional value Innovations solutions to identify, track, separate, prevent and decontaminate waste containing hazardous substances. Resource recovery from waste.
PO 4	**Air Quality**	€129 million under Circular Economy and Quality of Life directed to clean air contribution	Reduction in air quality and noise pollution Use of alternative fuels Innovative logistic or passenger mobility platforms
	Water	Water quality and water pollution are funded under climate mainstreaming – 61% of total fund allocated. Marine, freshwater and terrestrial ecosystems in scope.	Protecting the marine environment Improving ecological status of water bodies Water management efficiency Conservation and restoration of marine ecosystems (e.g., Natura 2000 marine sites) The promotion of healthy seas
	Noise	No specific funding earmarked.	
	Chemicals Risk Management	€1.345 bn under Circular Economy and Quality of Life, which targets the 'sustainable production and use of chemicals'	Projects to support the reduction in production and use of dangerous chemicals Increasing transparency of information to consumers Development of safe and sustainable chemicals Chemicals management
PO 5	**Nature, biodiversity, soil and land**	€2.143 bn allocated to the "Nature and Biodiversity" programme.	Space and Nature – area-based activities aimed at conservation and restoration of habitats or species Safeguarding species (other than area-based interventions).

Note: Policies grouped under the heading of 8th EAP PO6 cannot be mapped to clean up actions and are not included here

Source: Summary of evidence compiled in Appendix 2 of this report.

Invest EU Funding

The InvestEU programme (2021-2027) is a €26.2 billion programme that seeks to mobilise over €372 billion in investments between 2021-2027 across four key policy windows: sustainable infrastructure (€9.9 billion), research, innovation and digitalisation (€6.6 billion), small-to-medium

enterprises (SMEs) and social investment and skills. 30% of the total financial envelope is committed to climate objectives.[230] Investments should be channelled to projects that improve the 'competitiveness, socio-economic convergence and cohesion' to meet EU objectives, for example including the sustainability of the Union economy and environmental and climate objectives. Projects could target pollution prevention and control (air, water, noise, industry, soil) and directs funds towards sustainable finance systems aligned with the European Green Deal Investment Plan.

Table 5-12 presents potential clean up actions eligible for funding through the InvestEU programme.[231] Many of these relate to environmental infrastructure, including for drinking and wastewater. There are several clean-up actions explicitly noted, including the restoration of ecosystems and the clean up of contaminated industrial sites. However, the extent to which these funds are used to cover clean-up actions that polluters are liable to pay is unclear. The fund places a huge emphasis on research and the development of innovative solutions to address the EU's biggest priorities. For example, mobility projects that target emissions reduction may equate to potential clean-up actions depending on the recipient and the nature of the project. Similarly, this could also be a R&D project focussing on generic emissions reductions. As public and private sector entities are eligible to receive funding, further information at the project-level is needed to ascertain the extent to which funding is spent on clean-up actions.

Table 5-12 Potential clean-up actions financed through InvestEU Funding.

Specific Objective	Potential Clean-up Actions
The development of the energy sector in accordance with Energy Union priorities	Infrastructure for carbon capture and storage in industrial processes, bioenergy plants and manufacturing facilities towards the energy transition
The development of sustainable and safe transport infrastructures and mobility solutions, equipment and innovative technologies in accordance with Union transport priorities and the commitments taken under the Paris Agreement	Smart and sustainable mobility projects that target, amongst other things, emissions reduction
Environment and resources	Water – drinking water supply and sanitation, network efficiency, leakage reduction, infrastructure for the collection and treatment of wastewater, coastal infrastructure and other water-related green infrastructure Waste management infrastructure Enhancement and restoration of ecosystems and their services including through the enhancement of nature and biodiversity by means of green and blue infrastructure projects Climate change actions, climate adaptation and mitigation, including natural hazard disaster risk reduction The decarbonisation of energy-intensive industries and the substantial reduction of emissions in such industries, including the demonstration of innovative low-emission technologies and their deployment

231 European Parliament, Available at: eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R0523

Specific Objective	Potential Clean-up Actions
	The rehabilitation of industrial sites (including contaminated sites) and the restoration of such sites for sustainable use Sustainable agriculture, forestry, fishery, aquaculture and other elements of the wider sustainable bioeconomy

Recovery and Resilience Facility

The Recovery and Resilience Facility (RRF) is the centrepiece of the historic NextGenerationEU funds, introduced as a response to the economic and social fallout resulting from the COVID-19 pandemic. The RRF supports the economic, social and territorial cohesion of the EU by financing reforms and investments in Member States to aid recovery[232]. Investments cover projects that commenced at the start of the COVID-19 pandemic (February 2020) until 31st December 2026. The RRF contributes to the implementation of the European Green Deal and facilitates mainstreaming environmental sustainability initiatives and the green transition. It does not target specific pollution types, and the scope of the fund is broad, however specific intervention fields refer to carbon and greenhouse gas emission, water, waste (household, commercial, industrial), and air and noise pollution. A total of €723 (in current prices) billion, consisting of loans (€385.8 billion)[233] and grants (€338 billion), is available under the Facility, of which 37% must be spent on supporting climate objectives.[234]

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The Recovery and Resilience Facility contributes to almost 150 different types of activities across a range of areas. Table 5-13 details the potential clean-up actions funded through the fund, most notably including 'rehabilitation of industrial sites and contaminated land' and the 'protection and restoration of Natura 2000 sites'. As detailed above for the InvestEU programme, the extent to which funds are used for clean-up actions that directly conflict with the application of the PPP will depend on the specific nature of the clean-up operation and the recipient of the funding.

Table 5-13 Potential clean up actions funded through the Recovery and Resilience Fund

8th EAP Policy Objective	Funding received	Potential clean up actions funded
PO 1 and PO 2 Climate change	40% of the total RRF budget is allocated to climate expenditure.	• Sustainable mobility • Energy efficiency • Renewable energy and networks • R&D for climate change mitigation and circular economy • Climate change adaptation measures
PO 3 Waste and Recycling	'Transition to a circular economy, waste prevention and recycling' actions make up 3.6% of National Recovery Reslience Plans (NRRPs)	• Household waste management: prevention, minimisation, sorting, reuse, recycling measures • Commercial, industrial waste management: prevention, minimisation, sorting, reuse, recycling measures. • Use of recycled materials as raw materials compliant with the efficiency criteria. • Rehabilitation of industrial sites and contaminated land compliant with efficiency criteria.

232 Article 4 of Regulation (EU) 2021/241 (the RRF regulation)

233 Of which only 76% was actually requested by Member States, see 'FINAL OVERVIEW OF MEMBER STATES' LOAN REQUESTS UNDER THE RRF'

234 Article 16 of Regulation (EU) 2021/241 (the RRF regulation)

8th EAP Policy Objective		Funding received	Potential clean up actions funded
			• Support to environmentally friendly production processes and resource efficiency in SMEs • Support to environmentally-friendly production processes and resource efficiency in large enterprises
PO 4	**Air Quality**	'Pollution prevention and control' (such as air, water, noise pollution)' actions make up 2% of NRRPs	• Air quality measures
	Water	'Sustainable use and protection of water and marine resources' actions make up 2% of NRRPs	• Provision of water for human consumption (extraction, treatment, storage and distribution infrastructure, efficiency measures, drinking water supply) compliant with efficiency criteria • Water management and water resource conservation (including river basin management, specific climate change adaptation measures, reuse, leakage reduction • Waste water collection and treatment compliant with energy efficiency criteria.
	Noise	'Pollution prevention and control' (such as air, water, noise pollution)' actions make up 2% of NRRPs	• Noise pollution reduction measures
PO 5 Nature, biodiversity, soil and land		'The protection and restoration of biodiversity and ecosystems' actions make up 3% of NRRPs.	• Protection, restoration and sustainable use of Natura 2000 sites • Nature and biodiversity protection, natural heritage and resources, green and blue infrastructure

Note: Policies grouped under the heading of 8th EAP PO6 cannot be mapped to clean up actions and are not included here

Source: Summary of evidence compiled in Appendix 2 of this report.

Conclusions on EQ3b

Our review confirmed the findings of ECA (2021) that there was inconsistent application of the PPP between EU funds with evidence that they have been used for the clean-up of orphan pollution. The most frequent types of clean-up actions identified were remediation of contaminated (industrial) sites and the protection and restoration of protected sites, though additional clean-up actions include waste management (e.g., infrastructure development), climate change mitigation measures (excluding research & development) and restoration of soil condition. Although the full extent to which EU funds are financing clean-up actions remains unclear owing to the current granularity of expenditure reporting which does not distinguish clearly between relevant clean up actions funded.

5.2.3.3. EQ3c. Are there any unintended impacts?

The purpose of this question is to identify unintended impacts occurring as a result of the way the PPP is applied in EU policy that are limiting the overall effectiveness of the policy. We examined the extent to which the impacts identified are limiting the effective application of the PPP (linking back to the overarching EQ3).

Key finding(s)	Robustness
There are **unintended gaps in implementation where costs of pollution are not being addressed by policy**. This is illustrated by the ongoing costs of environmental externalities.	Strong
There is **evidence of unintended distributional effects from applying the PPP.** Examples provided relate to the EU ETS and water acquis (Water Framework Directive, Environmental Quality Standards Directive, Groundwater Directive, Floods Directive and the Drinking Water Directive) where there is evidence that costs of pollution are incurred by the user rather than the polluter.	Strong
The **use of EU funding to support implementation of the PPP can create unintended market distortion** where the PPP is applied more stringently by some sectors or Member States. The scale of this impact varies by EU budget programme, where the use of environmental conditionalities is found to mitigate the risk of market distortion to some extent under the CAP, but no equivalent conditionalities were identified for regional development funds.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Through the review of how the PPP is implemented in EU policy we have identified the following unintended impacts:

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- **Unintended gaps in implementation** where environmental externalities are occurring as a result of how environmental policy has been implemented.
- **Distributional effects** where there is evidence of varying economic sector capacity to pass-through costs to downstream users.
- National differences in implementation (namely where MBI are used to implement the PPP) that have led to varying degrees of environmental policy stringency between Member States, regions or municipalities, which may be creating an **unequal internal market** (where less stringent use of the PPP is giving a potential competitive advantage to economic actors). This is examined separately for EQ3d as regards impacts of the PPP on competitiveness.

For each of the above we assess what the scale of the impact and whether there are mitigating actions in place.

Unintended gaps in implementation

The current approach to implementing the PPP in EU policy has led to the following unintended gaps where costs of pollution are not being fully addressed:

- Allowable residual pollution, where the polluter has taken all the measures ordered by the authorities and is meeting the environmental requirements stipulated by the policy but there remains a degree of allowable residual pollution with associated costs incurred by wider society.
- Pollution from non-compliance, where the polluter has failed to meet environmental requirements stipulated by the policy and enforcement is focussed on ensuring the requirements are met, but not addressing the damage caused.
- Opportunity for polluters to circumvent the costs of pollution.

- Diffuse pollution, where multiple sources are contributing to pollution and it is not possible to distinguish who the polluter is with sufficient clarity.
- Legacy pollution, where contaminants are left in the environment by sources that are no longer discharging them and/or it is not clear who the polluter is.

From our review of how policies are implementing the PPP (EQ1a) we find there is limited evidence of enforcement provisions contained in command and control instruments to address the costs of pollution where the polluter fails to meet the environmental requirement. Penalties are used to enforce the legislation but this does not address the resulting costs of pollution, rather policy provisions require that Member States determine penalties that are "effective, proportionate and dissuasive". Similarly, our review of the policy provisions used to apply the PPP uncovers examples where polluters have been able to circumvent costs of pollution. These include the use of derogations under the IED (reviewed for EQ1c) or reflagging of ships to avoid EU rules under the Ship Recycling Regulation. Under the Ship Recycling Regulation the PPP is applied via several policy provisions that are intended to ensure ship owners are accountable for the way in which ship end-of-life procedures are carried out to minimise pollution (among other things). Key among these provisions is the requirement that ships are disposed of in OECD countries with adequate recycling infrastructure and processes to manage the disposal of hazardous substances. The costs of adhering to this provision are significantly greater than the costs of ship disposal in third countries where the rules are less stringent and facilities can offer a greater price for the ship to shipowners as there is not proper disposal of hazardous material, in protective equipment and with skilled labour, or in infrastructure to avoid environment contamination (where dismantling is taking place on a tidal beach vs in an industrial dry dock) and the price of recycled material that can be extracted from ships is greater (namely steel). As a result, ship owners commonly reflag their ship at end-of-life so that they are not subject to the requirements of the Ship Recycling Regulation. The impact of reflagging is being reviewed as part of an ongoing evaluation[235].

We note differences between policies and sectors in how the challenge of identifying who the polluter is in the case of legacy pollution or diffuse pollution are being addressed. For example, under REACH, where costs of addressing legacy pollution is not addressed (rather the approach is to address costs of chemical risk management). Under the IED, there is no definition for 'direct' and 'indirect' releases to the environment. It is intended by the legislation that no distinction is made between the two, meaning that permit conditions should include limit values for emissions to water regardless of where they are being released (onsite or offsite). However, in practice, national implementation varies and permit conditions are only partially addressing the costs of diffuse pollution (Ricardo, 2020)[236].

Scale of unintended impact

The scale of this impact is reviewed here in terms of the costs of environmental externalities. ECA (2021) find that the cost from allowable residual pollution to society is high. The evidence underpinning this finding has since been updated by the EEA in their assessment of the trends of externalities of industrial air pollution caused by over 10 000 facilities during the last decade (2012-2021)[237] and is summarised in section 4.3 of this report.

235 Eva Sinemus, "Convenient shipbreaking: shortcomings of environmental obligations for EU ship owners and possible solutions" (March 12, 2021), on-line: Eva Sinemus, Final_120321,NCLOS Blog.

236 Ricardo (2020) Permitting of emissions to water under the IED. Current practices in Europe. https://www.naturvardsverket.se/498c45/contentassets/a2dd23d9e9254054988fda8ac10cf739/permitting-of-emissions-to-water-under-the-ied-final-report.pdf

237 https://www.eea.europa.eu/publications/the-cost-to-health-and-the

Another example is the environmental damage costs for the agriculture sector (CE Delft, 2018a; Funke, et al., 2022; FAO, 2023[238]). The challenge being that social and environmental costs from environmental impacts are not currently considered in the cost structure of farmers or the subsequent food chain and are thus the cost is not addressed by the polluter (IEEP et al 2023). Studies have identified a particular challenge in the case of EU agriculture as regards the costs of GHG emissions (particularly in the case of conventional animal-based products, followed by conventional dairy products) (Pieper et al 2020).

There are several factors contributing to this challenge. First, the costs are highly dispersed and affect many sectors of the economy which makes them difficult to estimate. Second, there is no complete valuation framework for the *positive* externalities of agriculture (e.g. nutrient recycling, protection of landscape and wildlife, provision of jobs, enhancement of rural communities) (Pretty et al. 2001). Third, economists find demand for basic food prices to be relatively inelastic (e.g. as concluded by Andreyeva et al. (2010) based on a literature review of 160 studies for eggs, cheese, and fats and oils).

In a recent study, CE Delft (2023)[239] estimate that the external costs of environmental pollution of livestock for France are EUR 18.9 billion. per year and EUR 22 billion per year for Germany. These cost estimates are derived from a review of environmental damage costs associated with agricultural products and the scale of production in each Member State. A summary of the cost estimates underpinning these national totals is provided below at EU27 level. Cost estimates range between the EUR 0.34 for a litre of milk to over EUR 10 per kg of beef. Costs are largely associated with GHG and ammonia emissions from manure handling and fertiliser application for growing crops for feed. This shows that despite the range of EU policies implementing the PPP via command and control instruments, there remain a significant degree of costs for environmental externalities which are not being addressed. The extent to which they are addressed by other legal instruments is reviewed in the subsequent subsection in response to this question.

238 Leveraging true cost accounting: a two-phase assessment (fao.org)

239 CE Delft (2023) Pay as you eat dairy, eggs and meat. Internalising external costs of animal food products in France, Germany and the EU27. CE_Delft_220109_Pay_as_you_eat_dairy_eggs_and_meat_Def_2.pdf (cedelft.eu)

Table 5-14 External cost estimates for meat, eggs, milk and cheese in EU27 (EUR/kg, conventional farming)

Impact category	Unit	Beef Beef cattle (incl. veal)	Beef Dairy cattle	Pork	Chicken	Eggs	Milk	Cheese (Gouda)
Particulate matter formation	€/kg	3.66	0.74	0.56	0.39	0.33	0.11	0.88
Climate change	€/kg	2.38	0.63	0.47	0.44	0.23	0.10	0.76
Marine eutrophication	€/kg	1.61	0.28	0.13	0.07	0.06	0.04	0.33
Terrestrial acidification and eutrophication	€/kg	1.18	0.23	0.17	0.09	0.08	0.04	0.28
Agricultural land occupation	€/kg	0.65	0.13	0.16	0.10	0.07	0.02	0.16
Terrestrial ecotoxicity	€/kg	0.49	0.18	0.37	0.32	0.25	0.03	0.21
Human toxicity	€/kg	0.13	0.03	0.03	0.02	0.01	0.00	0.03
Photochemical oxidant formation	€/kg	0.04	0.01	0.01	0.01	0.01	0.00	0.01
Freshwater eutrophication	€/kg	0.01	0.01	0.01	0.01	0.00	0.00	0.01
Ionising radiation	€/kg	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Freshwater ecotoxicity	€/kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine ecotoxicity	€/kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ozone depletion	€/kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban land occupation	€/kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**€/kg**	**10.15**	**2.24**	**1.91**	**1.44**	**1.03**	**0.34**	**2.68**

Source: CE Delft (2023)

The extent to which actions to implement the zero pollution ambition will address these unintended impacts remains to be seen. In theory, the zero pollution vision for 2050 will result in more stringent standards that will enable more effective application of the PPP. However, based on the current level of environmental policy stringency, we find that command and control instruments do not widely address the issue of internalising the cost of "residual" environmental damage or the cost of damage caused by failed compliance, diffuse pollution or legacy pollution (EQ1a). This type of cost is more typically addressed by sanctions (market-based instrument). IEEP et al (2023)[240] argue that the most effective way to close the gap between market prices and the cost of agricultural goods including the cost of associated externalities, would be to place a price on GHG emissions from agriculture, via carbon taxes or emission trading systems for example. This evidence that supports this argument demonstrates the limitations of using command and control instruments to implement the PPP to address costs of environmental damage. Whereas command and control instruments focus on production, MBI can be used to change consumption patterns within the food sector and consumers to move away from emissions-intensive products, as well as supply side issues by facilitating innovations that reduce on-farm emissions, e.g. new inputs such as more effective fertilisers. In this way, IEEP find that MBI are well suited to addressing costs of environmental damage.

Distributional effects of the costs of pollution

Where an economic sector has good capacity to pass-through costs, there is a risk of the PPP having an unintended impact on how the costs of pollution are distributed equitably to downstream users[241]. For example, under the EU ETS where there is evidence that cost pass-through to

240 IEEP et al (2023) Pricing agricultural emissions and rewarding climate action in the agri-food value chain. https://ieep.eu/publications/applying-the-polluter-pays-principle-to-agricultural-emissions/

241 When a business changes the price of the products or services it sells following a change in the cost of producing them.

downstream users varies by sector. Estimates for select subsectors are presented below. These costs are passed through to end consumers, but also to industry by the suppliers of labour, capital, energy and materials[242]. This unintended effect implies that the PPP is not fully applied as the costs are not borne by the polluting industry.

Table 5-15 Overview of cost pass-through for EU ETS sectors and products

Sector	Product	Cost pass-through not significant*	Cost pass-through significant*	Indicative cost pass-through rates (% of costs), if significant
Cement	Clinker	UK, CZ	FR, DE, PL	35 - 40
	Total cement	UK, IT	FR, DE	20 - 40
	Portland cement	Mediterranean countries	CZ, PL	90 - 100
Petro-chemicals	Ethylene		North-western Europe, Mediterranean countries	>100
	Mono ethylene glycol	Mediterranean countries		n/a
	Propylene oxide		North-western Europe	100
	Propylene glycol ether	North-western Europe	North-western Europe	>100
	Methanol, butadiene, propylene	North-western Europe, Mediterranean countries		n/a
Iron and steel	Flat steel HRC		Northern Europe, Southern Europe	75 - >100
	Flat steel CRC		Northern Europe, Southern Europe	55-85
Fertiliser	Ammonia	North-western Europe		n/a
	Ammonium nitrate	FR	UK	>100
	Calcium ammonium nitrate		DE	>100
	Urea ammonium nitrate		FR	>100
	Urea	NL	North-western Europe	100
Refineries	Diesel	DE	BE, FR, EL, IT, PL	>100
	Gasoil	EL, PL, IT	BE, DE, FR	>100
	Petrol	EL, PL	BE, DE, FR, IT	80 - 95
Glass	Hollow glass	DE, ES	FR, IT	40 - >100
	Fibre glass	DE		n/a

Note: * Significance was determined based on statistical analysis applying on a 10% critical threshold.
Source: CE Delft and Oeko-Institut (2015)[243]

242 https://climate.ec.europa.eu/system/files/2016-11/cost_pass_through_en.pdf

243 CE Delft and Oeko-Institut (2015) Ex-post investigation of cost pass-through in the EU ETS. An analysis for six sectors. cost_pass_through_en.pdf (europa.eu)

In the context of this fitness check, the occurrence of cost pass-through was referred to by policy evaluations for a relatively small number of policies including EU ETS, Ecodesign Directive, and the Ecolabel Regulation.

Another example of the unintended distributional effects of the PPP is how the costs of managing water quality are addressed. Evidence compiled for the 2019 fitness check of water acquis found that pollution charges used to implement the PPP do not fully identify the polluter where the majority of costs (70-100%) incurred by water acquis (Water Framework Directive, Environmental Quality Standards Directive, Groundwater Directive, Floods Directive and the Drinking Water Directive) are borne by the drinking water consumer via tariffs, taxes and transfers.

Exploring this further in the case of nitrate pollution to water, there is evidence to show that in many Member States additional treatment costs are passed on to the user. In rural areas, where nitrate contamination is often more common due to agricultural activities, the cost of nitrate treatment can be especially burdensome for small water systems that serve a limited number of customers. These small water systems may not have the resources to install or maintain expensive treatment systems, and the cost of treatment can be spread across a smaller customer base, leading to higher water rates for individual consumers. There is no exact benchmark for the share of household income that is made up of drinking water. A 2011 study conducted in France estimated the additional expenses paid by households due to agricultural pollution as €494 per household per year for the most affected localities, which is over €100 pp/per year extra if we assume 4 people in a household[244]. This equates to >0.5% of the average annual EU income per person which is not insignificant when compared to the common reference level used in developed economies for water affordability (3% of household income ratio) (Martins et al., 2023)[245].

Market distortion

In practice, there is evidence that subsidies are being used for clean-up actions (EQ3b). The extent to which these exceptions apply varies by sector and Member State meaning that there is a risk of market distortion in the application of the PPP where different approaches are resulting in different levels of stringency in the way the PPP is implemented. EQ3b finds that the use of EU funding is most commonly used for remediation of contaminated (industrial) sites and the protection and restoration of protected sites, waste management (e.g., infrastructure development), climate change mitigation measures and restoration of soil condition. In general, recipients of EU funds include grant beneficiaries, contractors, remunerated external experts, or persons or entities receiving prizes or funds from the EU budget. In the context of polluting sectors, beneficiaries include farmers (and other land managers), infrastructure developers (private entities, public sector entities, mixed entities, non-profit organizations), and industry.

Scale of unintended impact

The extent to which the use of EU funding together with the PPP is creating internal market distortions is mitigated via conditionalities set for environmental management. The scale of impact is uncertain based on the level of detail available from current expenditure reporting where information is available at project level thus understanding the impact on overall market distortion is not possible to determine (as noted for EQ3b).

244 Assessing water pollution costs of farming in France, République Française, Ministère de l'écologie, Department for the Economics, Assessment and Integration of Sustainable Development, Studies and documents n. 52, 2011.

245 Martins et al. (2023) Water affordability across and within European countries: a microdata analysis. Utilities Policy Volume 83.

There is a risk of creating market distortions with third countries, as reviewed by the OECD (2023)[246], where subsidies are higher than many other countries (accounting for 13% of total support provided for agriculture; exceeded only by China, India, and the United States which account for representing 36%, 15%, and 14% of total support provided).

Conclusions for 3c

There are several unintended gaps where costs of pollution are not being fully addressed. Examples identified include allowable residual pollution, pollution from non-compliance, opportunity for polluters to circumvent costs of pollution, diffuse pollution, and legacy pollution. The ongoing cost of environmental externalities demonstrates the potential significance of this impact across 8th EAP priority objectives.

There is evidence of unintended distributional effects from applying the PPP. Examples provided relate to the EU ETS and water acquis (Water Framework Directive, Environmental Quality Standards Directive, Groundwater Directive, Floods Directive and the Drinking Water Directive) where there is evidence that costs of pollution the user rather than the polluter.

There are also a number of negative unintended impacts from implementing the PPP, however, the majority are having an impact at company level and are difficult to review at EU or Member State level. For example, the risk of market distortion and/ or unfair distribution of the costs of pollution.

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5.2.3.4. EQ3d. What is the impact on competitiveness (within the EU and compared to third countries)?

To respond to this question, we first reviewed the main theoretical arguments regarding the impact of the PPP on competition. We then undertook a comparative analysis of stringency in the way the PPP is applied between Member States and compared with third countries as well as at sector level to examine the impact on competitiveness.

Key finding(s)	Robustness
There are **two lines of argument for how the application of the PPP can influence market competition**. On the one hand that more stringent application of the PPP will contribute toward pollution-intensive production capacity shifting towards countries with less stringent application of the PPP to acquire a competitive advantage (**Pollution Haven Hypothesis**). On the other hand, that environmental policies can stimulate innovations in environmentally-friendly technologies which lead to a better economic performance, offsetting any additional costs of the policy (**Porter Hypothesis**).	Strong
Based on the Pollution Haven Hypothesis and the environmental stringency of environmental taxes in the EU, we find that there is a **potential risk that the PPP is impacting on market competition between EU Member States and third countries**. Between Member States, the potential risk is primarily as a result of CO_2, NO_x and SO_x taxes where they have been applied in certain Member States and not others.	Medium
Despite the potential risk on competitiveness, there is **general consensus that the macroeconomic impact of the PPP applied via taxes on economic sector activity is small**. Moreover, in keeping with the Porter Hypothesis, there is evidence for the waste water sector to show that applying the PPP to address nitrate pollution has contributed to investment in water treatment technologies and upgrading facilities to remove nitrates comes at a cost to consumers through their water bills, ultimately affecting affordability. Similarly, more stringent environmental	Medium

246 OECD (2023) Agricultural Policy Monitoring and Evaluation 2023. https://read.oecd-ilibrary.org/agriculture-and-food/agricultural-policy-monitoring-and-evaluation-2023_b14de474-en#page1

Key finding(s)	Robustness
policy is associated with a short-term increase in industry-level productivity growth in the most technologically-advanced enterprises. However, the impact of more stringent environmental policy will likely be more significant where productivity is low depending on the ratio of technologically advanced versus technologically lagging enterprises. To fully assess the impact of how the PPP is applied on competitiveness, further analysis at enterprise level would be beneficial for better understanding the impacts.	

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Theoretical arguments

There are two main arguments regarding the impact of environmental policy on market competition. First, the "Pollution Haven Hypothesis" which finds pollution-intensive production capacity will tend to shift towards countries with less stringent environmental regulation to acquire a competitive advantage. Second, the "Porter Hypothesis" which finds that environmental policies can stimulate innovations in environmentally-friendly technologies which lead to a better economic performance, offsetting any additional costs of the policy. The argument is that efficiency improvements and innovations are often overlooked at enterprise level owing to 'incomplete information, weak competition, organisational inertia and other behavioural biases' and that environmental policies may enable enterprises to address such challenges (OECD, 2021)[247].

According to the Pollution Haven Hypothesis, there may be a risk to internal market competitiveness where the PPP is implemented more stringently in some Member States or sectors compared to others. Similarly, where the PPP is implemented in EU policy compared with third countries. In their guiding principles for implementation of the PPP, the OECD (2008) notes the importance of common cost-allocation rules to avoid the risk of one country subsidising polluters while another makes them pay which may provide a competitive advantage to subsidised polluters. We find that this perceived risk can be a barrier to implementing the PPP via EU policy.

In particular, Isermeyer et al (2019) emphasise the significance of a price signal in signalling the scarcity of a good in the market economy but further note that it is only effective if the price is consistent between markets. Accordingly, for climate policy, Isermeyer et al (2019) find that a uniform carbon price is essential to avoid risk of unfair market competition.

Impact on competitiveness

The evidence showing the impact that the PPP has on competitiveness is difficult to disentangle from other legal instruments used to implement environmental policy as well as various economic factors.

Applying the Pollution Haven Hypothesis, there is a potential risk of unfair competition between Member States from implementing the PPP in EU policy where there is evidence of Member State variation in implementation. The OECD's Environmental Policy Stringency indicator (2021) provides an indication of the different approaches to applying the PPP between Member States

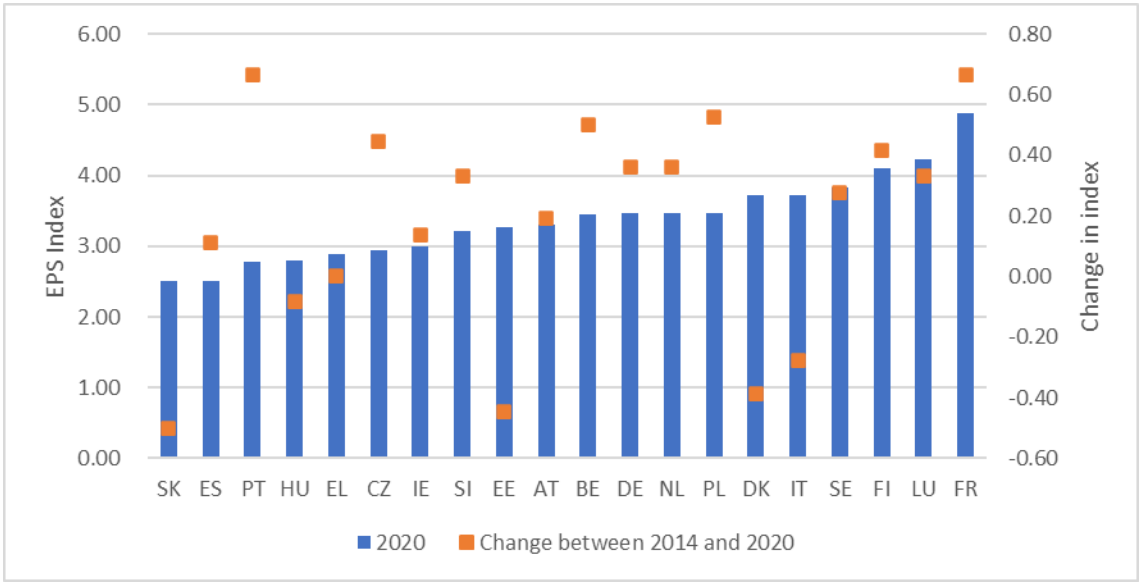
247 OECD (2021) Assessing the Economic impacts of Environmental Policies. https://www.oecd-ilibrary.org/environment/assessing-the-economic-impacts-of-environmental-policies_bf2fb156-en

and with third countries. The indicator compares "market-based instruments (taxes on CO_2, SO_X, NO_X and diesel fuel; trading schemes for CO_2, renewable energy certificates, and energy efficiency certificates; feed-in-tariffs; and deposit-refund-schemes), standards (emission limit values for NO_X, SO_X and PM, limits on sulphur content in diesel), and technology-support policies, such as government R&D subsidies". Thus, the resulting index encompasses a range of legal instruments, many of which are directly relevant to how the PPP is implemented in EU policy (reviewed for EQ1b).

The accompanying analysis for the Environmental Policy Stringency indicator by the OECD (2021) raises the concern that the differences between countries (and indeed Member States) in environmental policy stringency could impact the competitiveness of affected businesses. Moreover, there is evidence where concerns about a loss of competitiveness of local industries have led to exemptions and/ or the use of environmentally harmful subsidies for particular sectors that have reduced the effectiveness of environmental policy. However, the OECD further note that the risk of competitiveness concerns may be offset through efficiency gains achieved by restructuring, and spurring innovation and technological advances that enhance productivity at the same time as delivering environmental protection. However, the OECD further note that there is heterogeneity across enterprises and sectors, underlining the importance of combining both sector- and enterprise-level analysis.

Figure 5-17 shows how the index compares between EU Member States, where the environmental policy stringency value varies from the low end in Slovakia and Spain (value of 2.5, indicating less stringency of adopted policies) to the higher end in France (value of 4.9, indicating a greater stringency of adopted policies). It also shows the change over time between 2014 and 2020, where environmental policy stringency has decreased in five Member States (Slovakia, Hungary, Estonia, Denmark, Italy).

Figure 5-17 Environmental Policy Stringency Index for EU Member States



Note: No data for BG, CY, HR, LT, LV, RO, or MT
Source: OECD.Stat[248]

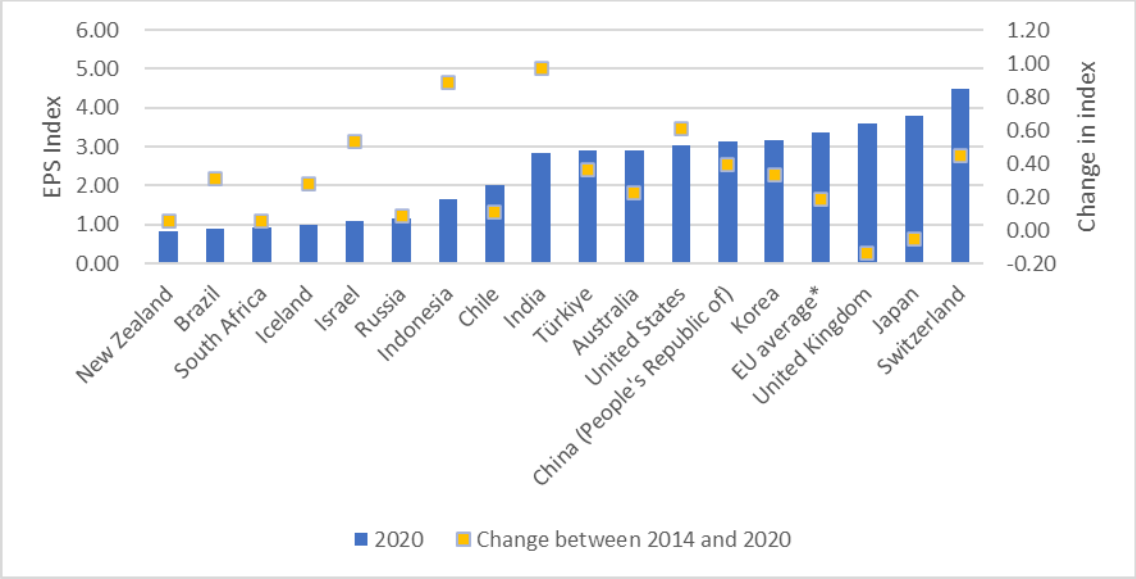
248 https://stats.oecd.org/Index.aspx?DataSetCode=EPS#

In the context of how the PPP is applied and internal market competition, the types of policies in scope of the OECD's environmental policy stringency indicator were compared with the evaluation findings for the extent of Member State flexibility in how they implement the PPP via EU policy (reviewed for EQ1c). Through this analysis we find that Member State differences in their environmental policy stringency value which are most relevant to the implementation of the PPP are more likely to be driven by the use of market-based instruments which are subject to more varied implementation by Member States. This is reflected in the individual ratings given to each legal instrument, as follows:

- EU ETS is consistently rated between countries (rated 3 for all Member States), as is the use of a diesel tax (varying between a 4 and 5 rating)
- The use of a Renewable Energy Trading Scheme in three Member States (BE, PL and SE)
- The use of a CO_2 tax in 10 Member States (DK, EE, FI, FR, IE, PL, PT, SI, ES, and SE)
- The use of a NO_x tax in eight Member States (CZ, DK, EE, FR, IT, PL, SK, and SE)
- The use of a SO_x tax in seven Member States (CZ, DK, EE, FR, IT, PL, and SK)
- No variation in non-market-based policies

Compared to third countries, the average Environmental Policy Stringency Index for EU Member States shows that EU environmental policy is comparatively high, exceeded by the United Kingdom, Japan and Switzerland. The variation between countries is again principally driven by the stringency of MBI rather than non-market-based instruments (including the EU ETS which is rated as being more stringent than ETS in third countries). Applying the Pollution Haven Hypothesis, this would again suggest there is a potential risk of unfair competition between EU Member States and third countries from implementing the PPP in EU policy where there is evidence of variation in implementation.

Figure 5-18 Environmental Policy Stringency Index for EU Member States compared to third countries



Note: EU average includes all EU27 Member States except for BG, CY, HR, LT, LV, RO, or MT (no data).
Source: OECD.Stat[249]

249 https://stats.oecd.org/Index.aspx?DataSetCode=EPS#

Despite the differences observed in the OECD's environmental policy stringency index between Member States and between the EU and third countries, and contrary to the Pollution Haven Hypothesis, there is general consensus that the macroeconomic impact of the PPP is small (as summarised by IEEP, 2021 which reviewed the macroeconomic impact of taxes on economic sector activity in terms of production levels). Moreover, in keeping with the "Porter Hypothesis", there is evidence for the waste water sector to show that applying the PPP to address nitrate pollution has contributed to investment in water treatment technologies and upgrading facilities to remove nitrates comes at a cost to consumers through their water bills, ultimately affecting affordability. In such cases there are examples of where alliances between farmers and water operators are set up (Hesse, North Rhine Westphalia and Lower Saxony; funded by water service charges) so the actors can work together to address source control of nutrients, as a more cost-effective solution to reducing nutrient loading of waters. These approaches are especially valuable in rural areas where agricultural production can be nitrogen-intensive and this filters into water systems over time.

Similar findings are reported for industry more generally where more stringent environmental policy is associated with a short-term increase in industry-level productivity growth in the most technologically-advanced enterprises. This is based on a comparison of the environmental policy stringency value at enterprise level with emission intensity (emissions over added value) and technological advancement by economic sector (Albrizio et al 2016)[250]. The analysis further shows that productivity decreases in less productive enterprises with more stringent environmental policy. An enterprise level assessment of what impacts the PPP is having on its competitiveness is not in scope of this fitness check and requires a more granular level of analysis than is possible with a fitness check. However, from this, we infer that the impact of more stringent environmental policy will likely be more significant where productivity is low depending on the ratio of technologically advanced versus technologically lagging enterprises.

Conclusions for 3d

Based on the Pollution Haven Hypothesis and the varied application of the PPP between Member States via environmental taxes there is a potential risk that the PPP could impact market competition between EU Member States and third countries. Between Member States, the risk of this occurring primarily as a result of CO_2, NO_x and SO_x taxes where they have been applied in certain Member States and not others.

However, there is general consensus that the macroeconomic impact of the PPP is small (as summarised by IEEP, 2021 which reviewed the macroeconomic impact of taxes on economic sector activity in terms of production levels). This is despite the differences between Member States and between the EU and third countries observed in the OECD's environmental policy stringency index which is indicative of the varied application of the PPP via environmental taxes, and contrary to the Pollution Haven Hypothesis. Moreover, in keeping with the "Porter Hypothesis", there is evidence for the waste water sector to show that applying the PPP to address nitrate pollution has contributed to investment in water treatment technologies and upgrading facilities to remove nitrates comes at a cost to consumers through their water bills, ultimately affecting affordability. Similarly, more stringent environmental policy is associated with a short-term increase in industry-level productivity growth in the most technologically-advanced enterprises. However, the impact of more stringent environmental policy will likely be more

250 Albrizio, S., T. Koźluk and V. Zipperer (2017), "Environmental policies and productivity growth: Evidence across industries and firms", Journal of Environmental Econonics and Management, Vol. 81, pp. 209-226.

significant where productivity is low depending on the ratio of technologically advanced versus technologically lagging enterprises.

To fully assess the impact of how the PPP is applied on competitiveness, further analysis at enterprise level – beyond the scope of the current fitness check - would be beneficial for better understanding the impacts of the PPP on market competition.

5.2.3.5. Stakeholder feedback for EQ3

Responses to the public consultation identify a number of factors that the public feel are limiting the effectiveness of the PPP.

As part of the public consultation participants were invited to evaluate the importance of the various obstacles to ensuring that polluters pay for the pollution they are responsible for (Q7). In accordance with our findings for EQ3a, responses show that the use of EHS was deemed a very important or important obstacle by 37% (99 participants) and 17% (45 participants). Moreover, the following concerns were raised regarding the use of EU and national funds to finance projects that should be paid for by the polluter by respondents in their position papers which are very much aligned with our findings for EQ3b:

- "For example, the project for monitoring internal pollution of Europeans, HBM4EU24, received € 74 million in public funding under Horizon 2020 (European Commission). Its successor project PARC25 will receive € 400 million from public funding (European Commission and Member States),
- "An analysis of the Just Transition Fund (JTF) plans indicates that hundreds of millions of euros are being approved for site rehabilitation which should have been the liability of the polluter",
- "EU funding plans for the 2021-2027 financing period in the CEE region imply a significant public financing of environmentally harmful activities and are very unambitious for climate action".

Responses to the public consultation show that the impact of the principle on competitiveness is regarded by respondents as an important obstacle to ensuring that polluters pay for the pollution they are responsible for (Q7). Competitiveness between EU Member States was found to be a very important or important obstacle by 58% (154). Competitiveness of the EU versus third countries implementing the principle differently was found to be a very important or important obstacle by 62% (166). However, there is no clear trend towards agreement/ disagreement about the negative impact of the PPP implementation on the profitability and competitiveness of EU enterprises (Q9). The ambivalence in respondent opinions is linked to the stakeholder categories, suggesting responses represent vested interests whereby 40% (43) of business entities completely or mostly agreed that the PPP negatively affected the profitability and competitiveness of EU enterprises, and 62% (64) of EU citizens and 44% (11) of NGOs completely or mostly disagreed that such a negative impact existed. As one example, business associations representing both animal and human medicines sectors raised concerns about EPR schemes covering pharmaceuticals. The representatives of these sectors believed that EPR schemes may impact patients' access to medicines where the inability to increase prices to cover EPR costs may lead to the withdrawal of critical medications from the market, posing a threat to patient health and well-being. Our evidence shows that there the extent to which public concerns regarding the impact of the PPP on competitiveness are justified is perhaps limited, where impacts are localised and mitigation measures have been taken by EU policy to minimise any negative impacts on market competition.

In addition, responses to the public consultation identified additional obstacles which have not been identified by our analysis, for example 'lack of political willingness to introduce and enforce implementation of the principle' was considered 'very important' by 35% (37) of business entities, 76% (79) of EU citizens, and 88% (22) of NGOs. The option 'the price of products and services does not fully reflect (internalise) the environmental damage (externalities) of the products' and services' lifecycles was considered 'very important' by 43% (46) of business entities, 39% (41) EU citizens, and 68% (17) of NGOs. Finally, the option national authorities fail to enforce environmental legislation and to make the polluters' pay was considered 'very important' by 31% (33) of business entities, 72% (75) of EU citizens, and 52% (13) of NGOs.

The problematic definition of **'who is the polluter' that limits the effectiveness of the PPP was prominent in textual contributions** (e.g., position papers, oral feedback of the interviewees and workshop participants) **of most stakeholder consultation activities** (i.e., public consultation questionnaire, stakeholder workshops and interviews). In the position papers, the respondents highlighted that the existing definitions did not include all actors responsible for the pollution and the public sector as a polluter was not sufficiently addressed. This issue prevailed in the responses of business associations and individual business companies. The stakeholders emphasised that the definition is an important pre-requisite of the PPP implementation effectiveness. The participants of the online workshops underlined that **identifying (and defining) a polluter** in the situations of legacy, chronic and diffuse pollution has been problematic. According to the participants, in such cases, determining a polluter is not a straightforward and often complex process that requires clear and standardised approaches in key pieces of legislation. Finally, the interviewees highlighted that identifying and defining the polluters has been a problem that affected the effectiveness of various PPP legal and non-legal instruments.

5.3. Efficiency

This criterion examines the distributional effects of the PPP as implemented in EU policy, to review whether it is fair and consistent with a just transition at EU level (EQ4) and the extent to which the application of the PPP at Member State level (EQ5) and EU level (EQ6) are contributing to efficient policy. In reviewing the evidence, potential for greater fairness in the application of the PPP (EQ4c) and improved efficiency have been examined (EQ6c).

5.3.1. EQ4. The extent to which the PPP is fair and consistent with a just transition including how it affects different stakeholder groups, including vulnerable groups

The purpose of this question is to demonstrate how the PPP, as implemented in EU policy, is fair and consistent with a just transition. For this analysis, fairness was assessed in terms of who bears the costs of implementation, i.e. whether they are borne by the polluter or wider society.

In answering this question, we reviewed:

- What the distributional effects of the application of the PPP are and whether they are generally fair (EQ4a)
- Whether the costs of implementing the PPP are fair and consistent with a just transition (EQ4b)
- Measures to improve the fairness of the implementation (EQ4c)

Points of comparison: The extent to which the costs of pollution have shifted away from wider society and toward the polluters causing it.

5.3.1.1. EQ4a. Why are the distributional effects of the application of the PPP generally fair?

The purpose of this question was to review whether the distributional effects of the application of the PPP are fair. The distributional effects were reviewed in terms of the differences between Member States and between households and corporations as two key polluting stakeholder groups. To respond to the question, national expenditure on environmental protection was reviewed as a share of national GDP to identify the distributional effects associated with how the costs of pollution are being met by the polluter - between Member States and between households and corporations. The resulting analysis was compared with findings from related studies and literature that have reviewed the distributional effects on households and corporations for specific examples.

The extent to which the ineffective application of the PPP in EU policy (where costs of pollution have been passed through to the user) has impacted on the distribution of costs is not reviewed here, rather it has been identified as an unintended consequence of the PPP that is reviewed for EQ3c.

Key finding(s)	Robustness
The PPP is fair in that it shifts the costs of pollution away from society and towards the polluters causing it.	Strong
For households, the share of expenditure on environmental protection over national GDP ranges between 0 and 1%, suggesting a generally fair distributional effect between Member States. Exceptions may be occurring in the case of Poland and Denmark where the costs are comparatively high as a share of GDP.	Medium
For corporations, national expenditure for environmental protection by corporations as a share of GDP is not as evenly distributed, ranging between 0.1% (Greece and Ireland) and 2.9% (Austria). This may suggest an unfair distributional effect between Member States.	Medium
There is insufficient granularity in the NEEP data to unpick the drivers of these differences in terms of the specific revenue streams that comprise the national totals. However, pollution levels will likely be a key factor, where lower pollution levels incur lower costs.	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	NO

The extent to which the PPP is fair

EU environmental policies aim to ensure the burden incurred by polluters is equally distributed across sectors and individuals and do not contribute to inequalities (European Commission, 2023)[251]. In this way, the PPP is fair, in that it shifts the costs of pollution away from society and towards the polluters causing it (as reviewed for EQ1d).

251 European Commission (2023) Annual report on taxation 2023. Untitled-3 [Recovered] copy (europa.eu)

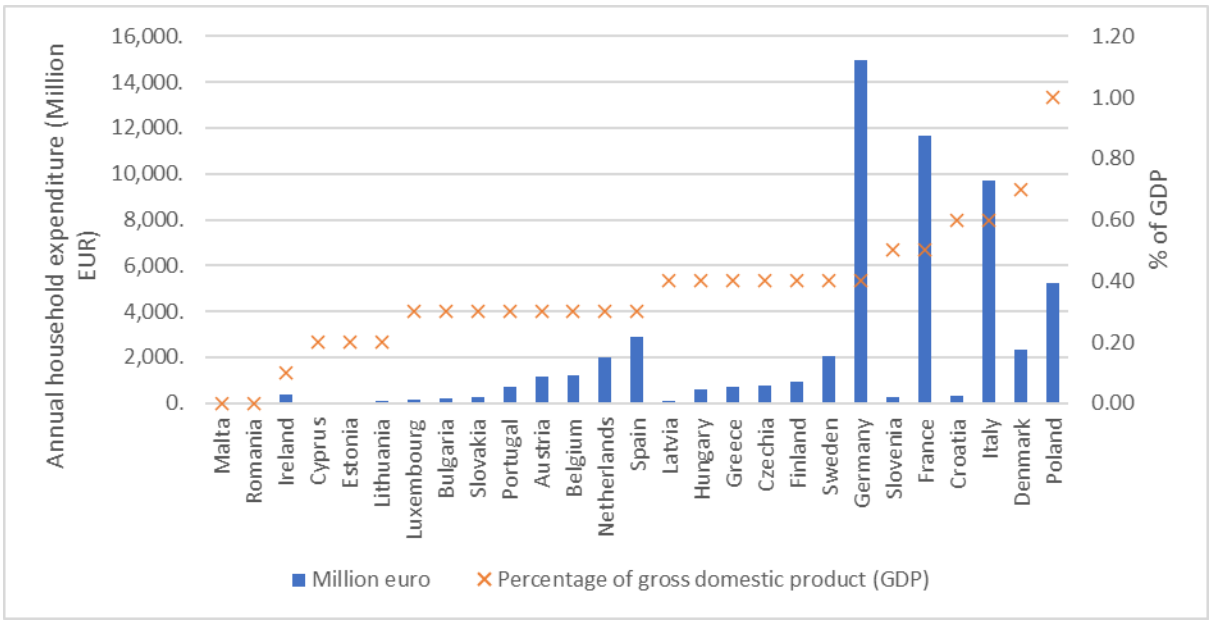
However, there is a risk of undesirable distributional effects where lower income households are disproportionately impacted by the costs of pollution which may make the application of the PPP unfair. In practice, distributional effects depend on the way costs are recovered. Regressive effects can be avoided through a careful design of policies implementing the PPP as well as compensation mechanisms. As a result, a fair application of the PPP through carefully designed mechanisms to ensure an acceptable distribution of costs and benefits not only does not cause concerns with regards to the just transition, but it directly contributes to the fairness of the transition. In general terms, evaluating the distributional impacts of EU policy is key to conducting policy evaluation and impact assessment according to the European Commission's Better Regulation Guidelines and thus where available, the policy evaluations reviewed for EQ1d examine the distributional effects of policies finding that undesirable distributional effects are mitigated.

To examine the distributional effects of the PPP, the distribution of national household expenditure on environmental protection by households and corporations as a share of national GDP was reviewed to compare differences in the distribution of costs between *Member States.* To supplement this analysis, undesirable distributional effects have been examined for specific examples.

Distribution of costs of pollution by Member State (households)

As a share of national GDP, expenditure in 17 Member States is within 0.1% of the EU27 average (0.4% of GDP). Member States where household expenditure on environmental protection as a share of GDP exceeds this average are Croatia (0.6%), Italy (0.6%), Denmark (0.7%) and Poland (1%). Member States where the share is below the EU27 average are Malta and Romania (0%), Ireland (0.1%) and Estonia, Cyprus and Lithuania (0.3%). There is insufficient granularity in the NEEP data to unpick the drivers of these differences in terms of the specific revenue streams that make up the national totals. However, pollution levels will likely be a key factor, where lower pollution levels incur lower costs.

Figure 5-19 Member State distribution of household expenditure on environmental protection (for the year 2020)



Note: The low end of national expenditure on environmental protection by households is not visible in the above chart but ranges from EUR 0.6 million in Malta to EUR 199.6 million in Bulgaria. As a percentage of GDP, a value of 0 was reported for Malta and Romania.

Source: Logika Group,

Overall, the comparison between household expenditure on environmental protection over national GDP suggests that the costs of pollution are fairly distributed between Member States. This is despite the varied approaches between Member States in their implementation of the PPP (as reviewed for EQ1c) and may be owing to the redistribution of costs by Member States where application of the PPP may be coupled with compensatory measures targeted to vulnerable households.

IEEP (2021) found that environmental taxes used to apply the PPP had small unintended effects on GDP or household income[252]. This finding was based on the fact that while the application of the PPP can 'negatively affect real incomes for all households if the income is used to reduce debt', policy mechanisms are used by Member States to redistribute costs, which reduce the impact on households. The findings further show that among the MBI reviewed, a PAYT scheme, a NO_x tax, and a fertiliser levy typically impact higher income households more than lower income ones. Whereas, an indirect tax on domestic biomass fuel and coal, a waste water pollution tax, a tax on intensive agriculture, and a water consumption tax were found to impact lower income households more than higher income ones. It is generally agreed that the application of the PPP is only progressive if the revenues generated are recycled back to households, rather than put towards public budgets[253]. Examples include the Croatian Forest Public Benefit Fee which charges companies for the economic use of forests, and the social impacts of the system are positive despite being an unpopular, and unnecessary, policy in the opinion of industry[254]. Additionally, there has been a positive social impact noted by Poland under an extension of the EU ETS 2 and a revision of the ET Regulation[255]. This means that where Member States take a varied approach to implementing the PPP, on average there is a risk of small scale impacts for households which may not be apparent at Member State level.

A further study that examined the distributional effects of carbon taxation noted that without revenue recycling (where governments re-invest the revenue generated by the tax in low-income households through schemes such as renovation and/or renewable energy subsidies), such taxes tended to be regressive in developed economies (Wang, Hubacek, Feng, Wei, & Liang, 2016)[256]. Applying this theory, modelled analysis for microsimulations for four Member States reusing energy tax revenue for households minimised inequality and poverty (European Commission, 2020)[257].

Distribution of costs of pollution by Member State (corporations)

As a share of GDP, the differences between Member States are equally noticeable, ranging between 0.1% (Greece and Ireland) and 2.9% (Austria). In 18 Member States, the share of corporation expenditure on environmental expenditure is less than the EU27 average of 1.2%, exceeded only by Italy (1.3%), Estonia (1.4%), Germany (1.4%), Poland (1.6%), Slovenia (1.7%),

252 (Mottershead et al., 2021)

253 (Best, Martini and Görlach, 2022)

254 (IbidGalović, 2016iGalović, 2016bGalović, 2016

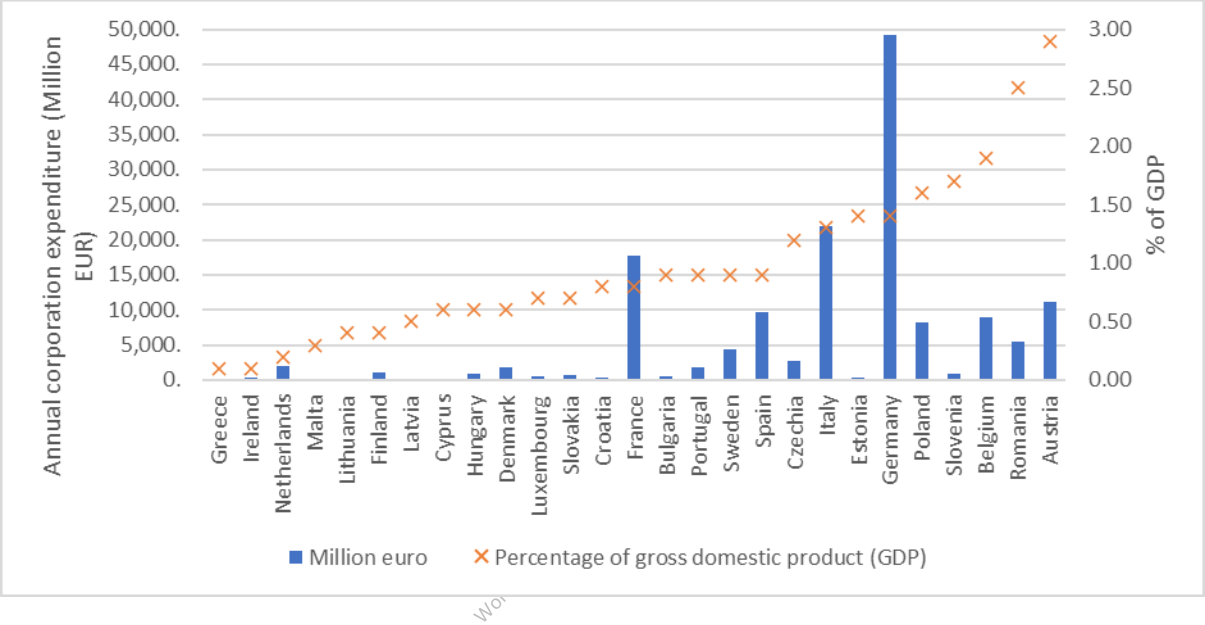
255 (WiseEuropa, 2022)

256 Wang, Q., Hubacek, K., Feng, K., Wei, Y., & Liang, Q. (2016). Distributional effects of carbon taxation. Applied Energy, 184, 1123-1131. Available at: https://www.sciencedirect.com/science/article/pii/S0306261916308583

257 European Commission. (2020). Tax wedge on labour: Shifting tax burden from labour to other forms of taxation. Brussels: European Commission, Directorate General for Economic and Financial Affairs. Available at: https://www.consilium.europa.eu/media/42557/eg-thematic-discussion-on-growth-and-jobs-tax-wedge-onlabour.pdf

Belgium (1.9%), Romania (2.5%) and Austria (2.9%). The variation is affected by national action to implement the PPP reviewed for EQ5.

Figure 5-20 Member State distribution of corporation expenditure on environmental protection (for the year 2020)



Note: The low end of national expenditure on environmental protection by households is not visible in the above chart but ranges from EUR 36.4 million in Malta to EUR 253.6 million in Ireland.

Source: Logika Group

Further differences are noticeable between sectors, for example, the differences observed between energy intensive trade exposed industries under the EU ETS. Relative to the sectors turnover, compliance costs account for 4% of the sectors turnover for refineries compared to 0.1% for the paper sector. Free allowance allocation was granted under phases I, II and III to mitigate the competitive impact of the ETS for economic sectors at risk (and to avoid carbon leakage). Free allowances were traditionally allocated via grandfathering (based on historical emissions) to protect companies in sectors at risk of carbon leakage. Where this applied, companies did not have to pay for their emissions allowances. However, free allowance allocation was found to be subsidising the sectors in question and thereby hampering implementation of the PPP. Phase IV of the EU ETS involves phasing out free allowances.

At sector level, free allocation was most significant for industry in terms of the share of free allocation granted to subsectors (granted to 71% of operators), and the overall coverage of the ETS in terms of economic activity (67% of the sector regulated by the ETS). Focussing on industry, free allocation was primarily granted to the chemical subsector, mining, non-ferrous metals and non-metallic minerals subsectors, as well as paper production subsector. The resulting effect is that the costs of compliance are estimated to range between 0.1% and 4% of sector turnover. While Phase IV of the EU ETS involves phasing out free allowances, the impact

on EU ETS operators is expected to be minimal in view of the opportunity costs that exist under the EU ETS[258].

Table 5-16 Share of free allocation to industry subsectors in the EU ETS and share of compliance costs as a share of turnover

Sector	Minimum – maximum share of free allocation in the EU ETS (OECD)	Compliance costs as a share of turnover (%) (CE Delft)
Iron and steel	57 – 100	1
Minerals	70 – 98	Glass: 0.4 Cement: 4
Energy	26 – 100	Refineries 0.1
Chemicals	34 – 100	0.2
Paper	82	0.1
Aluminium (non-ferrous metals)	87	0.2

Sources: OECD, 2023[259]; CE Delft, 2016[260]

Conclusions for EQ4a

not for draft

The PPP is fair in that it shifts the costs of pollution away from society and towards the polluters causing it. This is supported by evidence presented for EQ1d.

The extent to which this is fair has been examined based on the distribution of national expenditure on environmental protection between Member States for households and corporations as a share of GDP.

For households, the comparison suggests there is a fair distribution between Member States. The share of household expenditure on environmental protection over national GDP ranges between 0 and 1%. Exceptions may be occurring in the case of Poland and Denmark where the costs are comparatively high as a share of GDP. The fair distribution between Member States is despite the varied approaches between Member States in their implementation of the PPP (as reviewed for EQ1c) and may be owing to the redistribution of revenues generated by policies used to apply the PPP by Member States (which is reviewed in more detailed for EQ5).

For corporations, the comparison suggests there is a potentially unfair distribution between Member States where national expenditure for environmental protection by corporations as a share of GDP is not as evenly distributed, ranging between 0.1% (Greece and Ireland) and 2.9% (Austria).

In terms of the distributional effects to groups (including vulnerable groups) within Member States, in practice such effects depend on the way costs are recovered. Fair application of the PPP via carefully designed mechanisms to ensure an acceptable distribution of costs and benefits directly contributes to the fairness of the transition. Assessing such distributional impacts of EU policy is

258 https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en

259 OECD (2023) Effective Carbon Rates 2023. Effective Carbon Rates 2023 : Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading | OECD Series on Carbon Pricing and Energy Taxation | OECD iLibrary (oecd-ilibrary.org)

260 Ex-post investigation of cost pass-through in the EU ETS: An analysis for six sectors, European Commission, available at www.ec.europa.eu)

key to conducting policy evaluation according to the European Commission's Better Regulation Guidelines and thus where available, the policy evaluations reviewed for EQ1d support this.

5.3.1.2. EQ4b: Are the distributional effects of policies applying the PPP exceptionally unfair in the sense of inconsistent with a just transition when targeting vulnerable groups and regions?

To review whether the costs of the PPP are fair and consistent with a just transition, the possible distributional effects of national expenditure on environmental protection reviewed for EQ4a were compared with Member State ranking according to the "Transitions Performance Index" (TPI) to identify correlations where differences in national expenditure on environmental protection may be having a positive or negative impact (JRC, 2021)[261]. The "Transitions Performance Index" (TPI) is a scoreboard to monitor and rank countries on their transition(s) to sustainability according to:

a) economic aspects (measured in terms of education, wealth, labour productivity, R&D intensity, industrial base)

b) social aspects (measured in terms of health life, work & inclusion, free or non-remunerated time, equality)

c) environmental aspects (measured in terms of greenhouse gas emissions reductions, biodiversity, resource productivity, energy productivity), and

d) governance aspects (measured by fundamental rights, security, transparency, sound public finances). The TPI is based on the UN SDG and covers progress between 2011 and 2020.

Key finding(s)	Robustness
The limited distributional effect of applying the PPP between households in different Member States is consistent with the generally strong transition performance of Member States for social aspects of a just transition.	Medium
There is no clear correlation between Member States in terms of the distribution of pollution costs for corporations as a share of GDP and their transition performance of Member States for economic aspects of a just transition. The absence of a clear correlation suggests that environmental expenses are not a determining factor on achieving the economic aspects.	Medium
For both social and economic aspects, the comparison at Member State level does not provide insight for the varied approaches between Member States in their implementation of the PPP. In such cases, the distributional effects of implementing the PPP can only be considered on a case-by-case basis as there is no comprehensive data. While the distributional effects vary between Member States and policies used to implement the PPP, the magnitude of the effects described are generally minor and effects addressed by recycling the revenue generated.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	NO

261 https://ec.europa.eu/research-and-innovation/en/knowledge-publications-tools-and-data/interactive-reports/transition-performance-index-2021

Defining a just transition

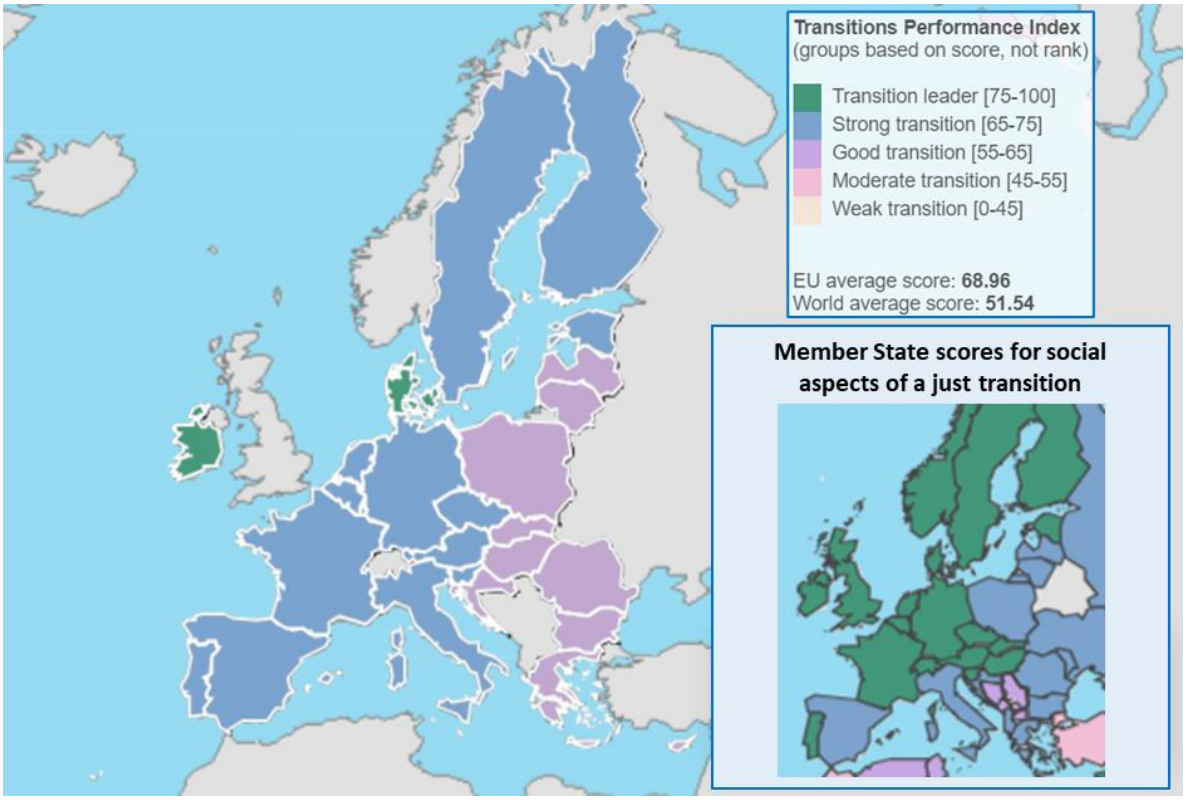
This question examined the extent the costs to implement the PPP under EU policy are consistent with a just transition, and in accordance with the stated objectives of the PPP (Figure 3-1). The term "just transition" refers to the need to achieve climate and environmental targets at the same time as protecting from economic and social inequalities (and thereby promote fairness)[262].

Member State performance on achieving a just transition

The TPI for the year 2021 shows that the EU27 is a strong transition performer, with Denmark and Ireland categorised as transition leaders (JRC, 2021)[263]. Most EU countries (17) are either transition leaders or strong performers. The scores that inform the overall ranking are grouped by the four components of the TPI (economic, social, environmental and governance). It shows that Member States are scoring high on social and governance aspects (categorised either as a transition leader or as demonstrating a strong transition). One exception to this is Hungary which scores lower for governance (between 55 and 65). Member State scores on economic aspects show evidence of moderate transition (Spain, Portugal, Poland, Latvia, Lithuania Hungary, Slovakia, Croatia and Greece) and evidence of weak transition (Romania and Bulgaria). Comparing Member State performance on achieving social aspects of a just transition (Figure 5-21) with the distributional effects of implementing the PPP, we find that the limited distributional effect between households in different Member States is consistent with the generally strong transition performance of Member States for social aspects of the TPI.

Working draft

Figure 5-21 Member State performance on social aspects of a just transition (2021)



Source: JRC, 2021

262 JustTransition-Indicator-Paper.pdf (oeko.de)

263 https://ec.europa.eu/research-and-innovation/en/knowledge-publications-tools-and-data/interactive-reports/transition-performance-index-2021

We compared Member State performance on achieving economic aspects of a just transition with the distributional effects of implementing the PPP. National expenditure on environmental protection by corporations is not consistently reflected in Member State scores for economic aspects of the TPI. For example, the share of national expenditure by corporations compared with GDP in Romania is higher than the EU27 average and exceeded only by Austria, whilst Romania scores low for economic aspects under the TPI. The absence of a clear correlation suggests that environmental expenses are not a determining factor on achieving the economic aspects at Member State level.

For both social and economic aspects, the comparison at Member State level does not provide insight for the varied approaches between Member States in their implementation of the PPP (as reviewed for EQ1c). In such cases, the distributional effects of implementing the PPP can only be considered on a case-by-case basis as there is no comprehensive data.

Taking the example of environmental taxes used to apply the PPP, based on relative household expenditure, distributional effects have been found to vary between environmental taxes commonly used to apply the PPP (European Commission, 2023)[264]. As referred to for EQ4a, the modelled distributional impacts of MBI used to apply the PPP suggest that despite this variance between taxes, the likely impacts are small, owing to the ways in which Member States recycle the tax revenue generated (IEEP, 2021). For example:

- Taxes on transport fuels are not considered regressive because lower-income households tend to use transport fuels less (Flues & Thomas, 2015). As reviewed for the accompanying issue paper on the use of environmental taxes, an ex ante assessment that looked at the impact of a smart kilometre charge based on type of vehicle, weight and fuel use further confirmed no distributional effect (Ex'tax Project, 2022)[265]. However, there are nuances as regards the social justice aspects of such charges which vary by region and indicate that low emission zones and charges to implement them are widening the inequalities between social groups particularly for small and medium enterprises, low income citizens and self-employed carriers. However, quantitative evidence to support this is weak (Logika, 2023)[266].
- Taxes on heating fuels are regressive where lower income households spend a higher share of their income on energy taxes than higher income households (see e.g. (Zhang & Baranzini, 2004); (Williams III, Gordon, Burtraw, Carbone, & Morgenstern, 2015)). Similarly, a modelled analysis comparing the real income of the lowest income quintile to the highest income quintile found that tax on domestic use of coal and biomass would have a regressive effect if introduced in Bulgaria, Hungary, Poland and Slovakia - where modelled data showed that real income for the lowest income group was adversely affected (IEEP, 2021). Recycling the revenue from taxes to households can address the undesirable distributional effect (e.g. WWF, 2022)[267].
- The same modelled analysis assessed different PAYT schemes for waste management in Latvia, Cyprus, Greece, Estonia, Malta and Slovakia, concluding that the schemes were likely to have a small distributional effect where real income for the lowest income group

264 European Commission (2023) Annual report on taxation 2023. Untitled-3 [Recovered] copy (europa.eu)

265 Ex'Tax Project (2022) The taxshift. A EU fiscal strategy to support the inclusive circular economy.

266 Logika (2023) Quantifying the impact of low- and zero- emission zones in six European cities. A report for the Clean Cities Campaign.

267 WWF (2022) Social Climate Fund and ETS 2 impact studies. Evidence review. https://wwfeu.awsassets.panda.org/downloads/ets2_and_scf_studies_review_final__1_.pdf

was adversely affected (IEEP, 2021). The analysis further found that recycling revenue addressed the imbalance.

- Forest felling charges are applied in Austria, Croatia, Hungary, Italy, Latvia, Lithuania and Sweden and are found to be regressive- where modelled data showed that real income for the lowest income group was adversely affected (IEEP, 2021).
- Taxes on electricity are found to be regressive where lower-income households have less scope to reduce electricity consumption.
- Charges on wastewater pollution meanwhile are found to have an inflationary effect for the whole economy, eroding income for all groups, albeit to a small degree (IEEP, 2021). The analysis further found that recycling revenue generated by charges to industries that discharge effluents addressed the imbalance.
- As reviewed for the accompanying issue paper to this fitness check report on the use of environmental taxes, landfill taxes have been found to have a low distributional, trade and competitive effect (European Commission, 2021)[268]. The same conclusions have been drawn for both pesticide and fertiliser taxes, as well as the plastic bag tax (based on modelled analysis by IEEP, 2021).

As reviewed in the case of environmental taxes (European Commission, 2023)[269], the undesirable distributional effects where lower income households are disproportionately impacted by the costs of pollution may be counterbalanced by the resulting environmental benefits of applying the PPP. For example, where the PPP is addressing the costs of environmental damage that is having a disproportionately negative impact on lower-income households and where pollution exposure is greatest for poorer households.

Conclusions for EQ4b

Comparing Member State performance on achieving social aspects of a just transition, with the distributional effects of implementing the PPP, we find that the limited distributional effect between households in different Member States. This is consistent with the generally strong transition performer of Member States for social aspects of the TPI. However, no clear correlation was identified from the comparison of Member State performance on achieving the economic aspects of a just transition with the distributional effects of implementing the PPP. This suggests that environmental expenses are not a determining factor on achieving the economic aspects.

For both social and economic aspects, the comparison at Member State level does not provide insight for the varied approaches between Member States in their implementation of the PPP (as reviewed for EQ1c). In such cases, the distributional effects can only be considered on a case-by-case basis as there is no comprehensive data. While the distributional effects vary between Member States and policies used to implement the PPP, the magnitude of the effects described are generally minor and effects addressed by recycling the revenue generated.

5.3.1.3. EQ4c. Could measures have been taken to improve the fairness of the implementation?

To respond to this question, we reviewed how issues of fairness are addressed in EU policy and national initiatives and whether there is scope for improvement. Evidence to inform this analysis was primarily compiled from literature review and compared with findings for EQ4a and 4b.

268 European Commission (2021) Ensuring the polluters pay – toolkit.

269 European Commission (2023) Annual report on taxation 2023. Untitled-3 [Recovered] copy (europa.eu)

Key finding(s)	Robustness
Recycling revenue generated through implementation of the PPP has been identified as having potential to improve the fairness of the implementation of the PPP. The evidence shows it mitigates the risk of unfair distribution of costs.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	NO	YES	NO

Revenue recycling

As identified in the evidence reviewed for EQ4b, recycling revenue generated by implementation of the PPP can effectively minimise the risk of unfair distributional impacts. “From a societal point of view and if well designed, environmental taxes reduce distortions by internalising negative externalities (e.g., the costs of pollution and other environmental costs) while at the same time providing some additional public revenue.” (European Commission, 2023)[270]. Thus, recycling revenue generated through implementation of the PPP has been identified as having potential to improve the fairness of the implementation of the PPP.

In modelling the wider impacts of recycled revenue generated through environmental taxes, IEEP concluded that they had a clear impact on macroeconomic outcomes, noting that their tailored use to address issues of fairness specific to the use of the MBI had a more favourable impact on GDP compared to their use to pay-down government debt. To support this, Best et al (2022)[271] find that the level of revenue recycled back to households has a direct impact on whether the implementation of the PPP is progressive or not in the case of taxes and pollution charges applied in Germany to buildings and transport sectors. Accordingly, at national level, we observe that examples of recycled revenue are widely used and recognised among the benefits of using MBI to address pollution and resource use[272]. One such example among the 40 case studies published by IEEP (2017) is the environmental pollution tax in Lithuania which provides direct funding to support recycling operators with infrastructure investments and research and development (Šleinotaitė-Budrienė et al, 2017)[273]. Another example is the NO_x tax in Sweden which is found to have stimulated innovation through the refund system available to regulated operators (OECD, 2013; Pederson, 2017)[274], [275].

For the 2021-2030 EU ETS period a Carbon Border Adjustment Mechanism (CBAM) is being phased in (COM(2023)330)[276].[277] The CBAM places a price on carbon emitted to confirm the price paid for the embedded carbon emissions generated in the production of certain goods imported

270 European Commission (2023) Annual report on taxation 2023. Untitled-3 [Recovered] copy (europa.eu)

271 Best, A., Martini, L. and Görlach, B. (2022). ‘Can Polluter Pays policies in the buildings and transport sectors be progressive? Country report: Germany’, Ecologic Institute: Berlin. Available at: https://www.ecologic.eu/sites/default/files/publication/2022/50074-ETD-reform-ETS2-introduction-country-briefing-Germany.pdf

272 https://ieep.eu/publications/new-suite-of-40-case-studies-on-environmental-fiscal-reform/

273 https://ieep.eu/wp-content/uploads/2022/12/LT-Env-Pollution-Tax-final.pdf

274 OECD (2013) The Swedish Tax on Nitrogen Oxide Emissions. Lessons in Environmental Policy Reform. OECD Environment Policy Paper, December 2013 no. 2. OECD.

275 Pedersen, AB (2017) NOx and SO2 taxes in Sweden. https://ieep.eu/wp-content/uploads/2022/12/SE-NOx-SO2-Tax-final.pdf:

276 https://commission.europa.eu/system/files/2023-06/COM_2023_330_1_EN_ACT_part1_v5.pdf

277 https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en

into the EU[278]. It is intended to secure an equivalent carbon price for imports as for domestic production. Revenue generated under the CBAM will be largely recycled to the EU budget (it is proposed to recycle 75% of revenue generated). This revenue will be used in part to fund the Social Climate Fund that has been introduced as part of EU ETS II 2 to support lower-income households which are most vulnerable to cost pass-through which occurs as a result of increased carbon prices) (OECD, 2023)[279]. The Social Climate Fund will also benefit vulnerable micro-enterprises and vulnerable transport users[280]. The role of the Commission regarding the generation of revenues for environmental protection is evolving and a notable change in this regard is the move away from the GNI income to increase the EU own resources via specific revenue streams[281]. Moreover, revenue from the auctioning of allowances under the EU ETS will be allocated to the Innovation Fund and the Modernisation Fund. The Modernisation Fund targets investments in the ten lower-income EU member states to help modernise energy systems, improve energy efficiency, and address social issues in the path to net-zero emissions. The recycling of revenue generated also shows the potential for the PPP to support with R&D (and bridging the gap between R&D and commercial readiness of new techniques particularly in the field of decarbonisation). Owing to the postponed introduction of the own resource from the EU ETS, the scale of revenue that will be allocated to the various funds is uncertain[282].

Another example at EU level is the plastics own resource (adopted in January 2021) that generates revenue from national contribution based on the amount of non-recycled plastic packaging waste applying a uniform rate of €0.80 per kilogram to the weight of plastic packaging not recycled.[283] Since it was introduced, this resource has generated EUR 6 billion per annum in 2021 and 2022[284]. This revenue is being used to support with the NextGenerationEU recovery plan, which while broadly intended to support having environmentally-friendly and energy efficient technologies, transport, and buildings is not tailored to recycling of plastics. Thus, applying the conclusions from IEEP (2021), we infer that the impact of this revenue on macroeconomic outcomes to improve fairness of how the PPP is implemented is may be improved better targeted to the source of income.

Conclusions for EQ4c

Recycled revenues from MBI used to apply the PPP can, for example be used to reduce the risk of unfair distribution of costs. There are comparatively few examples of recycling revenue at EU level, suggesting potential for its greater use to improve the fairness of the implementation of the PPP. Member States take a varied approach to the use of recycling revenue generated which is consistent with modelled analysis where the use of recycled revenue is found to be most effective when tailored to the specific tax or pollution charge. Based on current approaches to

278 On 1 October 2023, the CBAM entered into application in its transitional phase. Once the permanent system enters into force on 1 January 2026, importers will need to declare each year the quantity of goods imported into the EU in the preceding year and their embedded GHG. They will then surrender the corresponding number of CBAM certificates. CBAM is being phased in in the period 2026-2034 and initially applies to carbon intensive sectors including cement, iron and steel, aluminium, fertilisers, electricity and hydrogen.

279 Effective Carbon Rates 2023 OECD

280 https://www.consilium.europa.eu/en/infographics/fit-for-55-social-climate-fund/

281 https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2021-2027/revenue/next-generation-eu-own-resources_en

282 European Commission (2023) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on An adjusted package for the next generation of own resources. COM(2023)330. https://commission.europa.eu/document/download/e3760cdf-5394-48ae-948a-5fd22c119911_en?filename=COM_2023_330_1_EN_ACT_part1_v5.pdf

283 https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2021-2027/revenue/own-resources/plastics-own-resource_en

284 GenRev.pdf (europa.eu)

implementation, recycling revenue generated through implementation of the PPP has improved the fairness of implementation particularly where the use of revenue generated can be tailored to the specific socio-economic challenges incurred as a result of introducing the tax or pollution charge.

5.3.1.4. Stakeholder feedback for EQ4

The focus of the questions included in the public consultation were on the distributional effects of the PPP (relevant to EQ4b). Overall, the respondents indicated that they perceive the implementation of the PPP as not having led to disproportionate prices for products and services to EU consumers nor in the production of products and provision of services by EU companies. Sixty-one per cent of the respondents (161) indicated that they completely disagreed (34%, 90) or mostly disagreed (27%, 71) that the implementation of the PPP had led to disproportionately high prices of products and services for EU consumers. However, several issues related to fairness were identified by respondents in their open text responses. In sum, these suggested that the implementation of the PPP had a negative impact on:

- Vulnerable social groups (e.g., low-income households, etc.) where the PPP is not effectively applied and the consumer bears the costs that should be paid by the polluter, particularly in terms of limited availability of goods and rising expenditure due to higher prices of goods and services in energy and waste management sectors.
- Small and medium enterprises, where SMEs do not have the same investment capacity as larger companies.

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The interviewees discussed the distributional effects of specific legal and non-legal PPP instruments. The areas where distributional effects were discussed included the use of fossil fuels, transport, agriculture, pharmaceuticals, food, energy and water. Several commonly affected audiences usually included specific industry sectors or social groups (e.g., low-income populations). The respondents highlighted that both positive and negative distributional effects were the outcomes of the design of environmental policies or instruments.

5.3.2. EQ5. Whether (and if so, why) there are significant differences in the (efficient) application of the PPP across EU policies and between Member States

In answering this question we reviewed the following:

- Differences in the efficient application of the PPP between Member States
- Factors that are driving the differences in efficiency

5.3.2.1. EQ5a. Are there significant differences in implementation between policy areas and Member States affecting efficiency?

As reviewed for EQ1c, one of the main drivers that have led to differences in implementation is the varied use of environmental taxes and pollution charges. Thus, the focus of this analysis is on the differences in the efficient application of the PPP via such environmental taxes and pollution charges. Member State experiences were drawn on via a review of case studies on the use of economic instruments to address pollution and resource use, compiled by the IEEP (2017[285]). At

285 https://ieep.eu/publications/new-suite-of-40-case-studies-on-environmental-fiscal-reform/

Member State level, efficiency was assessed based on the cost of implementation compared to the environmental impacts described for the case study, it is not possible to compile this analysis at the EU level.

Key finding(s)	Robustness
We find differences in implementation which affects efficiency, but it is not possible to quantify this difference or conclude on the effect on overall efficiency of the PPP at EU level. Case studies for how the PPP is implemented in EU and national policy provide evidence that market based incentives can deliver efficient environmental improvements. At the same time, there can be an administrative burden that negatively impacts on efficiency e.g. where there are challenges in establishing who the polluter is, or linking taxes to the level of pollution. However, there is insufficient data to quantify these costs at EU level.	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	NO	NO	NO

A review of efficiency gains based on Member State experiences

Member State experiences in implementing the PPP that were reviewed refer to the use of MBI. It is rarely possible to draw quantitative conclusions. Rather, the efficiency gains are described in qualitative terms.

Member State experiences generally demonstrates that efficiency gain is achieved as a result of the polluter having flexibility to find the least cost method to address pollution. Moreover, where MBI is used in conjunction with EU command and control instruments, it is not possible to distinguish the effect on efficiency from each[286].

A common theme in the literature is how the PPP has the potential to motivate a polluter to find the best available technology to reduce pollution[287] and to spur innovation when it comes to alternative resource use[288]. For example:

- IMF (2017) find that applying the PPP to address externalities of GHG emissions can incentivise polluters to improve production or management methods, increase efficiencies, and switch to low-carbon solutions. For example, under the EU ETS, the PPP provides an incentive to polluters to take action and reduce pollution at the lowest cost possible and develop new technologies and ways of working that are cleaner e.g. where carbon pricing

286 Darrah, C. (2016). 'Phytosanitary Product Tax in Italy', IEEP. Pp. 1-9. Available at: https://ieep.eu/wp-content/uploads/2022/12/IT-Phytosanitary-Tax-final-2-1.pdf. Accessed: 14/11/2023.

Sastre, S. (2016). 'Tax on fluorinated greenhouse gases in Spain', IEEP. Pp. 1-9. Available at: https://ieep.eu/wp-content/uploads/2022/12/ES-Fluorinated-Gases-final.pdf. Accessed: 14/11/2023.

287 Illes, A. (2016). 'Air pollution load charge in Hungary', IEEP. Pp. 1-8. Available at: https://ieep.eu/wp-content/uploads/2022/12/HU-Air-Pollution-Charge-final-1-1.pdf. Accessed: 14/11/2023;

Vollebergh, H and Dijk, J. (2016). 'Taxes and fees of regional water authorities in the Netherlands', IEEP. Pp. 1-12. Available at: https://ieep.eu/wp-content/uploads/2022/12/NL-Water-Taxes-Fees-final.pdf. Accessed: 14/11/2023.

Šleinotaitė-Budrienė, L and Kazlauskaitė, L. (2016) 'Environmental Pollution Tax (for taxable products) in Lithuania', IEEP. Pp. 1-13. Available at: https://ieep.eu/wp-content/uploads/2022/12/LT-Env-Pollution-Tax-final.pdf. Accessed: 14/11/2023.

288 Brizga, J. (2016). 'Packaging Tax in Latvia', IEEP. Pp. 1-12. Available at: https://ieep.eu/wp-content/uploads/2022/12/LV-Packaging-Tax-final.pdf. Accessed: 14/11/2023.

Darrah, C. (2016). 'Phytosanitary Product Tax in Italy', IEEP. Pp. 1-9. Available at: https://ieep.eu/wp-content/uploads/2022/12/IT-Phytosanitary-Tax-final-2-1.pdf. Accessed: 14/11/2023.

has contributed further to innovation and investment in low-carbon technologies, such as carbon capture and utilisation or electrolytic hydrogen. As such, the PPP reduces the cost of meeting a given environmental target.

- The Environmental Pollution tax in Lithuania, for example, identified seven taxable products to apply a fee for production - and implemented further elements of a producer responsibility scheme - to minimise the impact the tax could have on end-users[289]. The tax has had a positive impact in increasing private capital investments in recycling technology and as a result has increased capacity for Lithuanian waste treatment as well as reducing pollution.
- Dutch water levies have been found to increase the removal rate of nitrogen from untreated sewage at the same time as promoting investment in BAT or product innovation [290]. The charges levied were found to help spread the cost of treating pollution efficiently across polluters (OECD, 2008)[291].
- The Czech air pollution fee introduced economic incentives to business to reduce emissions or air pollutants, based on best available techniques (Rakovský 2016)[292] and to achieve the standards set by the AAQD. The fee was introduced to address industry scepticism and lack of incentive where air quality standards alone were not succeeding.

Work in progress

Member State experiences highlight potential for greater efficiency in the delivery of EU policy where it is aligned with EU funding to facilitate implementation of best available techniques by industry. For example:

- Rakovský (2016) finds greater efficiency gains are thought possible if the Dutch water levies were further aligned with EU funding opportunities to optimise the use of available technical measures for reducing pollution.
- Nõmmann (2016) finds greater efficiency gains are thought possible if pollution charges in Estonia were aligned with EU funding to facilitate implementation of best available technologies[293]. The author suggests reluctance by industry to adopt BAT rather than paying the charge is owing to industry suspicions that the charges outweigh potential negative externalities associated with their activities.

Pedersen, AB (2017) refers to evidence in Sweden where NO_x emissions per unit of energy produced have fallen by 50% since a tax was introduced in 1992. Here the economic framework provided by the tax has motivated operators to achieve the lowest NO_x emissions possible, instead of aiming to be just below the limit values. Another example is the packaging tax in Latvia. This applies a fee to use of paper, glass, plastic, and metal packaging to all producers. This was reviewed by Brizga (2016)[294] and was adopted as part of measures needed to demonstrate compliance with the Regulation on packaging and packaging waste (Regulation (EU) 2019/1020). The scheme has seen many companies join producer responsibility schemes, as doing so entitles

289 Šleinotaitė-Budrienė, L and Kazlauskaitė, L. (2016) 'Environmental Pollution Tax (for taxable products) in Lithuania', IEEP. Pp. 1-13.

290 Vollebergh, H and Dijk, J. (2016). 'Taxes and fees of regional water authorities in the Netherlands', IEEP. Pp. 1-12. Available at: https://ieep.eu/wp-content/uploads/2022/12/NL-Water-Taxes-Fees-final.pdf. Accessed: 14/11/2023.

291 OECD. (2008). 'An examination of the polluter-pays principle based on case studies', in The Polluter Pays Principle: Definition, Analysis, Implementation. Paris: OECD Publishing, p. 93-117. Available at: https://doi.org/10.1787/9789264044845-en. Accessed: 10/11/2023.

292 Rakovský, P. (2016). 'The Air pollution fee in the Czech Republic', IEEP. Pp. 1-12. Available at: https://ieep.eu/wp-content/uploads/2022/12/CZ-Air-Pollution-Fee-final.pdf. Accessed: 14/11/2023.

293 Nõmmann, T. (2016). 'Mineral resource extraction charge (peat, phosphate and rock) in Estonia', IEEP. Pp. 1-19. Available at: https://ieep.eu/wp-content/uploads/2022/12/EE-Mineral-Extraction-Charge-final.pdf. Accessed: 14/11/2023.

294 Brizga, J. (2016). 'Packaging Tax in Latvia', IEEP. Pp. 1-12. Available at: https://ieep.eu/wp-content/uploads/2022/12/LV-Packaging-Tax-final.pdf. Accessed: 14/11/2023.

them to a a 100% tax break on the products. Alignment between further EU Eco-design policies is also thought to improve efficiency of the scheme.

Member State experiences demonstrate that the efficiency of the PPP is also related to the administrative burden and enforcement of the provisions used to implement it. For example, in the case of France, this burden is the result of multiple bodies selecting the appropriate standards, and how best to incentivise pollution discharge[295]. The source notes that in some areas of France, the polluter does not pay enough, because of administrative boundaries which dictate that they are merely to accept payment, rather than ensure a quality standard of discharge. In this way, whilst there is a low-cost option, efficiency is lost as there is no environmental target being met.

Similarly, the air pollution fee in Czechia, for example, experienced high administration costs. Because of this, an impact assessment of the scheme concluded that the system was not efficient since it did not optimise the costs for decreasing emissions (OECD, 2008). The administration costs were also noted in the example of the Spanish tax on F- gases which applied a fee on the use of F-gases to the individual who used them in production without a treatment system in place[296]. Owing to the cost of monitoring the plants, the overall the tax was found to have a low efficiency.

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Conclusions on EQ5a

Differences in Member State implementation of the PPP have affected efficiency, but it is not possible to quantify this difference or draw conclusions on the effect on overall efficiency of the PPP. EU policy is facilitating polluters to find the least cost abatement options through application of the PPP. Taxes and charges in particular send price signals that spur private investment, including in innovative eco-design or application and development of best available technology for addressing pollution. Environmental taxes have also the advantage of raising public revenues in a non-distortionary manner. Moreover, where rates of tax are high enough, they reduce environmental pollution significantly.[297] The OECD finds that high efficiency gains are achieved via auction of pollution rights and pollution charges (including taxes). Case studies for how the PPP is implemented in EU policy support this finding that market-based incentives deliver efficient environmental improvements, but also suggest that applying the PPP via a combination of MBI and command and control measures can have a more efficient outcome. Extended Producer Responsibility schemes for example have resulted in increased rates of separate collection of waste that can be problematic in the general waste streams (e.g., batteries), increased recycling rates and reduced landfilling or incineration of covered products and materials, but there is little evidence that EPR schemes have worked successfully as a tool for Design for Environment (Braun et al. 2023).[298] The reason is that EPR fees in Member States do not sufficiently differentiate between products designed for reuse, remanufacturing, repair, or recycling, thus offering little incentive for producers to make upstream design changes aimed at waste prevention. EPR fee structures should account for the social and environmental costs of products and modulate fees to encourage eco-design that aligns with the waste hierarchy's top levels, such

295 OECD. (2008). 'An examination of the polluter-pays principle based on case studies', in The Polluter Pays Principle: Definition, Analysis, Implementation. Paris: OECD Publishing, p. 93-117. Available at: https://doi.org/10.1787/9789264044845-en. Accessed: 10/11/2023.

296 Sastre, S. (2016). 'Tax on fluorinated greenhouse gases in Spain', IEEP. Pp. 1-9. Available at: https://ieep.eu/wp-content/uploads/2022/12/ES-Fluorinated-Gases-final.pdf. Accessed: 14/11/2023.

297 Fischer, C. (2023), "Legacy of Tom Tietenberg in Research", International Review of Environmental and Resource Economics: Vol. 17: No. 4, pp 421-447. http://dx.doi.org/10.1561/101.00000157.

298 Braun, A., Laubinger, F., Börkey, P. (2023). New Aspects of EPR: Extending producer responsibility to additional product groups and challenges throughout the product lifecycle. OECD Environment Working Papers, No. 184, OECD Publishing, Paris, https://dx.doi.org/10.1787/cfdc1bdc-en. https://www.oecd-ilibrary.org/environment/new-aspects-of-epr-extending-producer-responsibility-to-additional-product-groups-and-challenges-throughout-the-product-lifecycle_cfdc1bdc-en

as waste prevention and preparation for reuse. This would entail lower fees for products designed with these objectives in mind, as opposed to those designed solely for recyclability. The implementation of refined EPR schemes is associated with higher costs. Indeed, while MBI allow industry greater flexibility in meeting environmental objectives and therefore lower overall costs, there are costs to administer the PPP through MBI and command and control measures that can negatively impact on their efficiency, for example where there are challenges in establishing who the polluter is, and how much they are polluting (e.g. for diffuse pollution). Another example is the implementation of biodiversity markets: they can be a cost-effective solution for developers, as they allow to meet environmental requirements without necessarily carrying out on-site mitigation, but monitoring and enforcement are crucial and expensive, in particular if considering that any biodiversity gains achieved would have to be maintained in perpetuity. The costs to administer the PPP through MBI are reviewed in more detail for EQ6a.

5.3.2.2. Stakeholder feedback for EQ5

The consultation instruments used in this study did not contain questions directly inquiring the stakeholders about differences in the efficiency of the PPP application in various Member States. Therefore, it is impossible to draw any conclusions regarding stakeholder opinions for EQ5.

5.3.3. EQ6. Whether policy could be made more efficient via recourse to the PPP

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In answering this question, we reviewed:

- Available evidence on the costs to implement the PPP under EU policy, defining what the costs are and the challenges they present for making policy more efficient via recourse to the PPP (EQ6a).
- The efficiency gains that can be achieved when implementing the PPP in EU policy (EQ6b)
- The extent to which there is scope for improvements in efficiency via simplification and/ or burden reduction (EQ6c)

Points of comparison: Costs of applying the PPP in EU policy were defined together with efficiency gains to assess the potential for a more efficient recourse to the PPP.

5.3.3.1. EQ6a. What have been the costs of the PPP (both overall and between different stakeholder groups)?

Based on the policy provisions identified for the state of play, the available evidence on the costs of applying the PPP in EU policy were reviewed. This section does not review the Member State costs of applying the PPP via national actions. In the absence of a singular approach to apply the PPP in EU policy, this question first sought to define the main costs of applying the PPP in EU policy.

The main costs of applying the PPP in EU policy are incurred via administration costs. While the costs addressing pollution are significant (as reviewed for EQ1d), application of the PPP assumes that such costs are the responsibility of the polluter and thus they are not defined as an implementation costs. Costs data (quantitative and qualitative) was reviewed from existing policy evaluations and support studies. No specific costs data was identified in the policy evaluations and impact assessments reviewed, hence the discussion is qualitative.

Key finding(s)	Robustness
The main costs of applying the PPP in EU policy are incurred via administration costs. It includes the costs of identifying the polluter as well as monitoring and reporting the costs of pollution. Application of the PPP assumes that pollution costs are the responsibility of the polluter and thus they are not defined as an implementation cost for the application of the PPP in EU policy.	Medium
There is limited information on the costs of enforcing the PPP in EU policy.	Medium
It has not been possible to quantify the costs to administer the PPP. They are not systematically covered by policy provisions (particularly in the case of monitoring and reporting how the PPP is applied).	Medium
Where provisions are adopted in policy to administer the PPP, the associated costs have not been reviewed systematically in policy evaluation or impact assessment. However, administrative and enforcement costs assessed in policy evaluations and impact assessments are typically borne by competent authorities and EU institutions (as reviewed for the state of play and EQ1d). The partial application of the PPP to address these costs implies that it is not wholly fair and consistent with a just transition and that there is scope for improvement to ensure costs of implementation are more fully addressed by the polluter rather than society.	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	NO	NO	NO

Building on the state of play and effectiveness analysis, the main activities to administer the PPP in EU policy are:

- Identifying the polluter
- Enforcing the PPP in EU policy
- Monitoring and reporting the costs of pollution

To respond to this question, the implementation costs are further defined in the context of EU policy, taking each activity in turn.

Identifying the polluter

Identifying the polluter is simplest where costs of pollution are addressed at source and the costs of identifying the polluter are minimal. In such cases, the provisions are targeted at the polluter and no further costs to administer the PPP are necessary. On this basis, we have reviewed policies in scope of this fitness check that do not address pollution at source to identify where costs of identifying the polluter will be incurred, to then review how the costs are borne. As identified among the unintended impacts that were assessed for EQ3c, the main challenge of identifying who the polluter occurs in the case of:

- Legacy pollution, where contaminants are left in the environment by sources that are no longer discharging them and/or it is not clear who the polluter is.
- Diffuse pollution, where multiple sources are contributing to pollution and it is not possible to distinguish who the polluter is with sufficient clarity.

The costs of legacy pollution are not addressed widely addressed by EU policy. Two cases were identified: the Mercury Regulation and the POPs Regulation. The Mercury Regulation requires

competent authorities to identify and assess sites contaminated by mercury and mercury compounds and to address the significant risks such contamination may pose to human health and the environment without any provision to identify the historic source of pollution or reclaim cost from polluter (and we conclude that the PPP has not been fully applied). The POPs Regulation requires stockpiles of substances classified as POPs to be identified and managed by the polluter. In such cases, the provisions stipulate that the cost of identifying the stockpile is recovered by the authorities (and we conclude the PPP has been applied). In both cases, the costs of identifying the polluter were not reviewed in accompanying policy evaluation and no costs data is available. Moreover, the issue of legacy pollution is broader than these two policies, suggesting that overall, this cost of implementing the PPP is not well applied and remains a challenge for the practical implementation of the PPP.

The costs of diffuse pollution are addressed in a greater number of EU policies compared to legacy pollution. However, as assessed for EQ1, the approach to addressing the costs of pollution is not as simple as establishing source controls, rather policies generally provide a framework for Member States to meet targets and / or standards, which in turn have an implicit requirement for the Member State to identify who the polluter is (15 policies: Waste FD, MSFD, Water FD, UWWTD, BWD, EQS Directive, GWD, Floods Directive, AAQD, NEC Directive, END, and the Nature Directives).

The use of programmes are generally considered to be appropriate instruments to achieve environmental objectives and are an effective tool for burden sharing and ensuring the costs of pollution are evenly distributed between polluters in the case of multi-party causation. However, there remains a challenge for applying the PPP where there is no clear causal link between the source of pollution and the pollution, e.g. in the case of water quality and ambient air quality (Lindhout and van den Broek, 2014)[299] In such cases, the PPP requires a proportional and justified distribution of the burdens which incur a cost to the authorities responsible for developing the programme. Lindhout and van den Broek (2014) provide examples for the Netherlands but do not quantify the costs, only to note that the PPP 'makes demands on the contents of such a plan or programme'.

Although it is noted that administrative and enforcement costs assessed in policy evaluations and impact assessments are typically borne by competent authorities and EU institutions, implying that costs of identifying the polluter are not consistent with application of the PPP (evidence reviewed for EQ1d). Where there is an implicit requirement for the Member State to identify who the polluter is, it has not been possible to quantify the costs as they are not systematically reviewed in policy evaluation or impact assessment.

In contrast, the prevalent use of sector specific standards and targets in EU policy that establish source controls ensures the polluter is readily identified and it is concluded that the costs of identifying the polluter are minimal.

Enforcing the PPP in EU policy

As summarised for EQ1b, limited examples of enforcement measures to apply the PPP were identified via the review of policy provisions in the state of play. References to infringements by the polluter and the use of sanctions to address infringements were identified for 5 policies: Single-use plastics Directive, Extractive Waste Directive, Safety of Offshore Oil and Gas Operations, Environmental Crime Directive (ECD), and Environmental Liability Directive (ELD). In such cases,

299 Lindhout and van den Broek (2014) The Polluter Pays Principle: Guidelines for Cost Recovery and Burden Sharing in the Case Law of the European Court of Justice. Utrecht Law Review.

it is stipulated that the polluter is financially liable where pollution has not been addressed in accordance with the requirements of the legislation. However, only in the case of the ECD and ELD do the provisions stipulate that authorities may recover *retrospective* costs. This is understood to encompass enforcement costs (as well as costs of remedial action). In other cases, the sanctions address the costs of pollution control and prevention and/ or environmental damage only.

For the ECD and ELD, the costs of carrying out the enforcement measures were not reviewed in the accompanying policy evaluation (evidence reviewed for EQ1d) and it is concluded that no costs data is available.

Monitoring and reporting the costs of pollution

Relevant monitoring or reporting activities to apply the PPP would entail tracking and reporting of costs incurred to address pollution. The review of policy provisions for the state of play identified no such examples. Policy provisions that address monitoring and reporting requirements encompass pollution rather than the costs of pollution. Whereas Member State experiences of applying the PPP in the case the NO_x tax in Sweden identify relevant monitoring and reporting to the application of the PPP as follows (Pedersen, 2017):

- Clearly defined indicators to monitor progress of the costs and benefits of how the PPP is being implemented in EU policy.
- Systematic inclusion of the PPP in policy evaluation and impact assessment to ensure the costs and benefits of how the polluter is addressing the costs of pollution are reviewed.
- Tracking of EU expenditure used to support clean-up action to better understand how the use of EU funding is facilitating efficiency gains when used to subsidise the costs of pollution.

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In part, the reporting requirements of the EU Taxonomy may address this gap with strengthened reporting requirements for businesses to publish non-financial information for the amount of capital expenditure (CapEx) or operating expenditure (OpEx) associated with taxonomy-aligned activities (Regulation (EU) 2020/852) [300]. The list of EU Taxonomy activities is far more granular than the existing list of CEPA categories used for the monitoring and reporting of National Expenditure for Environmental Protection (reviewed for EQ1d). This will provide greater insight as to the type of activity covered and the type of cost (whether it relates to measures to prevent or control pollution, administrative measures or costs for environmental liability or externalities). As the first year of reporting was 2023 data is not available to inform the current analysis. This suggests that with time, monitoring and reporting on how the costs of pollution are being met by polluters will be improved and provide some insight as to the costs to implement the PPP in EU policy. Accordingly, the monitoring and reporting costs incurred by the EU Taxonomy Regulation for businesses may serve as a proxy indicator for the implementation costs of the PPP as regards monitoring and reporting the costs of pollution by the polluter.

Conclusions for 6a

The main costs of administering the PPP in EU policy are incurred where there is a need to identify the polluter, to enforce the principle, and to monitor and report the costs of pollution by the polluter.

There are costs to administer the PPP, but it has not been possible to quantify them as they are not systematically covered by policy provisions. This is particularly the case for monitoring and

300 L_2020198EN.01001301.xml (europa.eu)

reporting how the PPP is applied to address the costs of pollution which is absent from the policy provisions reviewed).

Moreover, where provisions are adopted by policy to administer the PPP, the associated costs have not been reviewed systematically in policy evaluation or impact assessment. However, it is noted that administrative and enforcement costs assessed in policy evaluations and impact assessments are typically borne by competent authorities and EU institutions (as reviewed for the state of play and EQ1d). The partial application of the PPP to address these costs implies that the application of the PPP is not wholly fair and consistent with a just transition and that there is scope for improvement to ensure costs of implementation are more fully addressed by the polluter rather than society.

5.3.3.2. EQ6b. Does the PPP improve the efficiency of environmental policy (and reduce the overall costs of meeting environmental objectives)?

To respond to this question the potential for efficiency gains from applying the PPP in EU policy has been considered. To do this, literature that examines the economic theory that underpins the Member State evidence compiled for EQ5 was reviewed.

Key finding(s)	Robustness
The OECD and others identify that price signals are an efficient means of delivering the least cost abatement option. This means price signals are a way to reduce the overall costs of meeting environmental objectives.	Strong
The OECD finds that high efficiency gains are achieved via auction of pollution rights and pollution charges (including taxes). However, evidence to support this finding is limited to a select number of Member State case studies for how the PPP is applied.	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	NO	NO

The Efficiency of Economic Instruments used to Implement the PPP

The OECD finds that the PPP "is an efficiency principle [for allocating costs] designed to achieve the objectives at least cost to the community"[301] based on its capacity to spur product innovation or investment benefitting overall community welfare. It is assumed that the polluter will prioritise cost abatement for pollution control and prevention. The OECD finds that "Pricing instruments encourage broad-based action to reduce environmental damage at least cost and should be a central pillar of green growth policy. They provide incentives for further efficiency gains, green investment and innovation and shifts in consumption patterns. Increased or more effective use of environmentally related taxes can drive growth-oriented reform by shifting the tax burden away from more distortive taxes, e.g. on corporate or personal income, and contribute to fiscal consolidation."

The OECD find that the potential for efficiency gains varies by legal instrument. Of relevance to the way the PPP is implemented in EU policy, they conclude that direct controls are not expected to incentivise efficiency in the same way as MBI given there is no economic device that ensures

301 OECD. (2008). 'An examination of the polluter-pays principle based on case studies', in The Polluter Pays Principle: Definition, Analysis, Implementation. Paris: OECD Publishing, p. 93-117. Available at: https://doi.org/10.1787/9789264044845-en. Accessed: 10/11/2023.

lowest possible cost[302]. A summary of the differences in efficiencies is presented below for each of the different legal instruments used to implement the PPP.

Table 5-17: OECD conclusions on the efficiency of implementing the PPP

Type of legal instrument to implement the PPP	OECD conclusions on efficiency
Command and control	
Direct controls set a quality standard for the discharge of pollution, which requires the polluter to find the least cost-intensive way to manage that quality themselves.	Limited efficiency gain since the focus is on environmental benefit and no economic device or regulation exists to ensure or attain as low a cost as possible.
Market based instruments	
Pollution charges act as economic incentives to reach a quality standard in their pollution prior to discharge, and are flexible mechanisms, allowing polluters a level of freedom in the approach taken to reach the quality standard	Efficiency gain assumed as polluter has flexibility to find the least cost method to address pollution. Inefficiencies may occur if there is no streamlined process of determining the level of charges.
Taxes impose a fee for the use of a certain pollutant in production or set a price on the discharge of a particular pollutant	Efficiency gain assumed as polluter has flexibility to find the least cost method to address pollution. Where cost pass-through is occurring, potential for high efficiency gain by changing consumer behaviour and addressing the issue at source.
Auctioning, when polluters "buy the right" to release pollution	This relies on having an approach in place to determine the cost of pollution and is considered an efficient instrument assuming the purchase rights have been made prior to discharge.
Payments to give financial reimbursement to the polluter to not release their pollution.	Large risk of error associated with measuring efficiency, as this would mean finding out how much pollution would have been released without the abatement, which is a costly and time-consuming process.
Subsidies relieve the polluter of some or all of their costs associated with obligatory anti-pollution measures.	Subsidies can support efficient implementation of the PPP and may be justified in the following circumstances: • In cases of rapid environmental policy implementation or especially stringent pollution prevention and control regimes to mitigate the risk of socio-economic problems arising • In cases of R&D where new pollution prevention and control technologies or abatement techniques are required.
Various other incentives such as tax benefits, accelerated amortisation, or credit facilities are all noted as generally similar to subsidies in practice.	Efficiency gain can be negligible due to difficulties attributing exact costs to exact pollution levels, as well as maintaining clarity on which polluters are responsible.

Source: OECD, 2008

Conclusions for EQ6b

EU policy is facilitating polluters to find the least cost abatement options through application of the PPP. Taxes and charges in particular send price signals that spur private investment, including in innovative eco-design or application and development of best available technology for addressing pollution. The OECD finds that high efficiency gains are achieved via auction of pollution rights and pollution charges (including taxes). However, evidence is limited to a select number of Member State case studies for how the PPP is applied (reviewed for EQ5).

302 OECD. (2008). 'The "polluter-pays" principle and the instruments for allocating environmental costs', in The Polluter Pays Principle: Definition, Analysis, Implementation. Paris: OECD Publishing, p. 22-36. Available at: https://doi.org/10.1787/9789264044845-en. Accessed: 10/11/2023.

5.3.3.3. EQ6c. Is there scope for improvements in efficiency via simplification and/ or burden reduction?

The extent to which there is scope for improvements in efficiency via simplification and/ or burden reduction in the application of the PPP was examined based on the costs to administer the PPP (reviewed for EQ6a) and the potential efficiency gains (reviewed for EQ5 and EQ6b).

Key finding(s)	Robustness
Based on the administrative challenges reported by Member States there may be scope to improve efficiency by introducing measures in policy that help to identify the polluter 15 policies: Waste FD, MSFD, Water FD, UWWTD, BWD, EQS Directive, GWD, Floods Directive, AAQD, NEC Directive, END, and the Nature Directives).	
Opportunities to simplify the application of the PPP have been identified but there is insufficient data to assess the potential for efficiency gains. Opportunities include: a more systematic approach to enforcing the application of the PPP; the use of one policy to address horizontal aspects of the PPP, where shortcomings in addressing the costs of pollution are consistent across policies; and the use of insurance schemes to address potential costs of accidental pollution.	Medium
Data gaps are a key limitation to understanding the costs and benefits of implementing the PPP in EU policy. A more consistent approach to reporting on the implementation of the PPP would strengthen the evidence needed to identify risks that may impede the fairness of the implementation.	Strong

Worki

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	NO	NO	NO

Scope for improvements in efficiency via simplification and/ or burden reduction

The cost of implementing the PPP are administrative costs (reviewed for EQ6a). Based on Member State experiences (reviewed EQ5), there is a risk of administrative burden where institutional challenges apply (e.g. in the case of implementation at municipal level where there are a large number of stakeholders involved in implementation of the PPP each with different interests) and/ or difficulties in identifying who the polluter is. For example, in Sweden the plastic bag tax has been effective in reducing plastic bag consumption (EQ2b) but has had negative effects on administrative costs that were used to justify its removal in 2024[303]. Similar experiences are reported by Member States in the examples reviewed in EQ5. On this basis, scope for improvement may apply in particular to the use of MBI to apply the PPP through the use of a legal framework to support implementation of the PPP which can facilitate a consistent and efficient approach to administrative measures (as per the Energy Taxation Directive).

Based on the administrative challenges reported by Member States (reviewed for EQ5), there may be scope to improve efficiency by introducing measures in policy that help to identify the polluter. This scope for improvement may apply to 15 policies in particular: Waste FD, MSFD, Water FD, UWWTD, BWD, EQS Directive, GWD, Floods Directive, AAQD, NEC Directive, END, and the Nature Directives. However, there is no data available to assess the scale of impact and further evidence is required to better understand the potential for burden reduction.

303 https://www.sustainableplastics.com/news/sweden-plans-abolish-plastic-bag-tax-2024

The following opportunities may enable a more efficient approach to apply the PPP more generally:

- A more systematic approach to enforcing the application of the PPP may simplify its application and strengthen implementation where the current use of sanctions to enforce the PPP is limited to 5 policies (Single-use plastics Directive, Extractive Waste Directive, Safety of Offshore Oil and Gas Operations, Environmental Crime Directive (ECD), and Environmental Liability Directive (ELD)) and implementation is varied between Member States.
- The use of one policy to address horizontal aspects of the PPP, where shortcomings in addressing the costs of pollution are consistent across policies (e.g. the horizontal nature of the ELD used to establish environmental liability across policy areas and address the costs of environmental damage).
- The use of insurance might improve efficiency where the polluter is required to hold an insurance policy or financial security to cover the costs where there is a risk of accidental pollution or environmental damage. This can maximise the potential benefits of implementing the PPP. For example, under the Waste Shipment Regulation where financial guarantees and equivalent insurance are required which enables the risk of costs of environmental damage to be managed at low cost. There is limited use of insurance or financial guarantee schemes to implement the PPP in EU policy, reflecting the potential administrative overheads and practical issues associated with such schemes.

However, in the absence of a systematic framework to monitor and measure progress, it is not possible to review the potential for improvements in a comprehensive and consistent manner.

Working draft

Conclusions for EQ6c

Based on a review of lessons learned, we identify potential scope to reduce the costs of administering the PPP where costs to identify the polluter may be presenting a challenge for Member States. This particularly applies for 15 policies: Waste FD, MSFD, Water FD, UWWTD, BWD, EQS Directive, GWD, Floods Directive, AAQD, NEC Directive, END, and the Nature Directives. There is no data available to assess the scale of impact and further evidence is required to better understand the potential for burden reduction.

Based on costs to administer the PPP (EQ6a) and Member State challenges in applying the PPP via national action (EQ5), opportunities to simplify the application of the PPP have been identified but there is insufficient data to assess the potential for efficiency gains. Opportunities include: a more systematic approach to enforcing the application of the PPP; the use of one policy to address horizontal aspects of the PPP, where shortcomings in addressing the costs of pollution are consistent across policies; and the use of insurance schemes to address potential costs of accidental pollution.

While the type and design of legal instrument used to apply the PPP has a clear impact on the overall efficiency, in the absence of a systematic framework to monitor and measure progress, it is not possible to review efficiency gains in a comprehensive and consistent manner.

5.3.3.4. Stakeholder feedback for EQ6

The public consultation did not directly address issues relevant to EQ6. In the interviews, one question addressed the examples of costs related to the implementation of the PPP; however, most respondents were unable to provide comprehensive responses. Therefore, it is impossible to draw any conclusions regarding stakeholder opinions for EQ6.

5.4. Relevance

This criterion examines whether the PPP was, is and will be relevant to the needs of the EU. Relevance therefore is closely tied to the analysis of the intervention logic, especially to the 'needs' and 'objectives' identified therein. As defined by the intervention logic, relevance relates to the extent to which environmental costs of pollution exist as externalities – imposed on society but not reflected in prices paid or incurred by the polluter – and the degree to which pollution levels can be influenced by the application of the PPP. The 'needs' are operationalised by reference to the environmental objectives in the European Green Deal, specifically the priority objectives of the 8th EAP.

Points of comparison: The main points of comparison are the costs of pollution in different areas, and the extent to which they persist as externalities. These are referred to throughout the sections below.

5.4.1. EQ7. Whether the PPP is able to respond to current, new or emerging environmental issues and changes in technology

5.4.1.1. EQ7a. To what extent are the objectives of the PPP appropriate for helping internalise pollution costs in the appraisal period?

Draft

This EQ reviews the rationale, needs and objectives behind the PPP, starting from the intervention logic. According to the intervention logic (see section 2.1), the objectives of the PPP are to provide price signals to reduce pollution and to support the just transition. This EQ analyses whether the objective of the PPP to provide such price signals matches the needs of the EU, operationalised by using the priority objectives of the 8th EAP. It therefore reviews relevant pollution cost categories per 8th EAP policy area and the extent to which they exist as externalities (i.e. costs not covered by the polluter, see EQ2a) to determine the relevance of the principle in relation to the needs. The second objective of the PPP, supporting the just transition, is discussed in more detail in EQ8.

Economic activities are associated with different kinds of environmental pollution to air, soil and water. GHG and other emissions, hazardous waste, plastic pollution, agricultural runoff and many other types of pollution lead to a range of environmental and social impacts, which result in significant financial costs to society. The costs of preventing and remediating these impacts should, according to the PPP, be borne by the polluters and not by society. To assess whether the objectives of the PPP (to internalise these costs in a fair manner) are appropriate for tackling environmental issues, the following sections describe the impacts of pollution and their associated costs in different interrelated areas. The policy areas introduced in Chapter 1.2.5 are detailed below, with the exception of those related to PO6 of the 8th EAP (horizontal policies, EU funding and state aid), as these are not associated with environmental or social impact categories of pollution. Moreover, since chemicals and noise pollution are not part of the analysis of internalisation rates (EQ2a) given that there is no comparable 8th EAP headline indicator, we have excluded these from the present analysis as well.

Key finding(s)	Robustness
The **objectives are relevant where the PPP is providing a price signal** for polluters to reduce pollution and to support the just transition (implied by evidence compiled for EQ2a)	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	WIP	YES

Climate change

The consequences of climate change are severe, posing existential threats both to natural and social systems in a highly interrelated manner. For example, high temperatures and extreme weather events such as droughts, wildfires and floods significantly impact not only ecosystems and biodiversity, but also agricultural yields, food security, human health, infrastructure, water quality and freshwater availability, amongst many others[304]. These consequences of climate change thus imply immense financial costs for society. For example, costs related to human health occur as a result of more frequent and severe heatwaves and other extreme weather events causing an increase in hospital appointments and mortality[305]. Biodiversity impacts of climate change lead to costs related to loss of ecosystem services underpinning the global economy and human well-being, such as loss of food (e.g. fisheries), clean-up measures for water, and loss of protection from natural hazards[306]. Regarding infrastructure, costs occur for repairing damages to buildings and roads, caused by extreme weather events such as droughts and floods, for example[307].

Fossil-based economies are the main drivers of GHG emissions and, therefore, of climate change. Some of the main economic activities contributing to climate change thus include energy use, land use and land-use change, as well as patterns of consumption and production[308]. Due to the continued reliance on fossil fuels, energy production, industrial activities and transportation are large contributors to global GHG emissions[309], mainly CO_2, but also fluorinated gases contained in industrial applications[310]. Land-use changes from industrialisation, urbanisation and agriculture lead to high rates of deforestation, releasing stored carbon into the atmosphere while destroying carbon sinks. The food system is another major driver of GHG emissions and climate change. Global food production and distribution was the source of 18 Gt CO_2 in 2015, representing around a third of total GHG emissions[311].

The costs of climate change/GHG emissions are complex, with not all impacts thoroughly understood, long-term, global, and often highly uncertain. Therefore, costs of climate change can be approximated by using costs of GHG abatement consistent with achieving the Paris

304 See https://www.un.org/en/climatechange/science/causes-effects-climate-change and https://climate.ec.europa.eu/climate-change/causes-climate-change_en, accessed 08 September 2023.

305 Costs of illness are elaborated on in more detail for the policy area of 'air pollution' in this chapter. For more details, see IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

306 For more details on costs of biodiversity loss, see the policy area of 'nature, biodiversity, soil and land' in this chapter, as well as OECD (2019), Biodiversity: Finance and the Economic and Business Case for Action, report prepared for the G7 Environment Ministers' meeting, 5-6 May 2019.

307 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

308 IPCC (2023), Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)], IPCC, Geneva, Switzerland, pp. 35-115.

309 See https://www.un.org/en/climatechange/science/causes-effects-climate-change, accessed 08 September 2023.

310 See https://climate.ec.europa.eu/climate-change/causes-climate-change_en, accessed 08 September 2023.

311 Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F.N. and Leip, A.J.N.F., 2021. Food systems are responsible for a third of global anthropogenic GHG emissions. Nature Food, 2(3), pp.198-209.

Agreement[312]. The IEEP's calculations on cost internalisation refer to both GHG emissions and air pollution. As elaborated on in Evaluation Question 2a, not even half the costs associated with GHG emissions and air pollution are currently internalised in the EU. There are also sectoral differences in internalisation, showing that the agriculture and energy sectors currently only internalise 6 % and 7 %, respectively, of GHG and air pollution costs. Moreover, there appears to be large disparity in the internalisation of GHG emissions costs across Member States, ranging from 17 % in Bulgaria and Romania to 91 % in Sweden. The IEEP estimates also reveal that 16 of 27 Member States display internalisation rates below 50 %. Most Member States, as well as all sectors thus are a long way off from internalising the costs related to GHG emissions and air pollution. As long as these costs are not carried by the polluter, the objectives of the PPP have not been fulfilled and remain highly relevant.

Transition to a circular economy

If waste is not dealt with accordingly, it can lead to water, soil and air pollution[313]. More understanding has been reached in recent years on the potential eco-toxicological impacts of plastics specifically[314]. Plastics can be lethal to fish, birds and mammals, and micro- and nano-plastics can damage the lungs and guts of all living organisms, leading to inflammation and damage to cells. These plastics also leach toxic chemicals, which are inhaled and ingested. For humans specifically, this can lead to decreased male fertility, obesity, as well as increased rates of cancer[315]. The associated financial costs arising from biodiversity loss and negative impacts on human health are detailed for other policy areas in this section.

Total waste generation in the EU has been increasing until 2018 while recycling rates of material use have been stagnating at under 12 %[316]. As urbanisation increases, globally, waste production is expected to triple by 2 100[317]. The overall recycling rate in the EU was at 46 % in 2020. Looking at specific waste streams, packaging waste recycling rates were at 64 % in 2020, and have been decreasing since 2017. Municipal waste has been steadily increasing to 49 % in 2020, while electronic waste has stagnated at 39 % in 2018[318]. Waste generation and recycling rates vary highly within the EU[319]. As discussed in EQ2a, while costs associated with waste generation in the EU are being increasingly internalised, the overall damage costs are still far from being covered in their entirety. The EQ2a analysis shows a large gap between overall NEEP (€2.4 billion in 2020) and total waste management cost in the EU (€419 billion per year).

Zero-pollution ambition

Air quality

312 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

313 WHO (World Health Organization), 2022. Compendium of WHO and other UN guidance on health and environment (No. WHO/HEP/ECH/EHD/22.01). World Health Organization.

314 Da Costa, J. P., Rocha-Santos, T., & Duarte, A. C. (2020). The environmental impacts of plastics and micro-plastics use, waste and pollution: EU and national measures. EPRS: European Parliamentary Research Service. Belgium.

315 Barbir, J., Leal Filho, W., Salvia, A. L., Fendt, M. T. C., Babaganov, R., Albertini, M. C., ... & Müller de Quevedo, D. (2021). Assessing the levels of awareness among european citizens about the direct and indirect impacts of plastics on human health. International journal of environmental research and public health, 18(6), 3116.

316 Eurostat (2023), Sustainable development in the European Union Monitoring report on progress towards the SDGs in an EU context, Luxembourg, https://ec.europa.eu/eurostat/web/products-flagship-publications/w/ks-04-23-184

317 Hoornweg, D., Bhada-Tata, P., & Kennedy, C. (2013). Environment: Waste production must peak this century. Nature, 502(7473), 615-617.

318 See https://www.eea.europa.eu/ims/waste-recycling-in-europe, accessed 08 September 2023.

319 Minelgaitė, A., & Liobikienė, G. (2019). Waste problem in European Union and its influence on waste management behaviours. Science of the Total Environment, 667, 86-93.

Although air quality in the EU has benefitted from major improvements, around 300 000 deaths are still attributable to air pollution in the EU each year, primarily to emission of particulate matter, NO_x, SO_2, NH_3 and NMVOC[320]. Human health impacts include non-communicable diseases like asthma, cardiovascular problems and lung cancer[321], resulting in a range of financial costs to society. Cost-of-illness studies differentiate between direct and indirect costs. Direct costs refer to both medical care expenditures for diagnosis, treatment, etc., and to expenditures for non-healthcare resources like transportation, property losses, and others[322]. These tend to be particularly high for chronic and non-communicable diseases, such as those related to air pollution. For example, costs occur in relation to respiratory and cardiovascular hospital admissions[323]. Indirect costs refer to productivity losses from morbidity and mortality, borne by households, society, or the employer[324]. This includes chronic and acute mortality, loss of working days, and restricted activity days[325]. Air pollution thus leads to both direct and indirect health-related costs for society. Furthermore, air pollution disproportionately affects vulnerable people and socioeconomically disadvantaged groups.

Beyond human health impacts, air pollution leads to the acidification of lakes, eutrophication of estuaries and coastal waters[326], as well as soil acidification[327]. The effects of pollutants like nitrogen on plants are subtle, making them more receptive to pests or pathogens. Mercury does not necessarily kill fish, but reduces their reproductive abilities[328]. Increased ground-level ozone levels can also cause damage to ecosystems and crop yields[329]. As a result, air pollution negatively affects biodiversity and crop yields. The financial costs of biodiversity loss, loss of water quality and of crop yields are immense and have been detailed in other policy areas in this chapter. Finally, air pollution also triggers costs related to buildings and materials. Acidifying substances and particulate matter lead to corrosion and erosion of buildings and cultural heritage, while high ozone concentrations cause paint to wear off[330]. These damages thus result in higher maintenance costs.

The economic activities leading to loss of air quality highly depend on the type of pollutant. According to a report by the EEA (2022)[331], the agriculture sector is an important source of

320 EEA (European Environmental Agency) (2021a), Air quality in Europe 2021, Luxembourg, https://www.eea.europa.eu/publications/air-quality-in-europe-2021/air-quality-in-europe-2021 and IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

321 EEA (European Environmental Agency) (2021a), Air quality in Europe 2021, Luxembourg, https://www.eea.europa.eu/publications/air-quality-in-europe-2021/air-quality-in-europe-2021.

322 Jo, C. (2014). Cost-of-illness studies: concepts, scopes, and methods. Clinical and molecular hepatology, 20(4), 327.

323 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

324 Jo, C. (2014). Cost-of-illness studies: concepts, scopes, and methods. Clinical and molecular hepatology, 20(4), 327.

325 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

326 O'Dea, C. B., Anderson, S., Sullivan, T., Landers, D., & Casey, C. F. (2017). Impacts to ecosystem services from aquatic acidification: using FEGS-CS to understand the impacts of air pollution. Ecosphere, 8(5).

327 Lovett, G. M., Tear, T. H., Evers, D. C., Findlay, S. E., Cosby, B. J., Dunscomb, J. K., ... & Weathers, K. C. (2009). Effects of air pollution on ecosystems and biological diversity in the eastern United States. Annals of the New York Academy of Sciences, 1162(1), 99-135.

328 Lovett, G. M., Tear, T. H., Evers, D. C., Findlay, S. E., Cosby, B. J., Dunscomb, J. K., ... & Weathers, K. C. (2009). Effects of air pollution on ecosystems and biological diversity in the eastern United States. Annals of the New York Academy of Sciences, 1162(1), 99-135.

329 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

330 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

331 EEA (European Environmental Agency) (2022), Sources and emissions of air pollutants in Europe, https://www.eea.europa.eu/publications/air-quality-in-europe-2022/sources-and-emissions-of-air

ammonia (94 % of total EU-27 emissions) and methane (56 % of total EU-27) emissions, while nitrogen oxides mainly come from transport (37 % of total EU-27 emissions), agriculture (19 % of total EU-27 emissions and the extractive industry (15 % of total EU-27 emissions). Around 52 % of sulfur dioxides stem from energy supply, while energy consumption from the residential, commercial and institutional sectors is responsible for 37 % of black carbon and 46 % of carbon mono$_x$ide. Approximately 47 % of NMVOCs (diverse organic chemicals, excluding methane, with potential air quality impacts) are caused by the manufacturing and extractive industry sector, and 27 % by the agriculture sector[332].

The internalisation of the costs related to these economic activities is discussed in evaluation Question 2a. As highlighted for the policy area of climate change, the 2021 IEEP report does not distinguish between GHG emissions and other air pollution. However, it shows a significant lack of internalisation of GHG emissions and air pollution (44 %, which might even be an overestimation). Costs related to air pollution are thus still largely borne by end consumers, i.e. society.

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Water

Water pollution can have grave consequences for humans, for example through toxic algae growth[333]. Polluted water is the cause of many human diseases, mainly diarrhoea, skin diseases, cancer, and various childhood diseases[334]. Food production and agriculture also heavily rely on the availability of clean water, and although water stress in the EU is low, it can still occur seasonally due to abstractions for agriculture, public water supply, and tourism[335]. Moreover, decreased water quality can severely impact animal health, soil quality, ecosystems and biodiversity. All of these impacts lead to financial costs for society. Human health issues lead to direct and indirect costs of disease (as detailed above). Impacts on food production imply costs related to investments in agricultural productivity gains, which may themselves put ecosystems under increased stress. Financial costs related to biodiversity degradation and ecosystem losses are a high risk to the functioning of human societies[336], and loss of water ecosystem services already entail costs. Besides pollution, water scarcity also leads to costs to society. Since water provides crucial ecosystem services, the costs of water scarcity are the expenditures related to a lack of these services[337]. Water ecosystem services include provisioning services to households, industry and agriculture, flood management and nutrient cycling, and provision of habitat for species[338].

Agriculture is among the main drivers of water pollution, through its usage of fertilisers and pesticides[339]. Industry and urban wastewater, too, cause pressure through the discharge of water,

332 EEA (European Environmental Agency) (2022), Sources and emissions of air pollutants in Europe, https://www.eea.europa.eu/publications/air-quality-in-europe-2022/sources-and-emissions-of-air

333 EEA (European Environmental Agency) (2021b), Drivers of and pressures arising from selected key water management challenges - A European overview, EEA Report No 9/2021, Luxembourg, https://www.eea.europa.eu/publications/drivers-of-and-pressures-arising

334 Lin, L., Yang, H., & Xu, X. (2022). Effects of water pollution on human health and disease heterogeneity: a review. Frontiers in environmental science, 10, 880246

335 Eurostat (2023), Sustainable development in the European Union Monitoring report on progress towards the SDGs in an EU context, Luxembourg, https://ec.europa.eu/eurostat/web/products-flagship-publications/w/ks-04-23-184

336 See the policy area 'Nature, biodiversity, soil and land' for more details on costs related to biodiversity losses.

337 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

338 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

339 Evans, A. E., Mateo-Sagasta, J., Qadir, M., Boelee, E., & Ippolito, A. (2019). Agricultural water pollution: key knowledge gaps and research needs. Current opinion in environmental sustainability, 36, 20-27.

resulting in pollution by nutrients, as well as hazardous and oxygen-consuming substances[340]. Furthermore, emissions of air pollutants, especially mercury, lead to poor chemical status of water bodies[341]. Regarding internalisation of the costs associated with water pollution, EQ2a shows that costs related to water pollution (e.g. from high nitrate concentrations or for protection and remediation of soil, groundwater and surface water) are currently not internalised in the EU, with only limited improvements between 2016 and 2020.

Protecting, preserving and restoring biodiversity and natural capital

Nature's contributions are a fundamental prerequisite to people's wellbeing and to our economies, by providing us with clean air, purified water, food and natural resources[342]. These are largely irreplaceable. Loss of biodiversity increases the effects of climate change and extreme weather events and vice versa. It also exacerbates the decline in air quality and water, through its loss of services[343]. Biodiversity loss can imply economic losses from flooding other disasters, from reduced crop yields and fish catches, and from the loss of new sources of medicine, given that most drugs for healthcare are derived from biodiversity[344]. Since ecosystems are crucial for regulating air quality, loss of ecosystem services can lead to additional costs related to air pollution (as detailed above). Health care prices could also increase with loss of biodiversity, given that natural environments have important physical and mental-health benefits. Regarding food production, pollination from bees, birds, bats and other species relevant to global crop production is strongly dependent on biodiversity. Lower pollinator density and species, as apparent in the significant experienced decline, therefore, lead to lower crop yields and considerable economic losses[345].

Currently, the world is seeing dangerous rates of decline in nature and biodiversity. One million out of more than 8 million plant and animal species are threatened with extinction[346]. This is mainly the result of different land-use changes, such as agriculture, forestry, and urbanisation. Most crucially, agriculture is estimated to drive 70 % of projected loss of terrestrial biodiversity[347]. Both deforestation related to clearing land for agriculture and grazing as well as specific agricultural practices (e.g., pesticides, fertilisers) can have substantial impacts on water, soils, and animal life[348]. Direct exploitation through harvesting, logging, hunting and fishing have also caused

340 EEA (European Environmental Agency) (2019), Industrial waste water treatment – pressures on Europe's environment, EEA Report No 23/2018, Luxembourg, https://www.eea.europa.eu/publications/industrial-waste-water-treatment-pressures.

341 EEA (European Environmental Agency) (2021b), Drivers of and pressures arising from selected key water management challenges - A European overview, EEA Report No 9/2021, Luxembourg, https://www.eea.europa.eu/publications/drivers-of-and-pressures-arising

342 Eurostat (2023), Sustainable development in the European Union Monitoring report on progress towards the SDGs in an EU context, Luxembourg, https://ec.europa.eu/eurostat/web/products-flagship-publications/w/ks-04-23-184

343 IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services), (2019), Global assessment report on biodiversity and ecosystem services, Bonn, Germany, https://www.ipbes.net/global-assessment

344 OECD (2019), Biodiversity: Finance and the Economic and Business Case for Action, report prepared for the G7 Environment Ministers' meeting, 5-6 May 2019.

345 OECD (2019), Biodiversity: Finance and the Economic and Business Case for Action, report prepared for the G7 Environment Ministers' meeting, 5-6 May 2019.

346 IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services), (2019), Global assessment report on biodiversity and ecosystem services, Bonn, Germany, https://www.ipbes.net/global-assessment

347 UNEP (2022), 'Facts about the nature crisis', United Nation Environment Programme, https://www.unep.org/facts-about-nature-crisis

348 OECD (2019), Biodiversity: Finance and the Economic and Business Case for Action, report prepared for the G7 Environment Ministers' meeting, 5-6 May 2019.

significant ecosystem losses for a number of species. Urban area worldwide has doubled since 1992, and infrastructure, such as roads and highways, has led to ecosystem fragmentation[349].

The costs of biodiversity degradation are, like those of climate change, difficult to quantify due to high levels of complexity and uncertainty. Moreover, the IEEP[350] report finds that there is a broad range of different results from different studies valuating ecosystem services, even when simply focusing on one aspect (forestry). Therefore, the authors concluded it to be impossible to estimate the total cost (and internalisation) to forestry of economic activity. Similarly, EQ2a comes to the conclusion that while estimates of damage costs related to biodiversity loss are difficult to quantify, it is unlikely that costs of pollution in this area are fully internalised.

Conclusions for EQ7a

The analysis of EQ7a shows that significant externalities related to current and continuing pollution persist. Costs of pollution associated related to the 8th EAP's POs are complex and varied, as the above analysis demonstrates. Internalisation rates for environmental damage depend on the policy area (as also discussed in EQ2a). Moreover, certain policy areas are excluded from the analysis, and no conclusions can be drawn for the relevance of the PPP to internalising costs of noise pollution and chemicals risk management. Nevertheless, the PPP is considered to be relevant as it facilitates emissions reductions while incentivising the development of new technologies to deliver efficient environmental improvements, contributing to higher internalisation rates. Given the current general lack of internalisation across the analysed policy areas, it can be concluded that the PPP's objective to reduce pollution through price signals remains highly relevant to the needs of the EU.

5.4.1.2. EQ7b. To what extent are the objectives of the PPP appropriate for internalising continuing, new or emerging pollution costs and incentivising changes in technology?

Based on the analysis of past, current and continuing pollution provided in EQ7a, EQ7b provides an assessment of future relevance of the PPP in helping to internalise pollution costs. To do so, the assessment looks at emerging and future environmental challenges and technological developments, and how they may affect the internalisation of the costs of pollution in the policy areas analysed in EQ7a.

Pollution caused by human activities is ongoing, although trends and future projections vary per policy area. In the context of the stakeholder survey conducted for the purposes of this study[351], not even half of the respondents considered the current PPP implementation adequate for tackling emerging environmental issues. This challenge was particularly emphasised by business stakeholders and NGOs, where around a third of respondent considered PPP implementation inadequate to resolve problems related to new forms of pollution.

At the same time, there are technological developments aimed at mitigating pollution. Crucially, the PPP's need to internalise costs yields incentives to develop less-polluting technologies. In this context, EQ3c identified technological innovation as one of the (unintended) co-benefits of applying the PPP, in particular through carbon pricing instruments. This EQ, 7b, therefore

349 IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services), (2019), Global assessment report on biodiversity and ecosystem services, Bonn, Germany, https://www.ipbes.net/global-assessment

350 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

351 Detailed results of the stakeholder survey can be found in Annex 4.

analyses the specified policy areas in terms of future pollution trends, and how technological innovation may influence cost internalisation.

Key finding(s)	Robustness
Costs of pollution are expected to remain significant in the future and the risk of environmental externalities is expected to remain. Therefore, **the PPP will remain relevant in the future.**	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	WIP	YES

Climate change

Any future projections of climate change and related costs are subject to high levels of uncertainty and dependent on a range of factors. However, existing studies[352] agree that without significant climate action, the costs of climate change will further increase. For example, temperatures and sea levels are expected to keep rising, and extreme weather events are likely to become more frequent and more severe, exacerbating the issues discussed in the previous section. The main driver of anthropogenic climate change, GHG emissions, is expected to decline in the EU. EEA calculations show decreasing emissions - both under existing measures and more pronounced reductions under additional measures (see Figure 6-1). Internalisation rates for a number of sectors are available, but it remains unclear what the future trends of these rates are, for instance due to legislative changes (e.g. impact of Fit for 55 on aviation[353]).

GHG emissions and climate change are not a localised issue. As GHG emissions around the world are projected to increase[354], climate change impacts are likely to worsen, making adaptation and mitigation measures more costly. The IPCC's latest Climate Change report states that 'projected adverse impacts and related losses and damages escalate with every increment of global warming'[355]. The interrelatedness of climate change with other impact categories implies that with exacerbated climate change, costs will also rise in other areas, such as human health, biodiversity, water, etc. These developments will significantly increase the costs of pollution to society – and with worsened impacts, marginal costs will increase, as the costs extend beyond the immediate impact of environmental impacts and society will have to carry the burden of adaptation and mitigation of additional impacts. Thus, it is crucial to tackle climate change as much as possible, as soon as possible, to limit the effects on other impact categories.

Emerging and future technologies are projected to have a significant influence on the costs associated with climate change. For instance, scaling up the adoption of renewable energy technologies has the potential to decrease costs of energy production as well as associated GHG

352 See IPCC (2023), Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)], IPCC, Geneva, Switzerland, pp. 35-115.

353 IEEP (2021), Green taxation and other economic instruments. Internalizing environmental costs to make the polluter pay. European Commission.

354 IPCC (2023), Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)], IPCC, Geneva, Switzerland, pp. 35-115.

355 IPCC (2023), Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)], IPCC, Geneva, Switzerland, p. 95.

emissions from the energy sector. Economies of scale are expected to make renewables more affordable and efficient, allowing them to replace fossil fuels. At the same time, however, enormous amounts of raw materials would need to be extracted in order build up the necessary infrastructure. Embedded GHG emissions may thus still be significant, and would need to be internalised as well.

Similar arguments hold true for the electrification of transport, where internal combustion engines are expected to be gradually replaced by electric vehicle batteries. These have the potential to significantly reduce tailpipe emissions of cars, but imply the extraction of rare earths and minerals for battery production. Improved life cycle approaches, such as repair, reuse, and recycling, may however lower the impacts of battery production.

Technological investments to improve energy efficiency may reduce energy consumption of industrial processes, households, and transport, for example. While this may contribute to reducing GHG emissions in the future, rebound effects may conversely lead to increased energy consumption that levels out or even raises energy savings from efficiency bonuses. Advancements in carbon capture and storage (CCS) can contribute to lowering net emissions, by capturing and storing carbon emitted in industrial processes. However, CCS can be energy-intensive, and lead to other issues on a local scale, by affecting biodiversity, land use change, and water consumption[356], but to what extent remains uncertain[357]. Smart agriculture technologies, such as sensors, drones and data analytics, can improve resource use while enhancing crop yields. While these technologies come with additional energy and resource consumption, they are likely to be offset by the energy efficiency improvements that they trigger, leading to overall less emissions. This can help mitigate the economic impact of climate change on agriculture by increasing resilience and productivity. Therefore, a decrease of externalised costs is expected.

The above examples indicate that with technological innovations, direct emissions of economic activity are likely to decrease. At the same time, climate impacts are projected to worsen, especially in the absence of much more ambitious strategies. As such, the objective of the PPP to internalise the cost of climate change-related pollution is likely to remain relevant in the future. Moreover, many of the listed examples also show that a focus on embedded emissions and other environmental and social impacts beyond GHG emissions will be necessary to account for the true costs of pollution related to economic activity.

Transition to a circular economy

In the EU, both the evolution of waste generation and of circular economy processes will affect future internalization of related pollution costs. Waste generation is generally expected to remain a significant issue, although projections vary depending on the type of waste. For example, while total municipal waste is expected to increase, residual municipal waste is likely to decrease significantly by 2030[358]. Regarding waste management, the European Court of Auditors (2020)[359] showed that despite the increased efforts, the EU is unlikely to meet their targets for recycling rates for 2025 and 2030, and drastic action is needed to still fulfil the targets.

356 Babin, A., Vaneeckhaute, C., & Iliuta, M. C. (2021). Potential and challenges of bioenergy with carbon capture and storage as a carbon-negative energy source: A review. Biomass and Bioenergy, 146, 105968.

357 Middleton, R. S., & Yaw, S. (2018). The cost of getting CCS wrong: Uncertainty, infrastructure design, and stranded CO2. International Journal of Greenhouse Gas Control, 70, 1-11.

358 See https://www.eea.europa.eu/data-and-maps/figures/observed-total-and-municipal-residual, accessed on 6-10-2023

359 European Court of Auditors. (2020). EU action to tackle the issue of plastic waste. Review No 04/2020.

Technological advancements in the area of waste and circularity vary by sector and value chain. For example, there are ongoing developments on end-of-life treatment options for plastic waste, and chemical recycling of plastic waste is gaining popularity as a potential complementary option to traditional mechanical recycling[360]. However, recycling options themselves are often accompanied by high levels of pollution themselves. Moreover, while biodegradable bioplastic packaging is likely to reduce single-use plastics and associated pollution costs, major advancements are still to be made[361]. Another type of waste is e-waste, where the extraction of valuable resources is crucial to stop the quick growth of waste levels. Emerging technologies, such as biotechnology and thermal cracking, show promising applications to improve recycling of electronics[362]. Tracking of waste to improve traceability to the polluter is also an important aspect, in which technology will play a major role in the upcoming years[363]. This can ensure responsible disposal and recycling of materials used.

While there are significant technological developments to reduce pollution costs associated with waste generation, these vary by sector and are accompanied by significant complexities. To fully cover costs, more economic instruments, information technology, and smarter recycling technologies are crucial[364]. Therefore, the PPP is likely to remain relevant for cost internalisation of pollution associated with waste and circular economy.

Zero-pollution ambition

Air pollution

An analysis by the EEA suggests that improvements in air quality largely depend on the full implementation of current policies alongside additional action[365]. This is in line with OECD projections that unless new policies are implemented, global urban air quality will continue to deteriorate, making outdoor air pollution (particulate matter and ground-level ozone) the top cause of environmentally related deaths[366]. With continued policy implementation across the EU, emissions of air pollutants are generally expected to improve in the future – with the exception of ammonia emissions, which are projected to only exhibit a slight decrease. Remaining ammonia emissions are projected to continue to cause acidification of forest soils and freshwaters, despite reductions in atmospheric sulphur and nitrogen deposition. EEA projections thus highlight the need for more stringent policy, as many Member States are expected to fail their emissions reduction commitments by 2030. Moreover, even in a full implementation scenario, premature deaths attributable to $PM_{2.5}$ are estimated to amount to 194 000 in 2030[367].

360 Rizos, V., Urban, P., Righetti, E. and Kassab, A., 2023. Chemical Recycling of Plastics : Technologies, Trends and Policy Implications. Brussels : Centre for European Policy Studies.

361 Narancic, T., Cerrone, F., Beagan, N., & O'Connor, K. E. (2020). Recent advances in bioplastics: application and biodegradation. Polymers, 12(4), 920.

362 Rene, E. R., Sethurajan, M., Ponnusamy, V. K., Kumar, G., Dung, T. N. B., Brindhadevi, K., & Pugazhendhi, A. (2021). Electronic waste generation, recycling and resource recovery: Technological perspectives and trends. Journal of Hazardous Materials, 416, 125664.

363 Tansel, B. (2017). From electronic consumer products to e-wastes: Global outlook, waste quantities, recycling challenges. Environment international, 98, 35-45.

364 Gardiner, R., & Hajek, P. (2020). Municipal waste generation, R&D intensity, and economic growth nexus–A case of EU regions. Waste Management, 114, 124-135.

365 EEA (European Environmental Agency) (2020b), The European environment - state and outlook 2020, Luxembourg, https://www.eea.europa.eu/soer/2020

366 OECD (2012) OECD environmental Outlook to 2050. Organization for Economic Cooperation and Development. https://doi.org/10.1787/9789264122246-en

367 EEA (European Environmental Agency) (2020b), The European environment - state and outlook 2020, Luxembourg, https://www.eea.europa.eu/soer/2020

Innovations in the area of climate change, energy and transport were highlighted by the EEA as key measures to improve air pollution. By reducing pollution levels, renewable energy and the electrification of road transport thus have potential to decrease the amount of costs related to air pollution from road transport needing to be internalised. However, the arguments made in the previous sections imply that life cycle approaches to electric vehicles are necessary to account for indirect emissions, which would need to be internalised as well[368].

Since ammonia emissions are projected to experience the least reductions in the EU, technological innovation in the agricultural sector may be promising areas to reduce air pollution and concentration levels. Ammonia emissions cause the formation of secondary PM in the air, which leads to higher PM concentration that can exceed air quality standards.[369] Reducing ammonia emissions would entail synergies with biodiversity objectives on ecosystem health. The European Commission suggests several sustainable agriculture technologies, such as low-emission techniques for spreading manures and mineral fertilisers, and animal feeding strategies[370].

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Technological developments alone, while in many areas reducing pollution levels and therefore associated externalised costs, will not lead to an internalisation of costs. Given the uncertainty around future developments, as well as pollution and increased resource use associated with technological scale-up, such 'clean' technology innovations would still lead to pollution costs that would need to be internalised. Additional, policy, action is required. For example, disposing of manure from livestock farming causes almost 80 % of all ammonia emissions across the EU[371]. Changes in diets/subsidies for red meat consumption may therefore have a big impact on future air pollution and GHG emissions[372].

Water

Estimates by the UN show that by 2050, about six billion people will suffer from water scarcity, due to a combination of increased water pollution, increased demand, and a decrease of water resources[373]. More recent research, however, shows that this number might be an underestimation, as the effects of the three mentioned effects are underrated[374]. There is a major struggle to identify interventions that can address water-related issues, as there are large uncertainties, in terms of the variability in factors such as natural processes, human behaviour, and social, economic and technological dynamics[375]. Where there is water scarcity it is also expected that the number of conflicts in relation to water will increase, which calls for well-coordinated worldwide water governance. The water struggle is a pervasive issue, as, due to

368 EEA (European Environmental Agency) (2020b), The European environment - state and outlook 2020, Luxembourg, https://www.eea.europa.eu/soer/2020

369 EEA (European Environmental Agency) (2020b), The European environment - state and outlook 2020, Luxembourg, https://www.eea.europa.eu/soer/2020

370 EC (2019), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions — Environmental Implementation Review 2019: a Europe that protects its citizens and enhances their quality of life (COM(2019) 149 final

371 IIASA (2017), Progress towards the achievement of the EU's air quality and emissions objectives, International Institute for Applied Systems Analysis.

372 Springmann, M., Clark, M., Mason-D'Croz, D., Wiebe, K., Bodirsky, B.L., Lassaletta, L., De Vries, W., Vermeulen, S.J., Herrero, M., Carlson, K.M. and Jonell, M., 2018. Options for keeping the food system within environmental limits. Nature, 562(7728), pp.519-525.

373 UN-Water (2018), The United Nations World Water Development Report 2018: Nature-Based Solutions for Water, Paris, UNESCO, https://www.unwater.org/publications/world-water-development-report-2018

374 Boretti, A., & Rosa, L. (2019). Reassessing the projections of the world water development report. NPJ Clean Water, 2(1), 15.

375 Haasnoot, M., Middelkoop, H., Van Beek, E., & Van Deursen, W. P. A. (2011). A method to develop sustainable water management strategies for an uncertain future. Sustainable Development, 19(6), 369-381.

climate change, some regions will increasingly struggle with too much water, while others, as described above, will struggle with too little or too polluted water[376]. Therefore, it is crucial to internalise all costs of water consumption, to ensure that it is treated as a scarce resource and not wasted.

However, in no Member States are environmental or resource costs fully internalised[377]. For agricultural use of water, more efficient technologies are emerging, but there is still a lack of insight into the impacts on ecosystems and their services (Velasco-Muñoz et al., 2018). Such insights are crucial to assess the real impact that these emerging technologies can have, including external effects. In terms of plastic waste in water, leading to microplastics pollution, a number of promising technologies have emerged, which can both be applied to waterways and oceans, removing plastic from wastewater (Falk-Andersson, 2023; Schmaltz et al., 2020). There is, however, a lack of technologies that prevent the leakage rather than cleaning it up (Schmaltz et al., 2020). With regards to water pollution, prevention is an important aspect, as cleaning up waste does not allow for identification of the polluter. Without improved monitoring of the source of pollution, it is hard to internalise costs of the clean-up for the polluters. Moreover, improved monitoring can improve the ability to prevent pollution (Sousa et al., 2018; Zolkefli et al., 2020). If current trajectories continue, the emerging technologies will not be able to fully internalise all costs associated with water usage, as there is not enough focus on the source of pollution.

Protecting, preserving and restoring biodiversity and natural capital

Projections of biodiversity and ecosystem services in Europe show that in all scenarios, climate change and land use change pose significant threats to biodiversity[378]. Land use change mainly is expected to occur in Southern Europe, as intensive and extensive agriculture is likely to decrease due to a combination of higher temperatures, increased droughts, and less irrigation water. At the same time, intensive and extensive agriculture is expected to increase in Western and Northern Europe, mainly due to climate change[379]. An especially big threat to biodiversity in Europe is invasive species, according to an IPBES report[380]. The report shows that the negative impact of invasive alien species is increasing rapidly and expected to continue to do so. Under a "business-as-usual" scenario, the number of alien species worldwide is expected to increase by a-third by 2050 compared to 2005. It is expected, however, that his number will increase faster than the business-as-usual scenario. With regards to internalisation of the costs for these developments, it may be hard to apply the PPP, as it is hard to point out the polluter. Therefore, further action needs to be considered to ensure that the PPP is applied effectively.

To address the manifold issues described above, a number of technologies are emerging which aim at mitigating the impact of these issues. Currently, however, not all costs may be internalised through these technologies. With regards to land-use change and loss of species, a factor that

376 Tropp, H., A. Earle, X. Baloyi, K. Tiwari (2023), Water cooperation for accelerated Agenda 2030 implementation: Special focus on Africa. Water Cooperation Global Outlook initiative working paper. Stockholm: International Centre for Water Cooperation and Stockholm International Water Institute.

377 Kejser, A. (2016). European attitudes to water pricing: Internalizing environmental and resource costs. Journal of environmental management, 183, 453-459.

378 Veerkamp, C. J., Dunford, R. W., Harrison, P. A., Mandryk, M., Priess, J. A., Schipper, A. M., ... & Alkemade, R. (2020). Future projections of biodiversity and ecosystem services in Europe with two integrated assessment models. Regional Environmental Change, 20, 1-14.

379 Holman, I. P., Brown, C., Janes, V., & Sandars, D. (2017). Can we be certain about future land use change in Europe? A multi-scenario, integrated-assessment analysis. Agricultural Systems, 151, 126-135.

380 Roy, H. E., Pauchard, A., Stoett, P., & Truong, T. R. (2023). IPBES Invasive Alien Species Assessment: Summary for Policymakers.

will need addressing is the trade-off within some proposed solutions[381]. Renewable energy sources offer a solution to direct emissions, but those sources may entail different issues. For biofuels, for example, the environmental impact depends on what type of wood is used, and can lead to biodiversity loss and decrease of soil productivity. Crops can also be used for biofuels, but each crop can have different impacts on the soil quality, as well as on biodiversity. What is more, using crops can lead to competition with food production[382]. Projections show that bioenergy will account for 27 % of total primary energy demand in the EU for 2050[383], thus it is important to take into account the external negative effects such an energy source can have on the environment, as the current technologies do not ensure that further investments into this technology include all costs. For solar and wind energy, such externalities also exist. These costs are related to the rare earth materials needed for these technologies. Examples are the energy-intensity of the mining industry[384] and the threats to biodiversity[385]. Ensuring sustainability throughout the whole supply chain of wind and solar technologies is needed, which can only be done with more transparent sourcing, to internalise all associated costs[386]. If not, the pollution that the PPP is trying to prevent may simply be shifted. Emerging technologies do not internalise all costs, as they themselves cause pollution (even if to a lower extent). Thus, it is expected that internalisation rates will improve somewhat, but many external costs remain unaddressed.

Working version

Conclusions for EQ7b

The analysis of EQ7b indicates that costs of pollution are expected to remain significant, given that pollution is projected to worsen in many areas, which cannot be alleviated by technological innovation alone. This is in line with the stakeholder interviews conducted in the context of this study, where many respondents considered current PPP implementation inadequate to resolve problems related to new forms of pollution. Moreover, while cost internalisation may be improved with future technological developments, pollution in the reviewed areas is expected to remain significant or even increase. Despite playing an important role in cost internalisation, technologies themselves may also lead to unintended pollution effects. Therefore, the analysis concludes that the PPP's objectives of reducing pollution via price signals is relevant to the EU's needs, and will likely remain so in the face of emerging environmental issues.

5.4.1.3. Stakeholder feedback for EQ7

In the public consultation survey, 42% of respondents (112) believed that the **implementation of the PPP in the EU acquis is adequate to tackle new or emerging environmental issues and changes in technology**. Twenty-three per cent (62) of respondents thought the implementation of the PPP in the EU acquis was inadequate and 19% (52) were neutral. The analysis of answers by respondent groups has shown that 36% (39) of business entities felt that the implementation of the PPP in the EU acquis is adequate, while 30% (32) believed that it is inadequate to tackle new or emerging environmental issues and changes in technology. Fifty-seven per cent (59) of

381 Urban, P., & Hametner, M. (2022). The economy–environment nexus: Sustainable development goals interlinkages in Austria. Sustainability, 14(19), 12281.

382 Kosenius, A. K., & Ollikainen, M. (2013). Valuation of environmental and societal trade-offs of renewable energy sources. Energy Policy, 62, 1148-1156.

383 Mandley, S., Wicke, B., Junginger, H., van Vuuren, D., & Daioglou, V. (2022). Integrated assessment of the role of bioenergy within the EU energy transition targets to 2050. GCB Bioenergy, 14(2), 157-172.

384 Igogo, T., Awuah-Offei, K., Newman, A., Lowder, T., & Engel-Cox, J. (2021). Integrating renewable energy into mining operations: Opportunities, challenges, and enabling approaches. Applied Energy, 300, 117375.

385 Sonter, L. J., Dade, M. C., Watson, J. E., & Valenta, R. K. (2020). Renewable energy production will exacerbate mining threats to biodiversity. Nature communications, 11(1), 4174.

386 Huber, S. T., & Steininger, K. W. (2022). Critical sustainability issues in the production of wind and solar electricity generation as well as storage facilities and possible solutions. Journal of Cleaner Production, 339, 130720.

EU citizens considered that the implementation of the PPP in the EU acquis is adequate and 13% (13) believed that it is inadequate. Twenty per cent (5) of NGOs thought that the implementation of the PPP in the EU acquis is adequate, while 32% (8) considered it inadequate.

In the interviews, the respondents discussed **the emerging pollutants and pollution types that generated externalities** and elaborated on the **role of innovation and technologies** in preventing, controlling or remedying environmental pollution. The overwhelming majority of interviewees mentioned **perfluoroalkyl and polyfluoroalkyl substances** (PFAS) as (emerging) manufactured in various sectors that generated costs in preventing, reducing and eliminating environmental pollution. Other topics, that appeared in several interviews included the emerging environmental issues associated with the activities in **IT, mobile communications and electronics**. According to the interviewees, their effects have been underscored. According to a few interviewees, there was **a potential pollution issue (or a threat) of mining critical raw materials in Europe** to reduce the dependency on third countries. Several respondents indicated that **plastics** in general or specific plastic materials have been problematic due to recycling issues.

Several interview respondents reflected on whether the instruments for implementing the PPP encouraged the use of emerging technologies and innovation for preventing, reducing and remediating environmental pollution. The opinions expressed by the interviewees **substantially varied**. Some respondents considered that **the PPP had a positive effect on the application of new technologies or innovation.** Other interviewees emphasised that the **economic feasibility of sustainable business models** was more important than the application of innovative technologies *per se*. Finally, some respondents draw attention to the **emerging risk of greenwashing** related to specific technologies (e.g., carbon capture).

5.4.2. EQ8. The extent to which the PPP is consistent with the needs of the EU as set out in the European Green Deal

5.4.2.1. EQ8a. To what extent are the scope and objectives of the PPP relevant to the needs of the EU as set out in the EGD?

This EQ connects the two objectives of the PPP (see section Intervention logic for the polluter pays principle), providing price signals to efficiently reduce pollution and facilitating a just transition, to the targets specified in the EGD. As relevance analysis typically examines the extent to which the objectives adequately target the underlying needs, the EGD targets are interpreted as the 'needs' in this context. Given that the EGD's objectives reflect the current EU agenda and are the foundation of the EU's growth model, these were chosen as a relevant benchmark for the purposes of this fitness check.

The assessment in this EQ first describes the logic of the PPP and how it is supposed to reduce pollution levels. Then, it analyses the relevance of the PPP's logic and internalisation objective to the EGD. It analyses whether the PPP's objectives are relevant to the EGD needs, and, specifically, to which of the headline targets of the EGD. It does so by taking a look at how the PPP framework contributes to these targets. Finally, this EQ discusses the second objective of the PPP, supporting the just transition, in relation to the EU needs set out in the EGD.

Key finding(s)	Robustness
The **objectives of the PPP are relevant to the needs of the EU as set out in the EGD** (as indicated by evidence compiled for EQ2a).	Medium

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	WIP	YES

Relevance of the PPP to EGD needs

The logic of the PPP aims to lower pollution levels indirectly, through price signals. The aim of the principle is pollution abatement, by encouraging polluters to reduce their emissions instead of being content to pay charges. This is supposed to influence business and consumer choices whilst creating an incentive for producers to place on the market environmentally friendly products[387]. Through cost recovery, liability, and the obligation to undertake action to clean up any pollution, polluters are incentivised to prevent and/or reduce their environmental damage[388]. Apart from encouraging producers to produce more sustainably and to invest in cleaner technology and innovation, pass-through of costs to consumers should create incentives to buy cleaner products[389].

In the context of the needs of the EU set out by the EGD, the PPP's objectives are in line with the EGD's target of both achieving carbon neutrality and protecting biodiversity. Where funding is part of the EGD mechanism to accomplish environmental sustainability, the revenues from polluting actions can be used to invest into sustainable solutions, such as nature conservation, decarbonising the energy sector, or climate adaptation. Since polluters are legally liable for the pollution they cause, this aligns with the goal of the EGD to promote responsible and sustainable practices, by ensuring that those who pollute or harm the environment pay for these damages. Through this accountability mechanism, businesses are encouraged to convert to greener practices and technologies. Moreover, by incentivising businesses to decrease their environmental impact and emissions, the PPP can drive innovation[390]. This is essential to the EGD's ambition to transform the EU's economy to more sustainable, circular, and resource-efficient practices.

At the same time, pollution leakage remains a potential issue. By increasing costs of production at least in the short to medium term, the PPP may incentivise imports of unsustainably produced goods, as well as the migration of carbon-intensive industries to third countries with less stringent climate (or other environmental) policy[391]. Unless combined with other policy mechanisms, such as the Carbon Border Adjustment Mechanism in the case of climate, the PPP could thus entail a shift of pollution to third countries.

Going into specifics of the EGD targets (i.e., the needs of the EU), the PPP objective of cost internalisation is relevant to the EGD headline targets in the following ways:

- **Climate ambition for 2030 and 2050:** By putting a price on pollution, the PPP incentivises businesses to transition to cleaner ways of production, thus contributing to the aim of

387 de Sadeleer, N. M. (2012). The polluter-pays principle in EU law-bold case law and poor harmonisation. Pro Natura: Festskrift Til HC Bugge, Oslo, Universitetsforlaget, 405-419.

388 Lindhout, P. E., & Van den Broek, B. (2014). The polluter pays principle: Guidelines for cost recovery and burden sharing in the case law of the European court of justice. Utrecht L. Rev., 10, 46.

389 Huber, S. T., & Steininger, K. W. (2022). Critical sustainability issues in the production of wind and solar electricity generation as well as storage facilities and possible solutions. Journal of Cleaner Production, 339, 130720.

390 OECD. (1992). The Polluter-Pays Principle: OECD Analyses and Recommendations. OCDE/GD (92) 81. Organisation for Economic Co-operation and Development. Paris.

391 Jakob, M. (2021). Why carbon leakage matters and what can be done against it. One Earth, 4(5), 609-614.

reducing GHG emissions. The PPP can facilitate investments into different sustainability projects (such as renewable energy, sustainable transportation etc.), which not only benefit the EU's climate ambition, but also many of the policy areas below. To reach climate neutrality by 2050, such overall emission reductions are crucial. Still, spillovers of pollution to third countries may occur as the PPP raises input costs, thus potentially undermining the aim of carbon neutrality.

- **Supplying clean, affordable and secure energy:** Price signals can lead to increased demand for cleaner and more efficient energy production, although potential rebound effects would need to be taken into account. However, by raising production input costs, the PPP in the short term may also pose a threat to international competitiveness of EU industries. This is also reflected in the relatively high uncertainty expressed by survey participants as to whether PPP implementation sufficiently contributed to reaching this specific EGD objective (around a third of respondents).
- **Mobilising industry for a clean and circular economy:** Through price signals, the PPP promotes responsible production processes, supply chains, and waste and resource management[392]. By requiring businesses to pay for the costs involved in cleaning up or mitigating waste and pollution, the PPP's objectives are relevant to the EGD need to transition to a circular economy. This was generally confirmed by the survey conducted for this study. More than two thirds of participants agreed that the PPP contributed positively to this EGD objective.
- **Building and renovating in an energy and resource efficient way:** The PPP can contribute to reducing energy use and emissions associated with the buildings sector. It can encourage the use of cleaner construction materials and improved material and energy efficiency through price signals. However, around a third of survey respondents indicated that they were uncertain about the PPP's potential to facilitate this ambition.
- **Sustainable and smart mobility:** The PPP can encourage investments in electric and zero-emission vehicles, both for public and private transportation[393]. However, survey participants expressed relatively high uncertainty (around a third of respondents) on the PPP's potential contribution in this regard.
- **From Farm to Fork:** The PPP penalises unsustainable agricultural practices and thus encourages practices that lead to less pollution, while the penalties from unsustainable practices that remain can be used to improve or support sustainable farming methods[394]. Discouragement of harmful methods, like using some pesticides or degrading soil aligns with the EGD target of promoting sustainable agriculture and creating a healthy food system.
- **Preserving and restoring biodiversity:** The PPP may either lead to pollution prevention and biodiversity protection or to funding biodiversity conservation efforts[395]. Holding polluters accountable for any damage done can reduce harm to and loss of biodiversity, which supports the EGD's objective to protect and restore nature and biodiversity. Survey respondents tended to confirm this, with around two thirds of stakeholders indicating that PPP implementation facilitated the achievement of preservation and restoration of ecosystems and biodiversity.

392 Beccarello, M., & Di Foggia, G. (2018). Moving towards a circular economy: Economic impacts of higher material recycling targets. Materials Today: Proceedings, 5(1), 531-543.

393 Parry, I. (2020). Increasing carbon pricing in the EU: evaluating the options. European Economic Review, 121, 103341.

394 J Allen, B., Bas-Defossez, F., Weigelt, J., Marechal, A., Meredith, S., & Lorant, A. (2018). Feeding Europe: Agriculture and sustainable food systems. Proceedings of the Policy Paper produced for the IEEP Think, 2030. .

395 Alafaa, P. U. (2021). An Appraisal of the Polluter-Pays Principle and Biodiversity Conservation in Nigeria. Available at SSRN 3970775.

- **Zero pollution for a toxic-free environment:** By imposing financial obligations on polluters, the PPP provides incentives for industries to reduce pollution levels, invest in cleaner production technologies to prevent pollution, encourage safe disposal and management of chemicals and hazardous substances[396], and reduce the use of products with a high potential of pollution (e.g., single-use plastics)[397]This objective of the EGD was particularly highlighted by survey respondents, where around two thirds of respondents reported that the PPP contributed significantly to achieving the zero-pollution ambition.

Besides these thematic policy areas establishing the needs of the EU, the Green Deal also includes levers for mainstreaming sustainability in all EU policies, which could be supported by the PPP.

- **Just transition:** The need for a just transition is connected to a broader discourse on environmentally just policies. Here, three aspects are considered important: Fair distribution of environmental risks and hazards and fair access to eco-system services, fair sharing of the costs of pollution and of the transition, and positive effects on employment and fair employment opportunities[398]. Since at least the first two of these aspects necessarily become more urgent if polluters do not internalise the costs of their externalities, the PPP is in principle highly relevant to the need for environmental fairness and a just transition (and is therefore specified accordingly in the intervention logic).

  On the other hand, considerable uncertainties remain on whether the PPP can truly support a fair implementation of environmental policies. Regional convergence in the EU has slowed in recent years, while inequalities within countries have been growing[399], re-emphasising the importance of a just transition. At the same time, internalisation (and pass-through) of pollution costs can have adverse distributional effects via pass-through of higher product prices to consumers, which often disproportionally affect the poor and the development of areas with high pollution levels. Without mitigating measures, carbon pricing may initially lead to increased poverty and inequality, although concrete impacts may vary depending on the circumstances[400].

  Additionally, the pace of technological adoption can vary by region and sector, which can influence the extent to which these advancements mitigate the costs of climate change, for example. Therefore, the logic of the PPP may partly be conflicting with the need for a just transition, but there are many uncertainties about these dynamics in the literature. More evidence and a longer elaboration of the interconnections of the PPP and the just transition is provided in EQ4b, indicating that there is a risk of unfair cost distribution in certain cases. The complexity of these dynamics is also reflected in the stakeholder survey conducted for this study, where respondents broadly disagreed on whether PPP implementation contributed to the achievement of the EGD's Just Transition ambition.

396 Coly, R. A. (2012). Development and implementation of the polluter pays principle in international hazardous materials regulation. Environmental Claims Journal, 24(1), 33-50.

397 Atabay, D., Rosentrater, K. A., & Ghnimi, S. (2022). The sustainability debate on plastics: Cradle to grave Life Cycle Assessment and Techno-Economical Analysis of PP and PLA polymers with a "Polluter Pays Principle" perspective. Frontiers in Sustainability, 3, 931417.

398 Heyen, D. A., Menzemer, L., Wolff, F., Beznea, A., & Williams, R. (2020). Just Transition in the context of EU environmental policy and the European Green Deal. Issue Paper under Task, 3.

399 OECD (2023), Regional Outlook 2023 : The Longstanding Geography of Inequalities and Alcidi, C., Corti, F., Postica, D., Di Salvo, M, Maftei, A. (2023), EU convergence: Geographical dimension, impact of COVID-19 and the role of policy, Brussels : Centre for European Policy Studies.

400 Shang, B., 2023. The Poverty and Distributional Impacts of Carbon Pricing: Channels and Policy Implications. Review of Environmental Economics and Policy, 17(1), pp.64-85.

- **Research and innovation:** To avoid having to pay charges for pollution, the PPP incentivises companies to invest in research and innovation for cleaner ways of conducting economic activities.

Conclusions for EQ8a

The PPP is highly relevant to the needs of the EU as set out in the EGD. This is particularly the case for the PPP's commitment to reduce pollution levels via price signals, which overlap with all of the EGD's headline targets. Respondents to the stakeholder survey generally agreed with this finding, given that between around half to two thirds of them indicated that the implementation of the PPP fully or sufficiently contributed to all objectives of the EGD – except for the objective of leaving no one behind. This highlights that the PPP's objective to support a just transition, while in theory relevant to and matching the EGD needs, may in practice partly conflict with the EGD's aims. Costs for internalisation of pollution may be passed through to consumers, which could disproportionally affect disadvantaged groups. Similarly, there is a need to address potentially conflicting outcomes, such as carbon leakage.

Working draft

5.4.2.2. Stakeholder feedback for EQ8

The respondents of the public consultation survey felt that the **implementation of the PPP fully or sufficiently contributed to many objectives of the European Green Deal**; from 49% (103) to 68% (182) of respondents indicated that the PPP contributed to a sufficient extent or full extent to all objectives except for a just transition and leaving no one behind (see Figure 2 18,).

Respondents recognised that the **PPP especially contributed to a zero-pollution ambition for a toxic-free environment** (66%, 175: 40%, 106 – 'full extent'; 26%, 69 – 'sufficient extent'), **mobilising industry for a clean and circular economy** (68%, 182: 37%, 100 – 'full extent'; 31%, 82 – 'sufficient extent') and **preserving and restoring ecosystems and biodiversity** (62%, 167: 34%, 92 – 'full extent'; 28%, 75 – 'sufficient extent'). The analysis of the answers by respondent groups revealed that 54% (58) of business entities, 75% (78) of EU citizens, and 80% (19) of NGOs thought that the PPP fully or sufficiently contributed to a zero-pollution ambition for a toxic-free environment. Fifty-eight per cent (62) of business entities, 82% (85) of EU citizens, and 64% (16) of NGOs felt that the PPP contributed to mobilising industry for a clean and circular economy. Fifty-five per cent (59) of business entities, 72% (75) of EU citizens, and 68% (17) of NGOs believed that the PPP contributed to preserving and restoring ecosystems and biodiversity.

Respondents (39%, 103) were less confident that the PPP contributed to the achievement of a just transition and leaving no one behind to a sufficient (14%, 37) or full extent (25%, 66). For this objective, as well as building and renovating in an energy and resource-efficient way, supplying clean, affordable and secure energy and accelerating the shift to sustainable and smart mobility, 30% or more of respondents selected 'Don't know' or 'Neither sufficient nor insufficient', indicating some uncertainty amongst respondents as to how the PPP has contributed to the achievement of these objectives. The analysis has shown that 29% (31) of business entities, 52% (54) of EU citizens, and 44% (11) NGOs thought that the PPP fully or sufficiently contributed to the achievement of a just transition or leaving no one behind. Thirty per cent (33) of business entities believed that the PPP did not contribute to a just transition or leaving no one behind at all or sufficiently.

5.5. Coherence

The evaluation of coherence in the context of this study involved looking at how well different modalities of application of the PPP work well together across policies contributing to the 8th EAP. Secondly, this involved examining how well EU application of the PPP works in the international context in terms of its success in preventing pollution and internalisation of environmental costs caused by the EU's economy. It also considered the application of the PPP in non-EU countries and the EU's support therein.

The coherence analysis primarily focused on evidence of potentially conflicting and mutually non-supportive mechanisms used to apply the PPP in different policies as well as inconsistencies in its implementation within the EU. For the international context, this involved checking the degree of inclusion of the PPP in EU's external action in the context of its commitment of achieving a world without pollution. In addition, it involved examining the degree of utilisation of the PPP with a view to preventing EU's external pollution i.e., the pollution caused by EU's economic activity outside its borders.

5.5.1. EQ9. The extent to which the application of the PPP is consistent and coherent within the EU, across policies

impacting on environmental protection and the improvement of the quality of the environment

5.5.1.1. EQ9a. Is the PPP coherently and consistently applied across policies contributing to the 8th EAP priority objectives at EU level and Member State level?

To answer this question, policies contributing to the 8th EAP priority objectives grouped by policy areas have been reviewed to establish whether there are any tensions or synergies in terms of how the PPP is applied on the EU level and from the EU level to MS level. Assessment of coherence and consistency of application of the PPP between the different policies was carried out based on the evidence compiled for the state of play, effectiveness analysis (EQ1-3) and policy literature review.

Assessment of *consistency* reviewed the degree of variation in application of the PPP across policies grouped by 8th EAP priority objectives and policy areas.

Assessment of *coherence* reviewed the potential for conflicting or mutually non-supportive mechanisms used to apply the PPP between policies grouped by 8th EAP priority objectives and policy areas (except EU funds which are covered in EQ3b).

Key finding(s)	Robustness
There is a degree of variation in the application of the PPP between policies grouped by 8th EAP priority objectives. Good application in climate and circular economy policies compared to application in water quality and natural capital policies (as evidenced by analysis for EQ1a).	Strong
There is a degree of variation in the application of the PPP in the three cost categories between policies. There is very good application in costs to address pollution prevention and control, good application for costs to address administrative measures and mixed application for costs of environmental damage (as evidenced by analysis for EQ1a).	Strong
There are however overlaps between some provisions of the ELD and the IED that result in inconsistencies and/or incoherences in their joint application and, in turn, underuse of the ELD. The lack of clarity of certain ELD provisions has led to the incoherent implementation of the ELD across Member States, although the publication of the Commission's guidelines on the ELD should improve its implementation. **There are also incoherencies in how the PPP is applied within EU funding. There is limited evidence of other conflict between policies and the way the PPP is applied**. Environmentally harmful subsidies are in principle not coherent with the PPP.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	WIP	WIP	WIP

Climate change

EU climate change policies can be divided by the two main objectives, climate change mitigation and adaptation. In terms of how coherently and consistently the PPP is applied in this policy area

the analysis is primarily focused on the policies aimed at mitigation[401]. To achieve the main objective of mitigation of climate change the relevant policies are aimed at reducing greenhouse gas (GHG) emissions in line with the EU's GHG emission reduction targets under the EU 2030 climate and energy framework[402], while the main types of pollution are GHGs including pollutants emitted from the energy, industrial processes, transport, agriculture, product use and waste sectors.

Amongst different climate change policies aimed at reducing GHG emissions across specific sectors, the EU Emissions Trading System (ETS) Directive 2003/87/EC and the Effort Sharing Regulation (ESR) 2018/842 aim to achieve the overall objective of reducing GHG emissions more generally. Taken together, these two policies apply the PPP to a high degree and in a coherent manner as their implementation is divided between two clearly distinguished groups of sectors. EU ETS applies to polluting sectors including energy supply, energy intensive industry and aviation. ETS Directive has been amended by the Directive 2023/959[403] and Directive 2023/958[404] providing for the gradual expansion of the Emission Trading System to include maritime transport, buildings, road transport and aviation. ESR applies to non-ETS polluting sectors including domestic transport, buildings, agriculture, small industry and waste sectors There are no identified contradictions and/or overlaps in how the PPP is applied. This is due to the two policies targeting different groups of sectors in a complementary fashion. Moreover, the ESR is implemented at MS level and is based on binding national targets to reduce GHG emissions and annual emissions budget allocated annually for each MS (the maximum amount of GHG emissions it is allowed to produce in the non-ETS sectors).

In terms of the consistency of application of the PPP, the two primary policies are not highly consistent as the EU ETS contains measures which incur costs entirely met by the industries/companies that are the primary source of the GHG emissions in all three categories of costs (prevention and control, administrative and enforcement costs and costs of environmental damage), with the price put on GHG emissions acting as a disincentive for companies, thereby addressing costs of environmental damage. In case of the ESR the price put on GHG emissions also acts as a disincentive for industries/companies, and thereby addresses costs of environmental damage. However, trading is at national level (Member States can trade in GHG emissions at national level) and the costs are not incurred by the industries responsible for GHG emissions i.e. the companies which are the primary source of the GHG emissions. An additional issue in terms of consistency of implementation of the PPP occurs at national level as a consequence of the Commission's responsibility for only setting the national targets and emission budgets, while the Member State governments retain the responsibility for managing their emissions and implementation of policies and measures to meet them which ultimately determines whether the PPP is being implemented and to what degree (see ES Regulation in Table 4-1 State of play for policies contributing to the 8th EAP climate change priority objectives).

401 Some policies that include adaptation to climate change as their objective are analysed in the EU water quality policy area, e.g. the EU flooding directive (2007/60/EC). The EU has also implemented various abatement measures for adaptation to climate change. The EU's Adaptation Strategy, launched in 2013, sets out a framework for addressing the impacts of climate change and increasing resilience in different sectors, such as water management, agriculture, and forestry. Additionally, the EU has introduced regulations and standards to improve the resilience of infrastructure, such as the EU Directive on the assessment and management of flood risks (2007/60/EC). Through these abatement measures, the EU aims to increase the resilience of its Member States to the impacts of climate change and ensure that they are prepared to adapt to future challenges.

402 EC (2021). 2030 climate & energy framework. https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-energy-framework_en

403 Directive (EU) 2023/959 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union

404 Directive (EU) 2023/958 on aviation's contribution to the emission reduction target which extends the EU ETS to aircraft operators

The remaining relevant climate change policies aimed at reducing GHG emissions across specific sectors apply the PPP for costs of pollution prevention and control and administrative and enforcement measures to a consistently high degree and with no identified coherence related issues. As for the application of the PPP for the costs of environmental damage within the relevant climate change policies aimed at reducing GHG emissions across specific sectors, the question of coherent application of the PPP within those policies is not relevant due to no identified measures to internalise costs of environmental damage in eight of the policies (see Table 4-1 State of play for policies contributing to the 8th EAP climate change priority objectives).

Transition to a circular economy

The policy area of waste and recycling is regulated by the Waste FD as an overarching legal framework, supplemented by a number of more specialised pieces of legislation dealing with different categories of waste.

This policy area is characterised by relatively high degree of application of the PPP with individual policies containing measures which incur a cost that is intended to be entirely or largely borne by the polluter. Waste FD in its Article 14 refers explicitly to the PPP and requires that the costs of waste management including for the necessary infrastructure and its operation are to be borne by the original waste producer or by the current or previous waste holders. The Waste FD also introduces 'extended producer responsibility' (EPR) as a way of ensuring polluters contribute to meeting administrative costs and the costs associated with environmental damage. However, the degree of internalisation for environmental damage is limited.

The PPP is applied with no obvious coherence related issues across the relevant waste policies. This is because different categories of potential polluters (e.g. producers, different economic operators including landfill operators, distributors, products owners, households etc.) are made responsible for covering costs arising from a range of mechanisms.

In terms of overall consistency of application of the PPP in this policy area, the principle is consistently applied at a relatively high degree with respect to the first two types of cost categories (pollution prevention and control, and administrative and enforcement) ~~environmental damage~~) with a few exceptions. Costs associated with environmental damage are not captured well in price signals due to most of the policies in this area containing measures incurring costs that are only partially met by the polluter. The instances where the degree of application of PPP is somewhat reduced and thus less consistent are mostly related to national approaches to implementation which are varied and can have a major influence on the impact on waste management and by extension, the way in which the polluter is responsible. This includes instances where a policy in question establishes a duty for the Member State competent authority, hence the extent of application of the PPP depends on national plans and legislation and can lead to the application of the PPP to be inconsistent across the EU. Based on analysis in EQ1c, an example concerns legal requirements contained in the Waste FD (Article 14) where the polluter is required to pay for the costs of waste management, including for the necessary infrastructure and its operation. However, national approaches to implementation are varied and can have a major influence on waste management and by extension, the way in which the polluter is responsible.

Additionally, there are instances where policy in question contains measures which incur a cost and that cost is partially met by the polluter or is covered by a Member State. For instance, according to the Waste FD monitoring and reporting at national level and costs are incurred by Member State authorities. Member State authorities also incur the cost of establishing a monitoring framework that enables them to adequately ensure that producers of products and organisations on their behalf, implement their extended producer responsibility obligations.

According to the Batteries Directive, at national level, collection and recycling rates are to be monitored and reported, and this cost is primarily incurred by Member State authorities. Another example concerns Member States' responsibility for ensuring collection systems are in place and for implementing the producer responsibility principle to ensure minimum collection rate is achieved annually for electrical and electronic equipment (WEEE Directive).

Out of the twelve relevant policies in this policy area there are two identified instances where the degree of PPP application is negligible and these concern the Directive on packaging and packaging waste where there are no identified measures associated with costs of environmental damage and very limited application of the PPP in the WEEE Directive in terms of covering costs for pollution prevention and control.

In terms of coherence with other policy areas, management of waste from extractive industries is in the scope of the ELD which supports (is in synergy with) the Extractive Waste Directive by applying the PPP for prevention and remediation of environmental damage occurring as a consequence of a release of hazardous substances from the waste of extractive industries.

Zero-pollution ambition

Water

Control of water pollution can be thought of as focussed on stopping outflow, and monitoring pollutants. Directives stopping outflow make the link to polluters; these include the Urban Wastewater Treatment Directive, Nitrates Directive, Groundwater Directive, Sewage Sludge Directive, and Ship-Source Pollution Directive. Across this policy area, there is variation in the extent to which the PPP is applied, and, typically, within the policy itself in terms of the degree to which it is applied to different cost categories.

Based on the State of Play, for water policies, across the three cost categories (Pollution prevention and control, Administrative and enforcement, Costs of environmental damage), implementation of the PPP was typically greater for pollution prevention and control.

The ELD is applicable to water, and can thus be assessed for the implementation of the PPP, and the coherence of this approach with other water policies. Relevant activities are: all discharges to inland surface water that require prior authorisation, all discharges to groundwater that require prior authorisation, and the discharge or injection of pollutants into surface water or ground water that require a permit, authorisation or registration in advance. The Directive defines "water damage" as "any damage that significantly adversely affects:

> (i) the ecological, chemical or quantitative status or the ecological potential, as defined in Directive 2000/60/EC, of the waters concerned, with the exception of adverse effects where Article 4(7) of that Directive applies; or
>
> (ii) the environmental status of the marine waters concerned, as defined in Directive 2008/56/EC, in so far as particular aspects of the environmental status of the marine environment are not already addressed through Directive 2000/60/EC"

However, as noted in the ECA report, "The Directive applies when such "environmental damage" is considered "significant". The Directive does not specify criteria for assessing damage or determining the significance threshold for damage to water and land." The report notes that the 2016 evaluation of the ELD found that these issues had impeded the ELD in restricting environmental damage. Moreover, the ELD definition of "water damage" has led to differing

interpretation between Member States on whether it applies to water bodies as defined in the Water Framework Directive or "all waters". Since the WFD criteria with regard to water bodies' good status where not design to help competent authorities in determining instances of acute water damage, this has led to the limited application of the ELD. Even when the ELD applies to water damage, liability for its prevention and remediation may be limited (Stevens & Bolton et al., np). As with other policy areas, these issues represent a gap in the legislative underpinning of the PPP.

Since the MSFD does not provide for the designation of water bodies, any damage would therefore have to be severe to affect significantly the environmental status of marine waters under the MSFD (Stevens & Bolton et al., np). In terms of other challenges in coherence or consistency, while the Water FD references MS recovery of costs, the MSFD does not, which can be seen as a contradiction as these are both overarching Framework Directives. There are inconsistencies in applying the PPP in this policy area due to variations at MS level. Generally, implementation is relatively coherent in this policy area in that there do not appear to be overlapping measures, with pollution addressed at source level. It can be considered that the approach lacks some coherence in that across the acquis, there is variation in whether or not water policies apply the PPP when costs are incurred. No other coherence-related issues were identified.

Air quality

A relatively large group of policies regulating air quality are relevant. In general, costs for pollution prevention and control were well-directed towards the polluter (6/9 policies, 67%), while those for costs of environmental damage were not directed towards the polluter, or this was inapplicable to the policy (7/9, 78%). This indicates a lack of consistency in application of the PPP in this policy area.

Measures to prevent air pollution are driven by the AAQD and the NEC Directive. Also, the IED and MCPD require preventative action by industry: the IED for approximately 50,000[144] of the largest industrial installations across the EU and the MCPD for medium combustion plants (MCP) in the EU. For both, relevant Articles require Member States to determine a schedule of "effective, proportionate and dissuasive" penalties applicable to infringements. For the IED, there are disparities in penalty regimes between Member States, though this is in revision (which will facilitate a more consistent approach to implementing the PPP between Member States and regions). While costs associated with measures for air pollution prevention and control can be considered to implement the PPP relatively well, exceptions are seen for the AAQD and NECD (the PPP cannot be applied to the Eurovignette Directive). For the former two Directives, problems associated with implementation of the PPP for this cost category are due to challenges in tracing pollution back to the polluter.

Air damage is not included in the scope of the ELD. Instances in which the ELD may be applied to air pollution are those in which there are resulting impacts on water, land, protected species or natural habitats[405]. An ECJ decision of 2017 provided clarification that this can indeed apply[406]. While it is not possible to remediate air pollution in the same way that it is possible to remediate damage to land, water and biodiversity, Member States have reported a number of ELD occurrences which have also entailed damage to air from large fires. Measures to contain a fire result in lower air pollutant emissions, but their costs are not covered by the ELD, even if such

405 https://ec.europa.eu/commission/presscorner/detail/en/MEMO_07_157

406 https://uk.practicallaw.thomsonreuters.com/w-013-0317?transitionType=Default&contextData=(sc.Default)&firstPage=true

measures means that fewer air pollutants would deposit onto land and water and cause less biodiversity damage.

Similarly, it does not appear that the Ship-source Pollution Directive addresses air pollution from ships, including black carbon[407]. The issue of black carbon is relevant to the application of the PPP outside the EU, and is discussed further in Section 5.5.2.1 below (paragraph 3).

In general, there is limited consistency in PPP application in a number of aspects. There is limited consistency across cost categories within any given air quality policy, in the approach to air pollution across relevant policies, and across MS. Examples of inconsistencies across MS include differences in the monitoring framework, such that two MS were in infringement proceedings as of 2022[408], and the 2022 emissions projections review indicated that many MS are expected to be in non-compliance for ammonia, and to a lesser extent some other pollutants, in the upcoming years[409 via 408]. Inconsistencies across MS could also be seen as a coherence-related issue. Another coherence-related issue identified related to the Common Agricultural Policy. While the agricultural sector is a significant source of air pollution, the environmental objectives of the CAP are at times in conflict with its objectives of food security and economic viability (although this is mitigated at least to some extent through cross-compliance), such that it can be considered to lack internal coherence.

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Noise

Only one key policy was identified to regulate noise pollution in general, the Environmental Noise Directive (END); and more action is needed to reach policy targets. For the END, costs for pollution prevention and control were coded as amber in the State of Play, administrative and enforcement red, and costs of environmental damage white. As noted, the END does not impose targets on noise reduction, and Member State reporting of specific costs is voluntary. Abatement measures to prevent and reduce noise pollution are implemented at source, through Regulations and other Directives. Whilst depending on Member State choice, costs can be incurred by the polluter (not always possible e.g. double glazing to reduce noise pollution from roads). Noise is a policy area for which PPP implementation could be strengthened by imposing stronger restrictions at the source of the pollution.

In conclusion, it can be considered that this policy area is weak regarding PPP implementation, and monitoring and enforcement more generally, and lacks coherence with other policy areas where there are EU-level targets to prevent or remedy pollution at source, such as water or air.

Chemicals risk management

This is a large policy area with 14 policies in scope. Of these, costs for pollution prevention and control were relatively well-directed towards the polluter, with most rated as green (13/14, 93%) and one as amber (1/14, 7%). Costs for administration and enforcement were also generally well-directed towards the polluter, with green the most frequent rating (8/14, 57%). In contrast, and

407 Black carbon is a component of fine particulate matter, produced by incomplete combustion. It is harmful to human health and has environmental impacts such as melting ice and global warming.

408 European Commission (2022) COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Environmental Implementation Review 2022 Turning the tide through environmental compliance COM/2022/438 final. Available at https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=comnat:COM_2022_0438_FIN#footnote55 on 12 December 2023

409 Ricardo Energy & Environment (2022) Review of National Air Pollutant Projections and Assessment of National Air Pollution Control Programmes

similar to the typical pattern, costs of environmental damage were most frequently rated as white (10/14, 71%).

The Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation (EC) 1907/2006 (REACH) is the main piece of legislation affecting the use of chemicals in the EU. It is a comprehensive system to address risks, through requiring provision of registration data on hazards and risks, additional costs associated with applications for authorisation for substances of very high concern (SVHC) and restricting specific substances (or uses). REACH compliance costs are intended to be the responsibility of industry, but will be partially passed onto consumers via downstream price increases, and costs are also incurred by the European Commission, ECHA and individual Member States. However, costs to ECHA and the Commission are partially offset by the fees paid by industry. There is variation across MS in degrees of enforcement.

Other policies to manage chemicals pollution are the CLP Regulation, various Regulations and Directives including the CMR Directive and POPs Regulation, and emission limit values for chemicals manufacture under the IED. Each of these results in direct and indirect costs to chemical producers and users. The ELD and ECD are relevant to address environmental damage from chemicals. The ELD legislates both for environmental damage that has occurred, and situations in which there is an imminent risk of damage.

Working draft

There are inconsistencies in applying the PPP in this policy area due to significant variations at MS level. The 2018 evaluation of REACH found that it was generally coherent with other chemicals-related legislation[410]. There is overlap between this policy area and various other areas, such as water, with legislation such as the Pesticides Directive, but PPP application across this area reflects a focus on pollution prevention, particularly via REACH, supplemented by the ELD and ECD to address damage. As such, no coherence- and limited consistency-related issues were identified with relevance to PPP implementation in this area.

Nature, biodiversity, soil and land

The Habitats Directive together with the Birds Directive constitutes the core of the EU's nature conservation policy, and explicitly states in its recitals that the PPP has limited application for nature conservation[411]. In the two Nature Directives the PPP is applied through measures aimed at pollution prevention and control and through administrative and enforcement measures where potential polluters are required to cover certain costs associated with the appropriate assessment procedure. However, the extent to which the costs are borne by the polluter is not confirmed and there is a need to strengthen the application of the PPP. The Regulation on Invasive Species similarly implements PPP by making potential polluters (biological pollution) responsible for restrictions on invasive species, thus ensuring that the polluter bears the costs of pollution prevention and control, and of administrative and enforcement measures.

There is a degree of inconsistency in PPP application due to variations in national approaches, particularly in the case of the two Nature Directives, and this has some impact on cost attribution, through the way in which the polluter is made responsible for pollution prevention and control, and administrative and enforcement costs. However, the Court of Justice of European Union (CJEU) has issued a number of important Rulings on the Birds and Habitats Directives over the

410 COMMISSION STAFF WORKING DOCUMENT Accompanying the document COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE Commission General Report on the operation of REACH and review of certain elements Conclusions and Actions SWD/2018/058 final. Available online at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD:2018:58:FIN on 7 February 2024

411 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, Recitals

years, which provide an important source of jurisprudence as regards the interpretation of various legal provisions[412], making the application more uniform.

An evident inconsistency and a lack of coherence can be observed between the Nature Directives and the Environmental Liability Directive. This primarily concerns the differences in how Member States interpret the term 'significant damage'[413] to biodiversity. As the ELD establishes a legal framework of liability to prevent and remedy environmental damage including a damage to biodiversity, both the ELD and nature directives have complementary aims in terms of preventing/remedying (ELD) and preventing (nature directives) damage to biodiversity. However, the application of the PPP for biodiversity damage is hindered because the ELD does not specify minimum threshold levels, but instead ascribes liability to 'significant damage' where 'damage' is defined as 'a measurable adverse change in a natural resource or measurable impairment of a natural resource service which may occur directly or indirectly'.[414] The definition of 'damage to protected species and natural habitats' in article 2(1)(a) has led to incoherences in the ELD due to references to 'favourable conservation status' for natural habitats and species and geographic descriptions of areas in which species and natural habitats must be damaged in order for the ELD to apply. Additionally, "The Directive sets out that liable operators will bear the costs for any preventive and remedial actions necessary. Competent authorities are responsible for overseeing enforcement of the Directive and they are permitted to recover any costs they incur via security over property or 'other appropriate guarantees from the operator who has caused the damage'. Member States can transpose the Directive into national legislation and specify threshold levels."[415] The inconsistency in interpretation and implementation between Member States prevents the ELD in supporting the nature directives by applying the PPP for prevention and remediation of biodiversity damage. The incoherences have been eased by the Commission's guidelines on environmental damage which provide a broader definition of biodiversity damage and water damage than some Member States and competent authorities. The incoherences in application of the ELD should thus be reduced over time.

There are no coherence-related issues identified with regards to how the strategies relevant for this policy area[416] envisage the application of the PPP, with a negligible degree of application across all the relevant strategies. In terms of consistency of application of the PPP, all relevant strategies encompass measures which incur some cost, but that cost is not, or largely not, envisaged to be met by the polluter, with the exception of the EU Biodiversity Strategy for 2030 and the EU Forest Strategy for 2030 that contain no administrative measures to address pollution. In addition, there is no compliance cost assumed in the strategies. This means that there is no legal requirement to ensure costs are borne by the polluter.

Coherence of application of the PPP through biodiversity market-based instruments [417] should also be considered given the EU's strong support for these instruments as is reflected in the key

412 https://environment.ec.europa.eu/topics/nature-and-biodiversity/habitats-directive_en

413 Significant damage' – some MS consider the value of the damage caused, e.g., Czech Republic sets significant damage at €20,000 whilst Austrian law considers the ecological impact of the damage caused, Interim report, p129

414 Directive 2004/35/CE of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, Article 2, Definitions. Available at: EUR-Lex - 02004L0035-20190626 - EN - EUR-Lex (europa.eu)

415 Directive 2004/35/CE of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, Article 16. Available at: EUR-Lex - 02004L0035 -20190626 - EN - EUR-Lex (europa.eu)

416 EU Biodiversity Strategy for 2030 (and the Nature Restoration Law), EU Forestry Strategy for 2030, EU soil strategy (and the Soil Monitoring Law)

417 There is no agreement on the definitions of the main concepts related to biodiversity markets. However, the OECD (2014) defines biodiversity offsets as market instruments based on the 'polluter pays' approach, aiming 'to internalise the external costs of biodiversity loss from development projects by imposing a cost on the activities that cause adverse impacts to biodiversity'

strategic documents. Already the EU Biodiversity Strategy to 2020[418] stated that "EU will promote the development and use of innovative financing mechanisms, including market-based instruments", while the the need to unlock private and public funding is also recognised in the EU Biodiversity Strategy for 2030[419],

When considered in the context of broader environmental and sustainability policies, biodiversity market-based instruments are seen to have a good potential for coherent integration with policies related to sustainable development, climate change, and natural resource management. However, the coherence of application of the PPP via biodiversity market-based instruments in the EU can only be observed through EU's declared support for their implementation in the absence of concrete implementation of these instruments in a particular policy. It is also important to consider that many perplexities remain at both theoretical and practical levels. Ecosystems are inherently complex, but practical metrics, benchmarks, and robust measurement, reporting, and verification processes are needed to access finance. This however results in the implementation of biodiversity markets relying on the use of reductive proxies. Trading biodiversity in one place for another is associated with social and equity issues. Moreover, there have been very few evaluations of offset projects with robust methodologies, and an important criticism is the accuracy of the counterfactual scenarios used to assess biodiversity losses and gains. The literature on biodiversity markets broadly agree that biodiversity offsetting can theoretically enable the implementation of the 'polluter pays' principle. However, given that restoration-related activities are preferred over monetary compensation in offsetting schemes, the principle would be better named 'polluter restores'. Finally, it is very difficult that offsetting covers the full costs to repair and maintain in perpetuity any biodiversity gains, if achieved. The recurrent costs of retaining offset gains in the long-term (over a few decades) are discharged on public authorities, and are often very difficult to estimate due to long-term economic and regulatory uncertainties.

Conclusions for EQ9a

Analysis of application of the PPP across the relevant policies grouped by the 8th EAP priority objectives and policy areas led to the conclusion that there are no significant conflicts between the mutually non-supportive mechanisms used for the application of the PPP. The potential for tensions between the way the PPP is applied within different policies and policy areas is low as these policies generally function in different and separate areas of environmental protection.

Regarding horizontal policies, there are some ELD provisions that are inconsistent, incoherent and/or not clear, leading to a non-effective and non-efficient implementation of the PPP. While these issues have prevented the achievements of the minimum standards consistent with a high level of environmental protection that the ELD sought to establish, it is expected that incoherences in the application of the ELD should decrease over time, as more Member States and competent authorities refer to the clarifications and broader definitions of biodiversity damage and water damage provided in the Commission's guidelines on environmental damage.

Additional coherence issues were identified in relation to instances where policy mechanisms failed to apply the PPP leading to the use of EU funds for covering the cost of clean-up actions. However, the precise extent to which EU funds are financing clean-up activities remains unclear. Nevertheless, examples indicating incoherence in application of the PPP in the context of the use of EU funds include the use of the JTF to support Member States in meeting their obligations of

418 EC (2011). Our Life Insurance, Our Natural Capital: An EU Biodiversity Strategy to 2020, COM(2011) 244. European Commission, Brussel

419 EC (2020). EU Biodiversity Strategy for 2030. Bringing nature back into our lives. COM(2020) 380 final. European Commission, Brussels.

the Emissions Trading Scheme Directive and the use of several EU funds in contradiction with the Waste FD (analysis included for EQ 3b). Further issues impacting on coherence were found in relationship to EHS (analysis included for EQ 3a).

Findings related to consistency of application of the PPP across policies in scope concern lower degrees of application of the PPP in the mechanisms intended to internalise costs for environmental damage in comparison to higher degrees of application for the pollution prevention and control and medium application for administrative measures. This finding is consistent with the identified failure in the legal framework for liability through the ELD which to certain extent fails to prevent and remedy environmental damage. Additionally, the PPP is inconsistently applied across different policy areas. It is found to be overall well applied in the policy areas of climate change and waste, while its application is less successful in the policy areas of nature, biodiversity, soil, water, air and noise.

Finally, coherence and consistency issues were identified where there is a significant degree of Member State choice in implementation of the PPP, for instance, the differences in how Member States interpret the term 'significant damage'[420] to biodiversity which has consequences on liability in the context of the application of the ELD (for more examples see 5.2.1.3).

5.5.1.2. Stakeholder feedback for EQ9

Do not cite draft

As part of the public consultation, stakeholders were asked if the PPP is coherently and consistently implemented in relevant policies and strategies at the MS level, environmental policies and mechanisms at the MS level as well as in relevant policies and strategies at the EU level.

Respondents expressed overall dissatisfaction with the coherency and consistency of implementation of the PPP in various areas. The majority disagreed regarding its coherent and consistent implementation at Member State (MS) and European Union (EU) levels, both in relevant policies/strategies and environmental policies/mechanisms. For MS-level policies, 55-66% of business entities, EU citizens, and NGOs disagreed, while at the EU level, 50-58% disagreed. Additionally, respondents were more inclined to disagree than agree on the PPP's application across trade agreements (42% vs. 6%), with 36% expressing uncertainty. This lack of awareness may be due to the diverse backgrounds of respondents and their varying levels of involvement with trade agreements.

The interview respondents highlighted the following as **coherence issues** – environmentally harmful subsidies and the use of public funds to tackle environmental pollution that should be paid for by polluters. The interviewees claimed that some policies at the EU level enabled **environmentally harmful subsidies (EHS)** that conflicted with the PPP and mentioned diverse instances of what they considered such subsidies. For instance, some of them treated subsidies to farmers under agricultural policies (especially, Common Agricultural Policy – CAP) as EHS, while others highlighted EHS in the field of energy and fossil fuels. Some respondents emphasised that the **use of EU funds (e.g., through various funding mechanisms) to cover the costs to be paid by the polluters** contradicted PPP.

420 Significant damage' – some MS consider the value of the damage caused, e.g., Czech Republic sets significant damage at €20,000 whilst Austrian law considers the ecological impact of the damage caused, Interim report, p129

5.5.2. EQ10. The extent to which the application of the PPP is consistent and coherent outside the EU

This question examines EU activities aimed at addressing the costs of pollution outside the EU's borders as a result of its economic activity, as well as those activities which seek to encourage application of the PPP in third countries. This exercise is divided into two components. The first one (EQ10a) seeks to identify costs located in third countries resulting from EU economic activity and the extent to which these are addressed by EU policies through the application of the PPP. The second one (EQ10b) is concerned with different modalities of EU external action aimed at strengthening the application of the PPP in third countries. This is in line with the EU's declared commitment to achieve a world where pollution is reduced to levels that are no longer harmful to human health and natural ecosystems, whilst respecting our planetary boundaries, by 2050[421]. In addition, an overview of application of the PPP through green taxation instruments in non-OECD countries[422] is included. This provides insight into the state of implementation of the PPP through this type of market-based instrument in third countries and associated lessons learned.

5.5.2.1. EQ10a What environmental costs are being triggered outside the EU by the EU economic activity and to what extent are those being addressed by EU policies through application of the PPP?

Working draft

Assessing the coherence of EU application of the PPP in the international context involves ascertaining the effects of the PPP on potential reduction of pollution and associated environmental costs triggered outside the EU by its economic activity. This entails establishing what pollution is caused by the EU outside its borders and if this pollution is addressed by EU's policies through the application of the PPP implemented within the EU.

According to the OECD guidelines (2008) for products traded internationally, governments are expected to seek common standards for polluting products and establish procedures for checking conformity to product standards for the purposes of environmental control. The standards should be mutually agreed between importing and exporting countries. Their implementation should be coordinated to avoid any impact leading to distortion of trade or introduction of compensating import levies or export rebates designed to offset the consequences of these differences on prices.

Key finding(s)	Robustness
Only a **few policies applying the PPP in the EU contain measures that impact pollution outside its borders**. More evidence is needed to assess how these measures contribute to reduction of pollution abroad caused by EU's economic activity.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	WIP	YES

421 Available at Environment | EEAS (europa.eu)

422 Overview of application of the PPP through green taxation instruments in non-OECD countries is included in EQ10b and is based on the report provided by the client and advised to be used as the main source. European Commission (2023): Green taxation in non-OECD countries: A review of experiences and lesson learned. Available at: https://foes.de/publikationen/green_taxation_in_non-oecd_countries-KH0323319ENN.pdf

Pollution outside the EU

Pollution caused by EU's economic activity outside its borders is a broad topic which requires detailed examination beyond the scope of this study. However, there are indications that some of the environmental pressures in countries and regions outside the EU may be increased via EU consumption. A study by Bruckner et al. (2023)[423] suggested that, in the studied timeframe (1995-2019), environmental pressures associated with EU consumption generally decreased within the EU, but rose outside its borders. While this study did not assess pressures in terms of costs incurred, these can be inferred. As these pressures reflect displacement and indirect effects in third countries, they are challenging to address directly through PPP application within the EU. However, the introduction of CBAM may allow the mitigation of third-country environmental pressures related to production of carbon-intensive imports for EU consumption.

A different assessment of environmental impacts is measured by the Global Commons Stewardship Index, which includes international impacts through consumption and trade (spillover effects), on aerosol emissions, GHG emissions, biodiversity loss in terrestrial and marine biomes, and disruptions to the water and nutrient cycles[424]. The EU's impact on the 2022 GCS index was rated as extremely negative, and headed in the wrong direction based on five-year growth trends (see Table 2 of the reference).

Another case of polluting impacts of the EU on third countries is noted for diffuse pollution to the Arctic region, which is not wholly governed by any one entity, and is particularly vulnerable to long-range pollution due to its location. A report[425] for the European Commission by the EPRD Office for Economic Policy and Regional Development Ltd. consortium assessed such impacts. It noted that "the EU is responsible for around 36% of Arctic deposition of black carbon, which speeds up the warming of the Arctic, the melting of snow and ice surfaces, and is a harmful air pollutant. Black carbon is transported by air into the Arctic via wind patterns together with other pollutants. The European continent as a whole contributes 30-40% of persistent organic pollutants transported into the Arctic region. The EU-27 together with the UK, Turkey and Western Balkan countries make up 8% of Arctic mercury pollution."[426] The report also notes that the EU is likely to be a substantial source of macro and micro-plastic pollution to the Arctic, because of the motion of the Gulf Stream. Black carbon is regulated through the NEC Directive, although some analysts have called for further EU regulation in light of its particularly harmful properties[427]; it is a target of Action 27 in the Zero Pollution Action Plan (see EQ10b, below). Ship air emissions are also a source of black carbon, and those emitted outside the EU are not currently regulated at the EU level, although MARPOL has a wide scope of pollution including air pollution. As noted elsewhere, noise, sewage and marine litter are also not adequately addressed by the current Ship-source Pollution Directive.

As well as the diffuse pollution exerting ecotoxic pressures on areas outside the EU's borders, EU-consumed or exported products and waste may have harmful and toxic impacts in third

423 Bruckner, B., Shan, Y., Prell, C. et al. Ecologically unequal exchanges driven by EU consumption. Nat Sustain 6, 587–598 (2023). Abstract available at https://doi.org/10.1038/s41893-022-01055-8 on 7 February 2024.

424 SDSN, Yale Center for Environmental Law & Policy, and Center for Global Commons at the University of Tokyo. 2023. Global Commons Stewardship Index 2022. Paris; New Haven, CT; and Tokyo. Available at https://s3.amazonaws.com/sustainabledevelopment.report/2023/2022-global-commons-stewardship-index.pdf on 8 December 2023

425 EPRD Consortium (2021) Overview of EU actions in the Arctic and their impact: Final Report. Available at https://eprd.pl/wp-content/uploads/2021/06/EU-Policy-Arctic-Impact-Overview-Final-Report.pdf on 27 September 2023

426 EPRD Consortium (2021) Overview of EU actions in the Arctic and their impact: Final Report. Available at https://eprd.pl/wp-content/uploads/2021/06/EU-Policy-Arctic-Impact-Overview-Final-Report.pdf on 27 September 2023

427 Šipka S et al (2023) Towards a cleaner air in Europe: Time for a stronger vision and more action. European Policy Centre Discussion Paper: Sustainable Europe Programme. Available at https://www.epc.eu/content/PDF/2023/Clean_Air_DP_-_06_July_2023.pdf on 18 October 2023

countries. Further analysis focuses on identifying those EU policies that include application of the PPP in a way that has an impact on reduction of such external pollution.

EU Zero Pollution Action Plan

The EU Action Plan: "Towards Zero Pollution for Air, Water and Soil"[428] (Zero Pollution Action Plan) adopted by the Commission on May 12, 2021, sets out a vision to achieve a world, where pollution is reduced to levels that are no longer harmful to human health and natural ecosystems, whilst respecting our planetary boundaries, by 2050 in line with the EGD.

In the section 3.3. of the Zero Pollution Action Plan titled 'Promoting worldwide change for zero pollution' it is acknowledged that pollution does not stop at borders and that the EU will thus promote the zero-pollution ambition for a toxic-free environment in its external action, including its Green Deal diplomacy and investments, providing expertise and financial resources to scale up international partnerships and action in and with third countries.

The Zero Pollution Action Plan lists various types of activities aimed at reducing pollution inside and outside its borders in the framework of its external action including e.g. cooperation with enlargement partners and neighbours on pollution challenges, international cooperation and collaboration in relevant international fora, encouraging partner countries to improve their policy and regulatory frameworks and put in place the right incentives to reduce pollution, notably through the use of green budgeting and environmental taxes. According to the Zero Pollution Action Plan the EU will at multilateral level continue supporting implementation of the PPP, continue leading on the work for an ambitious post-2020 international framework for the sound management of chemicals and waste, enhance actions under the Basel, Rotterdam, Stockholm and Minamata Conventions on waste electric and electronic equipment, hazardous chemicals, persistent organic pollutants, and mercury and promote a global agreement on plastic.

Amongst the variety of actions aimed at reducing pollution worldwide there are certain specific policies that are expected to be adopted by the Commission which will include application of the PPP within the EU that will have impact on the reduction of pollution outside its borders and thus internalisation of environmental costs triggered by the EU's economic activity abroad. Restriction of export of hazardous waste is already applied through the Waste Shipments Regulation[429] which implements the obligations of the Basel Convention (1989) on the control of transboundary movements of hazardous wastes and their disposal[430]. Furthermore, the Commission adopted proposal for a new regulation on waste shipments containing stricter rules on the export of waste to non-OECD countries and improvements of monitoring and enforcement of rules on waste exports to OECD countries.

428 European Commission (2021): EU Action Plan: Towards Zero Pollution for Air, Water and Soil. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0400&qid=1623311742827

429 Waste Shipments Regulation (EC) No 1013/2006. Available: EUR-Lex - 02006R1013-20210111 - EN - EUR-Lex (europa.eu)

430 Basel Convention > The Convention > Overview > Text of the Convention

One of the nine flagship initiatives and actions of the Zero Pollution Action Plan – '*Flagship 8 – Minimising the EU's external pollution footprint'*, which is the Flagship initiative for the group of actions aimed at promoting worldwide change for zero pollution (part of the Zero Pollution Action Plan dedicated to the international context), contains measures which include application of the PPP domestically with expected impacts outside the EU's borders.

> The Flagship 8 states:
>
> "*As of 2021, the Commission will promote global zero pollution in all relevant international fora and work with the EU Member States and stakeholders to significantly reduce the EU's external pollution footprint, notably by proposing, in line with EU international commitments, to restrict the export of certain products which are no longer allowed in the EU market, and wastes that have harmful environmental impacts in third countries (such as subjecting plastic waste and electrical and electronic waste to the controls and restrictions of the UN Basel Convention). This will ultimately reduce EU global pollution footprint and benefit third-country citizens' health and environment."*

The status of the Flagship 8 initiative is *'Ongoing (advanced)'*[431] and the activities for its fulfilment which are relevant in terms of application of the PPP within the EU include the proposal for a revised Waste Shipment Regulation which looks at the rules governing the EU when exporting waste, in line with the international rules. Additionally, this includes the ongoing activities under the UN Basel Convention on environmentally sound management of waste lead acid batteries where the Commission is an active member of the Small Intersessional Working Group that will prepare guidelines on waste lead acid batteries[432].

The Zero Pollution Action Plan notes that the EU will undertake multilateral action to promote a global agreement on plastics. Negotiations on the new international legally binding instrument on plastic pollution including in the marine environment, and a Science Policy Panel for Chemicals, Waste, and Pollution are ongoing.

Proposal for a new regulation on waste shipments

The Waste Shipment Regulation is an example of a policy which implements the PPP in the EU resulting in reduction of EU's environmental impact outside its borders.

The Waste Shipments Regulation[433] implements the obligations of the Basel Convention (1989) on the control of transboundary movements of hazardous wastes and their disposal[434] and transposes provisions of the OECD decision (2001) establishing a control system for waste shipments for recovery within the OECD area[435]. It prohibits shipments of hazardous waste and waste destined for disposal to non-OECD countries outside the EU. For shipments to OECD countries, they are generally subject to the prior notification and consent procedure which requires the prior written consent of all relevant authorities of dispatch, transit and destination.

431 Available at: Actions (europa.eu)

432 UN, Basel Convention, Comments on the technical guidelines following the OEWG-12 online segment by 30 November 2020. Available: WLAB (basel.int)

433 Waste Shipments Regulation (EC) No 1013/2006. Available: EUR-Lex - 02006R1013-20210111 - EN - EUR-Lex (europa.eu)

434 Basel Convention > The Convention > Overview > Text of the Convention

435 The OECD Control System for waste recovery. Available: The OECD Control System for waste recovery - OECD

Implementation of the PPP through the Waste Shipments Regulation which is currently in force targets producers, distributors and end-users of waste and applies the PPP at a high degree with respect to all three cost categories, namely pollution prevention and control, administrative and enforcement and costs of environmental damage, which are largely met by the targeted polluters.

The Commission adopted a proposal for a new Regulation on waste shipments[436] on 17 November 2021. The proposal aimed to establish new rules for EU waste exports, making it easier to transport waste for recycling or re-use in the EU and setting out new measures to better tackle illegal waste shipments.

The key actions in the proposal are expected to strengthen the degree of application of the PPP. It involves stricter rules on the export of waste to non-OECD countries, improvements of monitoring and enforcement of rules on waste exports to OECD countries to ensure they manage waste in an environmentally sound manner. In particular, it obliges all EU companies that export waste outside the EU to ensure that the facilities receiving their waste are subject to an independent audit. This means more internalisation of environmental costs met by the economic operators. This is also the case with establishing stricter conditions for shipments for landfilling or incineration (so that they are only authorised in limited and well-justified cases), and more indirectly with strengthening current rules on administrative penalties against illegal shipments of waste to increase deterrence and stepping up action on waste trafficking. The Commission will support investigations by Member States on transnational crime linked to waste trafficking, with the support of the EU Anti-Fraud Office (OLAF).

Conclusions for EQ10a

Drawing together findings, it appears that EU economic activity can be associated with negative impacts linked to pollution in third countries. This environmental damage is only addressed by the PPP to a limited extent, although there does not appear to be a significant difference in degree of application compared to environmental damage in the EU. Steps are being taken to address this gap including through the Zero Pollution Action Plan and individual policies such as CBAM.

In terms of EU's external pollution caused by the export of products and wastes, this is only partially addressed, primarily through the Waste Shipment Regulation and the proposal for a new regulation on waste shipments. Restriction of the export of certain products which are no longer allowed in the EU market, and some of the wastes that have harmful environmental impacts in third countries (such as subjecting plastic waste and electrical and electronic waste to the controls and restrictions of the UN Basel Convention) is yet to be implemented as a part of one of the initiatives of the Zero Pollution Action Plan (Flagship 8 initiative)[437]. Thus, the application of the PPP in policies that would prevent negative impacts outside EU's borders through export restriction measures is currently limited to the Waste Shipment Regulation. Nevertheless, a number of policies[438] not primarily aimed at addressing environmental damage in third countries contribute to limiting such damage through application of the PPP for prevention and control, as well as for administrative costs in the EU.

Diffuse transboundary pollution exerting ecotoxic pressures on areas outside the EU's borders caused by the EU's economic activity as a form of cross-border pollution is primarily addressed by the policies included in the policy areas of air quality, water quality, chemicals risk

436 Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on shipments of waste and amending Regulations (EU) No 1257/2013 and (EU) No 2020/1056. Available: Proposal for a new regulation on waste shipments (europa.eu)

437 Zero Pollution Action Plan status of implementation. Available at: Actions - European Commission (europa.eu)

438 Primarily policies contributing to the 8th EOP objectives of accelerating transition to circular economy and zero pollution.

management and climate change. The degree to which the application of the PPP in these policy areas prevents external transboundary pollution caused by the EU's economy and internalises the costs associated with it is the same in which this is being achieved within the EU and this is covered in other relevant evaluation questions in this study. The EU's approach to transboundary pollution involves a combination of legislation, cross-border cooperation, emission reduction targets, monitoring, and international collaboration to address environmental challenges that transcend national boundaries.

Overall, limited information was identified on the role of the EU in producing, and limiting, pollution in third countries caused by its economic activities. However, while problems with exporting EU pollution to other countries were noted and continue, as described in the EPRD report[439], that report also notes that EU policy efforts have reduced this negative impact, and that more ambitious policies could do so further. Policy initiatives noted in this study also support this conclusion.

5.5.2.2. EQ10b Is the PPP applied outside the EU, and is this supported by EU interventions?

Analysis for EQ1d shows that environmental tax revenue is a principal source of revenue generated for environmental protection by Member States. Accordingly, a targeted review was undertaken to identify examples of how the PPP is applied outside the EU based on existing evidence reviews for the report on green taxation in non-OECD countries.

To further explore the extent of application of the PPP outside the EU and to show how the EU efforts in the climate change policy area fit into the wider global context, we reviewed OECD analysis of effective carbon prices in different countries published in the Effective Carbon Rates 2023 report[440]. This provides insights into global carbon pricing, covering fuel excise taxes, carbon taxes, and emissions trading systems up to 2023.

The Zero Pollution Action Plan (primarily the section on promoting worldwide change for zero pollution) was also reviewed. This focussed on the implementation status for key actions to establish the extent the environmental diplomacy of the EU is engaged in reducing pollution at source outside its borders through strengthening of the PPP application in third countries.

Key finding(s)	Robustness
The assessment focusses on the use of **green taxation instruments in non OECD Countries, where the PPP is generally applied at a low degree**..	Strong
Carbon pricing is gaining momentum worldwide and explicit carbon pricing instruments are assuming an increasingly important role. ETSs are progressively expanding in countries where they are already established and being introduced in new countries.	Strong
More evidence is required to establish the extent to which the environmental diplomacy of the EU is engaged and is achieving a reduction of pollution at source outside its borders through strengthening of the PPP application in third countries.	Strong

439 EPRD Consortium (2021) Overview of EU actions in the Arctic and their impact: Final Report. Available at https://eprd.pl/wp-content/uploads/2021/06/EU-Policy-Arctic-Impact-Overview-Final-Report.pdf on 27 September 2023

440 Effective Carbon Rates 2023 Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading, OECD. Available at Effective Carbon Rates 2023 : Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading | OECD iLibrary (oecd-ilibrary.org)

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	Yes	WIP	YES

Application of the PPP outside the EU through green taxation in non-OECD countries

The analysis for EQ10b focusses on a report from the European Commission titled "Green taxation in non-OECD countries: a review of experience and lessons learned"[441]. The report was commissioned to address a lack of information on environmental taxes in non-OECD countries, beyond those that focus on carbon intensive energy production. Within the report, the results of a literature review are outlined and there are also five "deep dives" which examine environmental tax instruments in: Ghana, Guyana, Morocco, Vietnam, and Zambia. The report has a total of eight lessons and recommendations. These are:

- Quantitative and qualitative information on specific environmental taxes in non-OECD countries is limited;
- Fiscal regimes in non-OECD countries fail to tackle environmental challenges;
- Design of environmental taxes in non-OECD countries often deviates from best practice;
- Environmental effectiveness is often limited due to low tax rates;
- Good tax governance designs taxes to minimise administration costs and tax evasion and close loopholes;
- Understand and address equity impacts;
- Rectify misalignment of revenue and expenditure; and
- Domestic revenue mobilisation is possible and feasible using environmental taxes.

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These built on a literature review of non-OECD countries. The polluter pays principle is mentioned explicitly in two of the case study countries; namely Mongolia and Zambia. Overall, the report states that many opportunities are being missed to make the polluter pay. This is due to numerous green tax instruments being too low to internalise the external costs of pollution or to incentivise pollution reductions. Furthermore, many non-OECD countries tend also to tax transport fuels for passenger vehicles, but this is viewed as a revenue raising instrument with environmental benefits being secondary.

Table 4-26 analyses the application of the PPP in a limited number of non-OECD countries. This is carried out according to the White-Red-Amber-Green rating that is outlined in the overall Introduction to this report. Overall, environmental taxes are seen as revenue raising measures as they are often far too low to internalise the environmental damage and the funds raised are rarely used to protect the environment. The use of the funds raised from these measures is often unclear, with only two of the environmental taxes raising money that goes into funds explicitly designated for environmental purposes.

441 European Commission (2023): Green taxation in non-OECD countries: A review of experiences and lesson learned. Available at: https://foes.de/publikationen/green_taxation_in_non-oecd_countries-KH0323319ENN.pdf

Table 4-26: Application of PPP in non-OECD countries

Country	Policy	Description	Cost categories addressed in each policy and who pays		
			Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
Mongolia	Water Pollution Fee law (2019)	A fee is levied on water polluters. The level of pollution is set in each river basin according to the Mongolian parliament	A direct fee is levied on water polluters according to a level in each river basin by parliament. The law seeks to reduce pollution by incentivising wastewater treatment	There is little data and monitoring of pollutant emissions and it is unclear if fee covers administrative and enforcement costs	It is unclear if the costs of any environmental damage would be sufficiently covered by the law due to the low level of the fee.
Ghana	Hazardous and Electronic Waste Control and Management Act (2016)	An e-waste levy is collected at the point of import with the revenue transferred to a fund	The cost of the levy is borne by importers of the e-waste making it more expensive for them thus reducing the amount of electric waste that goes into landfill	The fund is meant to help with the administration and enforcement however there are no public records on if this does take place or on the overall costs.	The fund created from the levy does not help with the costs of environmental damage
Guyana	Environmental levy on beverage containers (2017)	Per unit tax on non-returnable beverage containers. It is levied both on imports and for domestic manufacturers	The levy is designed to reduce plastic pollution by increasing the cost of non-returnable beverage containers. The cost is borne by polluters but is likely passed on to consumers	The tax is effectively enforced however there is little knowledge of the tax's environmental goals and a "throw away" culture persists in Guyana	Revenues show that the number of non-returnable beverage containers consumed per capita is growing therefore the cost is not likely to be high enough to internalise environmental damage
Morocco	Ecotax on plastics (2014)	Tax on the sale, manufacture and import of plastics or products made of plastic materials	The tax reduces plastic pollution by adding additional cost on plastic materials. The cost of the levy is paid for by polluters however it is likely that a large amount of this cost is passed on to the consumer	There is generally a weak enforcement of environmental taxation and there are other regulations that create inconsistencies	Part of the revenue from the levy goes into an environmental fund however it is not clear how much and there is a general lack of transparency on revenue and uses
Vietnam	Environmental Protection Tax (2012)	Broad-based environmental tax primarily	The law is wide-ranging and covers numerous taxes. Only	The tax is successfully enforced and is well designed allowing for	The tax is viewed as being too low to

Country	Policy	Description	Cost categories addressed in each policy and who pays		
			Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		paid for by consumers targeting a range of polluting products	some of them lead to pollution prevention and the law is widely seen as a revenue raising measure rather than environmental	adjustments in tax rates depending on the environmental and economic conditions	actually reflect the cost of pollution
Zambia	Mineral Royalty Tax (2016)	Levy on minerals which moves on a sliding scale according to international copper prices. Paid by companies that extract minerals	The MRT is levied on polluters however it does not disincentivise pollution as there is no additional cost for greater pollution as it is levied on the price of minerals not pollution levels	The MRT is frequently adjusted making it an unreliable source of revenue	Revenues from this tax are not used to pay for any environmental damage caused by mining
Niger	Household Energy Strategy (1992)	Tax imposes variable tax rates on locally produced wood and timber by species. Paid by lumber organisations	The tax incentivises environmentally sustainable forestry practices	There is a lack of information on administration and enforcement but field research showed that the tax had a positive environmental impact	Field research showed that the tax did successfully encourage ecologically sustainable forestry
Ecuador	Environmental Tax on vehicle Pollution (2012-2019)	Tax paid by consumers which was created incentives for the purchase of cleaner vehicles through taxation on engine size and vehicle age	The tax was effective in preventing pollution as it led to an increase in the purchase of smaller vehicles	The tax was effectively administered and there were numerous measures to ensure it was not regressive	The tax was removed in 2019, as the government of Ecuador stated it was environmentally ineffective however experts disagreed
Peru	Environmental harmfulness index (ISC) (2006)	Consumption tax on the import, production, and sale of goods that generates various negative externalities for society. Paid by importers	The ISC targets the most environmentally harmful pollutants for which is imposes higher taxes	It is unclear who pays for the administration of the tax	Modelling shows that the ISC will reduce air pollution in the future as the rates will increase
Kenya	Fuel excise duty	Excise duty is paid on fuel with a higher burden placed on wealthier	Higher tax rates are applied on those who use up more fuel thus incentivising lower usage	It is unclear who pays for the administration of the tax but there has been significant pressure to reduce it	Fuel consumption and transport emissions have increased between 2006 and 2017 so it has been ineffective in reducing

Country	Policy	Description	Cost categories addressed in each policy and who pays		
			Pollution prevention and control	Administrative and enforcement	Costs of environmental damage
		households. Paid by consumers			environmental damage
Indonesia	Luxury tax on vehicles (2009)	Tax applies varying rates depending on the engine size of the vehicle. It is unclear who initially pays the tax but cost is likely to be passed on to the consumer	The tax has been criticized for incentivising car purchases which has led to greater traffic volumes and congestion	It is unclear who pays for the administration of the tax	The tax imposes a greater cost on the most polluting vehicles which reflects their environmental impact
Mauritius	Maurice Ile Durable (MID) Levy (2008)	Environmental tax on petroleum products, aviation, and coal. Tax paid by companies	The tax does seek to prevent pollution and is effectively targeted in this area	Proceeds from the fund go straight into the MID fund has been used to finance energy efficiency and clean energy	The tax is viewed as a success and has led to positive environmental impacts

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Table 4-26: Application of PPP in non-OECD countries shows, the PPP is applied inconsistently in non-OECD countries. There are several countries, such as Mongolia and Morocco, that place PPP at the centre of their environmental laws but there are issues when it comes to enforcement. For the vast majority of the countries in the table, it is unclear where the proceeds from the taxes go with only Ghana, Guyana and Mauritius explicitly using the proceeds for environmental funds. According to the OECD report, one of the key issues is that environmental taxes are primarily viewed as revenue raising instruments, rather than environmental measures. This means that they are not set high enough to internalise the cost to the environment.

Focusing more specifically on the example countries in the report, Mongolia has implemented water pollution fees built on the principle of the polluter paying. A 2019 law sought to increase revenue and to encourage wastewater treatment at the source of pollution. The 2019 law was enacted due to a similar 2012 law not leading to the desired results. Increased revenue and reduced pollution was achieved through a mix of discharge permits and use of estimates on water pollution in wastewater. Furthermore, the rate of water pollution fees is determined by the Mongolian parliament for each river basin on the basis of the "ecological-economic evaluation". There is little data and monitoring of pollutant emissions, however the fee is expected to prevent discharge of over 61 million cubic metres of effluent into the Tuul River, and the fees have already catalysed innovation in small-scale wastewater treatment systems. The example in Mongolia is built on the polluter pays principle as the underlying principle which is explicitly referred to and is likely to lead to reduced water pollution. However, it is unclear what the revenue from the fund is used for.

In Zambia there is a legal framework for the polluter pays principle, as it is enshrined in the Environmental Management Act of 2011. However, only a few green taxation measures have been implemented to enforce it. For example, a flat tax is levied on the import of vehicles that are older than five years due to the issues associated with the importing of high-polluting second-hand cars. However, the measure is criticised as it is viewed as a revenue raising measure as the import duty is too low to disincentivize the import of older vehicles and the revenue raised is not spent on environmental measures. Another environmental protection measure stipulates that mining companies in Zambia are required to transfer money to the Environmental Protection Fund so that that funds are available if remedial action is required. This is not a tax as such and, unless remedial action has been taken, all payments are returned upon the expiry of a mining license or permit.

Zambia has climate targets in the medium term to reach a 25% GHG emissions reduction by 2030 based on a business-as-usual scenario. The report states that Zambia needs to review its fiscal policy framework to achieve set targets as it currently spends 0.6% of its GDP on environmental protection. Of this percentage, 26% is financed by government spending with the rest coming from international donors.

Zambia currently charges a Mining Royalty Tax (MRT) on a variety of materials in addition to corporate income tax. The MRT is payable on copper, cobalt and vanadium, base metals, precious metals, gemstones, energy minerals, and industrial minerals. The MRT is charged as a percentage of their value (typically 5-8%). However, for copper the rate is adjusted according to the international commodity prices, therefore varying between 4% and 10%. This allows the government of Zambia to receive greater tax revenue when copper prices are higher. However, the frequent adjustments in price have led to an erosion of trust between the government and the private sector. A more stable mining taxation framework would allow greater government revenue and would incentivise private sector investment. Furthermore, there are no fiscal instruments in Zambia that target the environmental damage associated with mining. This is despite mining leading to air pollution, soil acidification, and metal pollution. The report is not specific on what taxes could be implemented but it does state that technology could be installed to improve monitoring.

The report also analysed the use of green levies in Guyana. Data from the OECD[442] shows that revenue from environmental taxes play an important role in Guyana. However, over time they have decreased as a percentage of total tax revenue from 13% or 2.8% of GDP. This is due to the relatively high recent rate of economic growth in Guyana. Environmental taxes in Guyana cover a variety of areas, such as:

- An environmental levy on beverage containers;
- A withholding tax on gold miners;
- Capital gains on vehicle transfer;
- Purchase taxes on vehicles differentiated by engine capacity;
  A travel voucher tax levied at a rate of 15% of an airline ticket price (minimum tax payableGYD 500);
- Import duties (45% on motor vehicles); and
- Export duties, and consumption taxes on oil imports (50%).

However, the wider context must be noted. Recent economic growth rates are driven by recently discovered oil and gas reserves that are currently being exploited. These reserves are vast and

442 European Commission (2023): Green taxation in non-OECD countries: A review of experiences and lesson learned. Available at: https://foes.de/publikationen/green_taxation_in_non-oecd_countries-KH0323319ENN.pdf

amongst the highest per capita in the world. In 2020, Guyana's GDP grew by 43.5%. However, in the same year non-oil GDP shrank by 7.3% primarily due to the covid-19 pandemic. To ensure that this oil wealth does not lead to volatile public spending, the Government of Guyana created the Natural Resource Fund (NRF) in 2021 that will collect oil-related revenues on royalties, the government's share of oil and gas profits, petroleum income tax, bonuses and other fiscal instruments solely levied on oil & gas production. The NRF will also seek to ensure that future generations benefit from the wealth generated by oil & gas and for the sustainable development of the country.

Guyana has a variety of environmental taxes in place, however none of them place an emphasis on making the polluter pay. The cost is generally borne by the consumer, such as with the levy on beverage containers and variable purchase taxes depending on engine sizes. Furthermore, Guyana's rapidly growing fossil fuel sector means that the most effective measures to make the polluter pay would have to be implemented in this area both environmentally and economically. However, any levies will likely not be high enough to internalise the environmental cost as the government will likely want to take advantage of increasing fossil fuel related revenues.

OECD analyses of effective carbon prices in different countries

To explore the extent of application of the PPP outside the EU and to show how the EU efforts in the climate change policy area fit into the wider global context, we also reviewed OECD analysis of effective carbon prices in different countries.

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The key findings on the application of the PPP in the policy area of climate change in the EU demonstrate that the PPP is well applied in this policy area. The evidence shows its application has led to a price signal which has contributed to the reduction in pollution over the appraisal period.

The Effective Carbon Rates 2023 report[443] provides insights into global carbon pricing, covering fuel excise taxes, carbon taxes, and emissions trading systems up to 2023. It analyses 72 countries, responsible for 80% of global GHG emissions in 2021, ensuring comparability through a standardized methodology. The report underscores the importance of comprehensive and comparable information for policymakers to enhance carbon mitigation strategies.

Key findings reveal that in 2021, 58% of 40 billion tonnes of GHG emissions were unpriced. About 16% of emissions were priced at EUR 30 per tonne of CO_2 or more, with 7% exceeding EUR 60. Carbon pricing coverage varies across sectors, with fuel excise taxes playing a significant role. Emissions trading remains the primary explicit carbon pricing instrument.

Despite challenges, such as the energy crisis and geopolitical events impacting policy responses, the report notes positive trends. ETS coverage increased globally, with notable developments in China and Canada. ETS permit prices rose, indicating resilience amid the energy crisis. However, disparities persist, with over half of global emissions still unpriced.

The report emphasizes the need for targeted approaches to maintain carbon price signals amidst external shocks. Long-term solutions require investments in energy efficiency, low-carbon technologies, and addressing emissions from non-CO_2 gases.

443 Effective Carbon Rates 2023 Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading, OECD. Available at Effective Carbon Rates 2023 : Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading | OECD iLibrary (oecd-ilibrary.org)

Worldwide, carbon pricing is gaining traction, with explicit carbon pricing instruments playing an increasingly significant role. Emission Trading Systems (ETSs) are expanding both in countries with established systems and those newly adopting them. ETS permit prices have shown robust resilience to the energy crisis, maintaining an upward trend since 2021 in most cases. Despite this momentum, there are notable disparities in carbon pricing coverage and price levels across countries and sectors, leaving over half of global emissions unpriced.

The recent energy crisis led to an unprecedented surge in energy prices, prompting countries to implement support through broad, untargeted measures. These actions, coupled with a stagnation or reduction in nominal fuel and carbon tax rates amid high inflation, have weakened carbon price signals. Building resilience to future shocks and preserving carbon price signals may necessitate a more targeted approach.

Furthermore, addressing emissions from methane, nitrous oxide, fluorinated gases, and process-related CO_2 presents an additional challenge in the years to come.

EU's support for application of the PPP in third countries

The report[444] on green taxation in non-OECD countries does not describe how EU interventions outside its borders support the application of the PPP but does outline possible routes for the EU to engage with green taxation in other countries. For example, it highlights a series of international organisations that the EU could engage with. The authors point to the potential importance of the Coalition of Finance Ministers for Climate Action. This organisation is hosted by the World Bank, and includes 77 countries many of which are based outside of the EU. The group is highly engaged so there is scope to undertake policy dialogue on green taxation amongst the members. The report also points to the work of the African Tax Administration Forum (ATAF) that will produce a handbook on environmental taxation in 2023, which has the aim of delivering guidance that is specifically tailored to the African context. These two forums could be vital in allowing the EU to increase the application of PPP outside of the bloc.

The report stresses the need to collaborate on more in-depth research on green taxes in non-OECD countries. There is currently a lack of information in this area, therefore it would be useful to commission in-depth and comparative reports on environmental taxes in particular countries or regions. These reports would lead to greater knowledge on the effectiveness of environmental taxes in lower- and middle-income countries. This in-turn would feed into national and international policy dialogue. Furthermore, the report stressed the need for the facilitation of greater exchange between countries on innovate green tax designs. Knowledge exchange is particularly important for countries with similar socio-economic constraints.

The EU has ambitions to support the application of the PPP outside of its Member States. This is primarily taking place through the Zero Pollution Action Plan[445]. Part of this plan is to promote worldwide action for zero pollution through a mix of its Green Deal diplomacy and investments, providing expertise and financial resources to scale up partnerships and action in and with third countries. Furthermore, the plan explicitly states that the EU will "continue supporting international action for zero pollution and implementation of the polluter pays principle" through multilateral forums. Alongside the flagships, there are 33 actions that the EU is seeking to carry out. These include, Actions 27 to 30, which are aimed at "promoting worldwide change for Zero Pollution".

444 European Commission (2023): Green taxation in non-OECD countries: A review of experiences and lesson learned. Available at: https://foes.de/publikationen/green_taxation_in_non-oecd_countries-KH0323319ENN.pdf

The actions are inconsistent in terms of their application of the PPP, with none of them placing it centrally despite a scope for potential strengthening of application of the PPP. More specifically:

- Action 27 (implementation status ongoing-advanced): Seeks to advance international cooperation on black carbon policies to reduce climate change impacts and improve air quality. This will be achieved through a review of the Gothenburg Protocol in 2023[446]. There is no mention of the PPP in this action, however it is still in an early stage. The EPRD report on EU actions in the Arctic mentions that possible policy actions to improve the situation include "committing to a common target for black carbon reductions in parallel to the actions of Arctic States in the framework of the Arctic Council Expert Group on Methane and Black Carbon, utilising the Northern Dimension Environmental Partnership towards black carbon work, and bringing the long-range aspect of pollutants more strongly into the EU's regulatory and institutional framework."[447] An ongoing EU project in this area addresses black carbon from wildfires and the possible co-benefits of black carbon and methane emissions reduction, for clean air and climate objectives, to be completed by early 2024[205].

- Action 28 (implementation status ongoing-advanced): Supports global action on the export of end-of-life and used vehicles. This involves collaboration with UNEP through exploration of joint initiatives at the global level by major exporters during 2023 as a follow-up of UNEA5 resolution on Circular Economy that addresses used vehicles and a continuation of UNEP's work, and in preparations for UNEA6 in 2024.

  PPP is part of this particular action as it is mentioned in a proposed EU Regulation on circularity requirements for vehicle design and on management of end-of-life vehicles[448] and is likely to be used in joint initiatives in multilateral forums.

- Action 29 (implementation status ongoing-advanced): Supports initiatives to better monitor and manage international trade for waste electrical and electronic equipment (WEEE) and waste batteries. The PPP is central to this action with clear EU support for its implementation outside the bloc. Activities are ongoing under the UN Basel Convention including the implementation of the recently adopted exporting ban for waste electrical and electronic equipment (WEEE) and the launch of the update of technical guidelines on environmental sound management of waste batteries[449].

- Action 30 (implementation status ongoing-advanced): Support a global initiative to end informal recycling of used lead acid batteries. Main developments under this action include preparation of a workshop on 'Appraisal and Stocktaking of Actions to reduce Lead Poisoning in Low- and Middle-Income Countries' under the leadership of G7. The EU is also involved in UN Basel Convention launch of the update of technical guidelines on environmental sound management of waste lead acid batteries[450].

Conclusions on EQ10b

The extent of application of the PPP outside the EU is a broad topic which requires detailed examination beyond the scope of this study. The application of the PPP worldwide varies between countries and regions while being influenced by national laws, regulations, and

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447 EPRD Consortium (2021) Overview of EU actions in the Arctic and their impact: Final Report. p 8 Available at https://eprd.pl/wp-content/uploads/2021/06/EU-Policy-Arctic-Impact-Overview-Final-Report.pdf on 27 September 2023

448 Proposal for a Regulation on circularity requirements for vehicle design and on management of end-of-life vehicles (europa.eu)

449 Actions (europa.eu)

450 Actions (europa.eu)

international agreements. The PPP is recognised as a fundamental principle in international environmental law, it was included in the United Nations Declaration on Environment and Development (commonly known as the "Rio Declaration[451]") as one of the guiding principles for future sustainable development and many global agreements and conventions explicitly endorse the PPP. However, the implementation of these principles depends on the commitment and capacity of individual nations. Countries with strong environmental governance structures are more likely to incorporate and enforce the PPP in practice.

For the purpose of this study, we focused our analysis on the application of the PPP outside the EU through green taxation instruments in non-OECD countries and through carbon pricing instruments based on the OECD analyses of effective carbon prices in different countries. Taking each in turn:

Green taxation in non-OECD countries

The key findings point to a low degree and highly inconsistent application of the PPP through the use of green taxes in non-OECD countries. There is clearly considerable scope to apply the PPP more rigorously in this group of countries, and to both expand the coverage and enhance the effectiveness of green taxes.

Overall, the extent to which the polluter pay the costs of pollution in non-OECD countries remains low, with the polluter pays principle rarely implemented with many opportunities being missed to make the polluter pay. This is due to numerous green tax instruments being too low to internalise the external costs of pollution or to incentivise pollution reductions. Furthermore, environmental taxes are often seen as revenue raising measures as they are far too low to internalise the environmental damage and the funds raised are rarely used to protect the environment. The use of the funds raised from these measures is unclear, with only few of the environmental taxes raising money that goes into funds explicitly designated for environmental purposes.

Carbon pricing

Carbon pricing is gaining momentum worldwide and explicit carbon pricing instruments are assuming an increasingly important role for the application of the PPP. More specifically, ETSs are progressively expanding in countries where they are already established and being introduced in new countries. ETS permit prices have shown robust resilience to the energy crisis, consistently trending upward in most cases since 2021. Despite this positive momentum, significant variations exist in carbon pricing coverage and price levels across countries and sectors, leaving over half of global emissions without a pricing mechanism.

As for the EU context, the application of the PPP in the policy area of climate change in the EU demonstrate that the PPP is applied to a significant extent in this policy area with evidence showing that the application of the PPP has led to a price signal which has contributed to the reduction in pollution over the appraisal period.

European Union's Support

Regarding the question of EU's support for the application of the PPP outside its borders, the EU, as a proponent of environmental sustainability, declares its commitment for support of the application of the PPP globally through various mechanisms.

451 A/CONF.151/26/Vol.I: Rio Declaration on Environment and Development (un.org)

For example, the EU Action Plan: “Towards Zero Pollution for Air, Water and Soil”[452] (Zero Pollution Action Plan) adopted by the Commission on May 12, 2021, sets out a vision to achieve a world, where pollution is reduced to levels that are no longer harmful to human health and natural ecosystems, whilst respecting our planetary boundaries, by 2050 in line with the EGD. In section 3.3. of the Zero Pollution Action Plan titled ‘Promoting worldwide change for zero pollution’ it is acknowledged that pollution does not stop at borders and that the EU will thus promote the zero-pollution ambition for a toxic-free environment in its external action, including its Green Deal diplomacy and investments, providing expertise and financial resources to scale up international partnerships and action in and with third countries.

On a practical level more evidence is required to establish the extent to which the EU actively engages in international cooperation to promote environmental sustainability, including the PPP and effectively achieves a reduction of pollution at source outside its borders through strengthening of the PPP application in third countries. The EU encourages other countries through diplomatic channels to adopt and implement environmental principles in line with EU standards.

In summary, the application of the PPP outside the EU is diverse, with some countries embracing the principle in their legal frameworks and others having different approaches to environmental governance. The EU aims to support global application of the PPP through international cooperation, development aid, capacity building, and policy dialogues. However, the degree of effectiveness of this support lacks evidence and depends on the willingness of non-EU countries to adopt and implement environmental principles in line with international standards.

5.5.2.3. Stakeholder feedback for EQ10

In the public consultation respondents were asked to assess the impact of the EU implementation of the PPP outside of the EU.

Respondents generally lacked a firm opinion, with 20-30% expressing neutral views and 15-20% choosing 'don't know.' Half of the respondents (50%, 135) believed the EU's PPP implementation had a positive impact on environmental legislation in other developed regions.

Overall, there was no prevailing positive/negative opinion due to a significant number of neutral (22%, 58) or 'don't know' (16%, 43) responses.

In response to Q5, which asked respondents to assess the extent of the effectiveness of the PPP implementation instruments in preventing/reducing environmental pollution caused by human activities, more respondents considered international agreements insufficiently effective/not effective (37%, 97) in preventing/reducing pollution, with a larger group (41%, 108) expressing uncertainty or neutrality. This suggests a lack of awareness or confidence in the effectiveness of such agreements.

Q6 asked respondents to assess the extent of the effectiveness of the PPP implementation instruments in remedying the remaining environmental pollution caused by human activities and revealed that a substantial number of respondents (16%, 44) were not knowledgeable enough to judge or were neutral (22%, 60) about the effectiveness of PPP implementation instruments in

452 European Commission (2021): EU Action Plan: Towards Zero Pollution for Air, Water and Soil. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0400&qid=1623311742827

remedying remaining environmental pollution. This indicates a general lack of confidence or awareness regarding the efficacy of international agreements in addressing pollution.

Some interview respondents highlighted that through the PPP implementation the **EU has been extending its influence on environmental policies on a global scale**.

Regarding the EQ10a, it should be noted that there is a support from members of European Parliament for stronger legislation on the export of plastic waste to non-OECD countries, such that this would be banned and phased out within four years[453].

5.6. EU added value

Under the principle of subsidiarity (Article 5 of the TFEU), the EU should only act when the objectives can be better achieved by EU level action rather than Member State action. This criterion assesses the extent to which the application of the PPP in EU policy is consistent with the principle of subsidiarity.

In answering these questions we reviewed the following:

- The risks to applying the PPP in the absence of EU level action
- The extent to which EU policy has enabled Member States to apply the PPP to address the costs of pollution
- The extent to which EU level action and/ or national level action is contributing to examples of efficient and effective implementation of the PPP
- The extent to which EU level action could further contribute to efficient and effective implementation of the PPP

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Points of comparison: The points of comparison focus on how the PPP is integrated into environmental legislation as regards references to the PPP in the legal provisions and the policy mechanisms used to apply the PPP.

5.6.1. EQ11. Is the current split of responsibilities between the EU and Member States for the PPP the right split?

5.6.1.1. EQ11a. In the absence of EU level action, to what extent would Member States be able to apply the PPP?

To answer this question, a review was undertaken of the policies where Member States have a significant degree of choice in how they implement the PPP (identified for EQ1c). Conclusion are drawn on the risks associated with Member State implementation of the PPP in the absence of EU action. The analysis, presented in the following sections by Priority Objective, draws on impact assessment and evaluation studies, and input from stakeholders.

Key finding(s)	Robustness
There are risks for the application of the PPP in the absence of EU policy, which has led to more consistent implementation in Member States with positive implications for competition in the internal market.	Medium

453 European Parliament (2023). Available at https://www.europarl.europa.eu/news/en/press-room/20230113IPR66627/waste-shipments-meps-push-for-tighter-eu-rules on 27 September 2023

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Climate change

Overall, application of the PPP as regards policies for this Priority Objective is predominantly driven by EU intervention; EQ1c identified the Energy Taxation Directive as using policy provisions that have enabled Member States to apply the PPP via measures adopted at national level. The Energy Taxation Directive establishes a framework for the taxation of energy products, whilst leaving taxation specificities to Member States. However, the degree of Member State choice is reduced to some extent by the minimum rates of excise duty set out in the Directive applicable across the EU.

An evaluation of the Energy Taxation Directive was undertaken in 2019[454]. The study highlights an optional exemption on biofuels made in Article 16 of the Directive, which has enabled Member States to adopt preferential tax rates for unsustainable biofuels. Similar exemptions are made for fuels in the aviation and maritime sectors (Article 14), which the Commission proposed to remove in the revision as part of the Fit for 55 package. The minimum tax rates set out in the Directive are outdated, with most Member States applying rates *"significantly above the minima"*; as such, Member State action is addressing the costs of pollution to a greater extent than is required by EU level intervention. As the Directive uses taxation as the mechanism to address the costs of pollution, the current nationally-driven approach has presented risks in implementing the PPP due to the varied tax rates it has led to across EU Member States. The evaluation highlights that there is value to be gained from EU intervention through a common framework and a *"level of systemisation of product definitions, categories and respective tax rates"*.

Consequently, where flexibility has been afforded to Member States in applying the PPP, there have been risks in ensuring a uniform approach to addressing the costs of pollution between EU Member States.

Transition to a circular economy

Analysis for EQ1c (Section 5.2.1.3) indicated that the Waste FD affords Member States a significant degree of flexibility in the application of the PPP with respect to this priority objective. The Waste FD establishes an overall framework for regulating waste to guide implementation at the national level, thereby leaving the operational details of implementation to Member States, although targets for recycling and recovery set out in the Directive, which are applicable across the EU, establish a uniform level of environmental ambition. The Directive includes targets for household, municipal, and non-hazardous construction and demolition waste.

As regards the targets for municipal waste, a 2023 implementation review by the European Environment Agency (EEA)[455] concluded that 18 Member States are at risk of failing to meet the 2025 target for re-use and recycling owing to technical and infrastructural challenges which are addressed by Member States at local level. These include a lack of separate waste collection systems, and inadequate bio-waste treatment capacity. Implementation of these measures

454 European Commission (2019). Commission Staff Working Document: Evaluation of the Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity. https://taxation-customs.ec.europa.eu/system/files/2019-09/energy-tax-report-2019.pdf

455 EEA (2023). Briefing: Many EU Member States not on track to meet recycling targets for municipal waste and packaging waste. https://www.eea.europa.eu/publications/many-eu-member-states/

requires effective implementation of national or local initiatives that require the polluter to pay. Thus, the challenges identified are indicative of challenges Member States are facing in implementing the PPP under the Waste FD.

Notwithstanding these challenges and the widespread risks of noncompliance with the targets, the review concluded that efforts and initiatives by Member States to implement the Waste FD have resulted in improved separate waste collection systems and improved bio-waste treatment capacities over the course of the implementation of the Waste FD. Thus, where Member States have been able to implement national or local initiatives that require the polluter to pay, the initiatives are effective in delivering environmental improvements.

The varied approaches in implementing the PPP between Member States suggests that the targets in the Waste FD are only partially effective in ensuring a minimum level of environmental protection is achieved where implementation of the PPP is ultimately decided at national or local level.

Zero-pollution ambition

The analysis for EQ1c (Section 5.2.1.3) identified several policies contributing to this priority objective that afford Member States a degree of choice over the implementation of the PPP. All of these policies adopt an EU-wide framework to guide national implementation, and include Water FD, ND, MSFD, AAQD, NEC Directive, IED, Eurovignette Directive, END, Pesticides Directive, and Seveso Directive.

Working draft

The flexibility afforded Member States in implementing the PPP has led to the following risks to effective application of the PPP:

- Abatement measures are decided by Member States and the varying degrees of ambition determine the scale of compliance costs borne by the polluter. While we find there is a high degree of Member State choice in how the PPP is implemented, this is often limited by frameworks established to guide Member States with the selection of abatement measures together with EU standards adopted by the legislation (for example, in the cases of the Water FD, ND, AAQD, NEC Directive, IED and Seveso). By contrast, no factors reducing Member State flexibility have been identified for the MFSD meaning that the implementation of the PPP is wholly determined by Member State action. Under the END, in the absence of EU targets, implementation of the PPP is also largely determined by Member State action. Where a Member State is responsible for determining the scale of compliance costs borne by the polluter, there is a risk of inconsistent implementation of the PPP between Member States.
- While the Eurovignette Directive provides a clear framework for implementing the PPP, the decision to introduce tolls remains a national competence, meaning that there is significant flexibility afforded Member States in implementing the PPP via the Directive.
- Risks as regards the implementation of the PPP via national implementation have been identified in the case of the Pesticides Directive. This establishes an overall EU framework, with specific targets, levels of ambition, and implementation down to Member States. Some Member State authorities have observed that the flexibility afforded to national authorities by the Directive has resulted in differing approaches to national transposition and implementation[456]. This has meant that risks have persisted, with scope for some

456 European Commission (2021). Study supporting the evaluation of Directive 2009/128/EC on the sustainable use of pesticides and impact assessment of its possible revision : Final evaluation report. Available : https://food.ec.europa.eu/system/files/2022-06/pesticides_sud_eval_2022_eval_report.pdf

Member States to take less stringent action compared to others. Further EU intervention could ensure a more uniform approach to controlling pesticides across EU Member States, and more consistently internalise the costs associated with pesticides use.

Protecting, preserving and restoring biodiversity, and enhancing natural capital

Analysis in EQ1c highlighted that, as regards this Priority Objective area, flexibility in applying the PPP is afforded to Member States by the EU Biodiversity Strategy, the EU Forestry Strategy for 2030, and the EU Soil Strategy. How the PPP is applied is dependent on concrete actions (and potential legislation) based on Member State implementation and levels of ambition.

The Nature Directives have also been identified as affording flexibility to Member States in applying the PPP. The fitness check of the EU Nature Directives[457] found that divergent nature protection rules across the EU would compromise the achievement of a single market. In the context of the PPP, this could enable Member States to pursue competitive market advantages by adopting less ambitious levels of nature protection, and therefore addressing costs of pollution to a lesser degree than might otherwise be achievable.

Reducing environmental and climate pressures related to production and consumption

Analysis for EQ1c identified no policies falling within this priority objective that afford Member States a significant degree of flexibility in implementing the PPP, implying a relatively uniform approach to implementing the PPP has been achieved as a result of EU action.

Working draft

Conclusions on EQ11a

In the absence of a realistic baseline scenario where the PPP is implemented solely by national intervention, the challenges in implementing the PPP where there is currently a significant degree of Member State flexibility in its application were reviewed to examine the extent to which Member States would be able to implement the PPP in the absence of EU action.

Where Member States have been afforded a significant degree of flexibility, this has led in some cases (e.g. ETD, Pesticides Directive) to differing levels of ambition in national implementation. This reflects less stringent pollution prevention and control requirements in line with the legislation, rather than necessarily different approaches to applying the PPP.

In the absence of EU policy, it seems possible that concerns over incoherency may have led to weakened application of PPP compared to the current situation.

5.6.1.2. EQ11b. Were there clear benefits from EU level action?

The purpose of this question is to assess the degree to which the benefits in applying the PPP were achieved via EU level action. Benefits have been identified based on a review of the evidence analysis for previous questions.

Key finding(s)	Robustness
The benefits of EU action to apply the PPP are: • Minimised distributional effect between Member States in addressing the costs of pollution	Medium

457 European Commission (2016). SWD(2016) 472 final. Available: https://environment.ec.europa.eu/topics/nature-and-biodiversity/habitats-directive_en

• Market stability for industry by providing a clear price signal for how costs of pollution are addressed • A more harmonised approach to applying the PPP via national action, where national action is more appropriate to address the cost of pollution • Minimised risk of market distortion	

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Identified benefits

The uniform approach to applying the PPP in EU policies has contributed to minimal variation between Member States in the share of national expenditure on environmental protection by households and corporations compared to national GDP. It has also facilitated an even distribution in compliance costs between Member States (EQ1d). In contrast, there is greater variation between Member States in the revenue generated by environmental taxes (EQ1c).

The use of the Do No Significant Harm Principle avoids conflict between EU funding and the PPP and has reduced the risk of market distortion between Member States (EQ3c). In contrast, the varied use of environmentally harmful subsidies (EQ3a) is evidence of the potential for subsidies to result in market distortion hampering the effectiveness of the PPP.

Working draft

The consistent application of the PPP in EU policies by command and control instruments has led to the costs of pollution control and prevention being largely addressed by the polluter and provided a clear market signal for polluters to address the costs of pollution (e.g. adoption of BAT under the IED or the market stability reserve in the case of the EU ETS). In contrast, in non-EU emission trading systems, market volatility is recognised as a key challenge for carbon markets. (EQ2b)

The use of EU frameworks and requirements to establish EPR schemes to guide Member State implementation of the PPP via national actions has facilitated a degree of harmonisation (e.g. the use of taxes and charges to implement by Member States to implement waste management policies, EQ2b). In contrast, there is a much more varied approach by Member States to the use and design of pollution charges that contribute to the zero pollution ambition (EQ2b).

Conclusions on EQ11b

There are examples of benefits from EU action to apply the PPP. Essentially these are to facilitate market stability by minimising the distributional effect of the PPP between Member States. In the absence of EU policy, it seems possible that concerns over competitiveness may have led to weakened application of PPP compared to the current situation.

5.6.1.3. Stakeholder feedback for EQ11

As part of the public consultation, stakeholders were invited to evaluate the extent to which EU requirements have led to their Member State implementing the PPP in its policies. Most respondents (51%, 135) indicated that EU requirements had resulted in PPP implementation in Member States ‘to a limited extent’, with 27% (72) of respondents indicating that they had lead to PPP implementation ‘to a large extent’. A minority of respondents (6%, 15) were of the view that EU requirements had not led to Member State implementation of the PPP at all, or did not know

(14%, 37). Thirty-seven per cent (40) of business entities, 21% (22) of EU citizens and 4% (1) of NGOs answered that EU requirements to a large extent led their MSs to implement the PPP, while 43% (46) business entities, 57% (59) of EU citizens and 56% (14) of NGOs thought that EU requirements had a limited impact.

Asked about the EU added value of the PPP, most interviewees evaluated it positively and highlighted the role of the EU in the coordination of efforts of the Member States, facilitating the solution of transboundary issues and driving the development of the environmental policies all over the EU. In addition, some respondents highlighted that the EU has been extending its influence on environmental policies on a global scale.

Overall, these findings are broadly consistent with the outputs of the desk-based review conducted for EQ11, which indicated that benefits in terms of implementation of the PPP have been realised, although some challenges have persisted.

5.6.2. EQ12. Do current national and EU competences and Treaty legal bases support the implementation of the PPP in environmental policy?

5.6.2.1. EQ12a. Is the current split leading to the most effective and efficient implementation?

Working draft

This question investigates if the current split between EU and national action is delivering the PPP in manner that is effective and efficient**.** It does this by considering the principles of subsidiarity and proportionality to investigate if there are trade-offs with these principles which limit the effectiveness/efficiency of the implementation of the PPP.

Key finding(s)	Robustness
There is a trade off between the objectives of the subsidiarity principle and application of the PPP in EU policy which is a key driving factor for how the PPP is applied in EU policy.	Strong

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

Subsidiarity Principle

The Principle of Subsidiarity is set out in TEU Article 5(3). In the annex to the EC Communication COM(2018) 490} - {COM(2018) 491, *The principles of subsidiarity and proportionality: Strengthening their role in the EU's policymaking*, criteria in relation to national approaches and the subsidiarity principle are set out, relevant to the assessment of effectiveness and efficiency of the implementation of the PPP.

Application of environmental policy often varies across Member States due to differing polluting industries in operation, different environments and different socio-economic policies. Environmental policy is delivered through policies such as standards, charges or direct regulation. These policies are often the choice of national or local governments. Member States are often best placed to enact appropriate measures due to their specific understanding of the situation at national and local level within their country, as pertains to both polluting industries and the socio-economic climate.

This can be reflected in certain legal texts, proposing pricing mechanisms but enabling differing national and regional approaches to the application of the PPP based on socio-economic policy objectives including regional development and to meet time-critical environmental targets. For example, Article 4, of the Plastic Bags Directive[458] requires the use of pricing unless Member States can deliver the reduction target by other measures:

"The Measures taken by Member States shall include either or both of the following:

a) Adoption of measures ensuring that annual consumption levels…[decrease over time]
b) The adoption of instruments ensuring that …lightweight plastic carrier bags are not provided free of charge at the point of sale of goods or products, unless equally effective instruments are implemented…"

A factor that may limit the application of the PPP is where it creates significant distortions in international trade and investment. As outlined in EQ3d (5.2.3.4), application of the PPP has had limited impacts on international competitiveness or internal market distortions. Where the potential for distortion is highest is environmental taxes, which when applied at the national level may cause distortions. Therefore, there may be a trade off between the subsidiarity principle and application of the PPP, if Member States opt to implement the PPP through taxes.

In consideration of the above, EU-level action on implementation of the PPP would avoid competitive advantage acquired by polluters and distortions in the single market caused by variation in implementation of the PPP between different Member States. In other words, it may lead to greater market harmonization and reduced competitiveness issues, alongside the primary objective of providing incentives for innovation for polluters who are required to pay for pollution abatement.

One additional benefit of EU-level action is legal clarity. A key problem which may have different interpretations between Member States is the definition of the polluter, which may vary between Member States. The OECD references the example of a motorist causing pollution. Being a passive agent without individual responsibility, as they are using a product whose characteristics do not depend on them. Additionally, what is an acceptable level of pollution and therefore appropriate level of cost and abatement is also provided clarity by EU-level instruments.

Proportionality principle

The Principle of Proportionality is set out in TEU Article 5(4). The annex to the EC Communication COM(2018) 490} - {COM(2018) 491 considers criteria in relation to EU level action, relevant to the assessment of effectiveness and efficiency of the implementation of the PPP.

In implementation of the PPP, Member States choose the appropriate instrument at national or local level. As set out above, the current implementation of the PPP also does grant Member States some flexibility in application of the PPP. For pollution abatement, there is a need to ensure burden on the polluter is proportionate to the cost of pollution.

QMV versus unanimity

For tax policies, decision-making relies on unanimity in terms of Member State voting in Council. It has been argued that blocks the advance of green taxes, because it is usually not possible to have the support of all Member States. In response, in 2019, the European Commission published

458 Directive - 2015/720 - EN - EUR-Lex (europa.eu)

a Communication[459] proposing a gradual shift to qualified majority voting. A change of the Treaty is not necessarily needed to move from unanimity to qualified majority - this can be done with the so-called "passerelle clauses" in the current Treaties upon the approval of the Council or the European Council. This is referred to in Article 48(7) of the Treaty on European Union (TEU).

The Commission argued that a purely national approach to taxation was not working as an efficient way of decision-making. Article 192(2) of the Treaty on the Functioning of the European Union (TFEU) contains a clause for measures in the environmental field currently subject to unanimous voting, including provisions "primarily of a fiscal nature".

Conclusions for EQ12a

The current split between EU and national level action in application of the PPP is influenced by two key principles in EU policy; the subsidiarity principle and the proportionality principle. Application of EU policy provides Member States with some flexibility in application of the EU policy, including how the PPP is applied. There are limits on these flexibilities, in that they must not create distortions in the single market. This risk appears highest were environmental taxes are applied differently by Member States. Therefore, there may be a trade off between the subsidiarity principle and application of the PPP, if Member States opt to implement the PPP through taxes. A proposed gradual shift from unanimity to qualified majority voting on environmental taxes may aid future decision making.

Working draft

5.6.2.2. EQ12b. How could the current split have been improved to ensure to the most effective and efficient implementation?

Taking into account the potential trade off between the principle of subsidiarity and the PPP described for EQ12a and the benefits of EU level action (identified for EQ11b), this question reviews the potential of EU and national action to improve the application of the PPP.

Analysis considers if:

- There was scope for EU-level action where there was none to improve effectiveness and efficiency in the implementation of the PPP;
- There was room for further EU-level intervention beyond existing EU-interventions to improve effectiveness and efficiency; and
- EU-level action has not delivered benefits beyond those that would have likely been achieved through national interventions alone.

Key finding(s)	Robustness
There is scope for greater implementation of the PPP at EU level to address the costs from environmental damage, including the use of MBIs, within a co-ordinated or harmonised EU framework.	Strong
There is ongoing contradiction between the PPP and the use of EHS. Reducing or phasing out such subsidies will present different national challenges. EU level intervention may be necessary and appropriate.	Strong

459 EUR-Lex - 52019DC0177 - EN - EUR-Lex (europa.eu)

Information sources used:	Literature and data sources	Public consultation	Interviews	Workshops
	YES	YES	YES	YES

The state of play assessed that whilst there are differences between policy areas and 8th EAP PO's there is generally a lower level of implementation of the PPP in addressing the third cost category; environmental damage. This includes damage from ongoing residual allowable pollution, legacy, diffuse and transboundary pollution, as well as instances where it is practically challenging or impossible to identify the polluter(s), to attribute damage to specific entities and to undertake action retrospectively.

The benefits of implementation of the PPP in policy measures at both EU and MS level are clear, but there are also trade offs. EU level action can provide greater legal clarity, harmonised rules and a level playing field. This evidence suggests overall this has enabled greater ambition and higher levels of environmental protection, with associated effects on the application of the PPP. Member State action often better reflects national circumstance, provides greater flexibility and accountability, and accords to the principle of subsidiarity.

An example of this is the use of EPR schemes to apply the PPP. An example is found in the Waste FD. This enables, or requires, Member States to implement EPR schemes in efforts to strengthen the re-use and the prevention, recycling and other recovery of waste. In this context there is a wealth of evidence to show that EPR schemes are effective in ensuring investment and driving reductions in pollution (reviewed for EQ2b).

The challenge with applying the PPP via EPR schemes is that they are implemented at national or local level, where the technical implementation of measures to address the issue of pollution is undertaken by national and local authorities, in accordance with the principle of subsidiarity. Analysis of the challenges of national implementation of the PPP highlighted that the use of EPR is ineffective in some Member States where they are facing technical challenges linked to inadequate infrastructure for separate collection of municipal waste, and treatment of bio-waste (see EQ11a). As such, while the current split of responsibilities in applying the PPP via EPR schemes is considered effective, we find there is potential for EU action to facilitate a more harmonised approach between Member States – on the understanding it cannot undermine the principle of subsidiarity.

In the case of MBIs, establishing minimum rates, rules and policy framework at EU level, leaving the detail and level of ambition to be determined nationally, can minimize differences in application, striking a balance and increasing effectiveness and efficiency at the same time as facilitating higher levels of ambition. For example, the ETD establishes a set of minimum taxation rates to be applied by Member States to a variety of fuels and electricity. As these are minimum rates, Member States have the flexibility to adopt higher rates. The evaluation of the ETD indicates that the outdatedness of minimum taxation rates mandated by the EU in the Directive has meant that most Member States are applying rates exceeding those in the Directive, but also that there are disparities in the rates applied across the EU. Consequently, the implied extent to which polluters are paying for pollution likewise varies. Analysis under EQ11a and EQ11b highlights that the current split for applying the PPP via taxes may be sub-optimal as regards the ap-

plication of the PPP via taxation, and there is scope for further EU intervention to enable a uniform approach, and stronger application of the PPP via energy related taxes in some Member States. A revision of the ETD was proposed in 2021 with this in mind.

Another example where EU action has been successful in establishing minimum rates is the EU ETS. EQ1e indicates that the cap on GHG emissions introduced by the EU ETS Directive has evolved over the course of the appraisal period (2014-2023). Phase 3 (running 2013-2020) of the ETS included the strengthening of the cap on emissions, auctioning instead of the free allocation of allowances, and an extended scope of sectors and pollutants. Under Phase 3, free allocation of allowances remained however to protect at risk industries against carbon leakage. The current Phase 4 of the ETS has sought to address all remaining free allocations by requiring companies to pay for allowances covering all of their emissions, and seeking to combat carbon leakage via phasing in the CBAM. As such, the costs of GHG emissions have been internalised to an increasing extent over the course of the appraisal period as a result of increased EU intervention. As the EU ETS operates at EU level there is limited scope for Member State control in the way the PPP is applied in that it establishes a uniform carbon price and approach to capping.

EQ11b identified that a key benefit of EU intervention in applying the PPP where market mechanisms (including tradeable permit schemes) are applied is the facilitation of market harmonisation and industrial change at a scale greater than might be feasible with national intervention alone. This can increase the effectiveness in applying the PPP by ensuring that pollution prevention and control is adopted by a greater number of polluting entities, and can result in more efficient implementation by capitalising on economies of scale. The evaluation of the ETS Directive highlighted that the EU-wide scale of the ETS has widened the scope of emissions abatement options available, thereby resulting in more efficient abatement than might have been achieved by multiple national ETS. Thus we find the split of EU and national action is justified with respect to effectiveness and efficiency, as it capitalises on benefits that can be realised via EU implementation whilst precluding the challenges that have been observed to arise from nationally-driven application of the PPP, namely market fragmentation resulting in divergent practice and potentially lessened internalisation of costs.

Similarly, there is a contradiction between the PPP and the use of EHS, particularly where there are differences in use at national level. This includes fossil fuel subsidies as well as those used to support energy, agriculture and transportation sectors.

The assessment has identified relatively few examples where the application of the PPP has improved in EU policy over the appraisal period. Note that is not to say that the effectiveness and efficiency of the policies in question have not improved, we refer here to how the PPP is applied within them. Planned revisions to several polices and the development of new proposals which have resulted from the EGD, provide an opportunity to systematically consider the application of the PPP as well as design processes to better monitor its effect. As discussed in question EQ12a, we do not identify evidence where EU action has not delivered benefits beyond what would have likely been achieved through national intervention.

Conclusions on EQ12b

The analysis suggests there is scope for greater implementation of the PPP at EU level, with a particular focus on addressing the costs from environmental damage. Where consistent with the

subsidiarity principle, the use of MBIs, within a co-ordinated or harmonised framework at EU level may have been an efficient and effective instrument to do this.

There is a contradiction between the PPP and the use of EHS. The extent of these subsidies differs at Member State level. Reducing or phasing out such subsidies will present different challenges, reflecting different national contexts. EU level intervention may be necessary and appropriate.

Stakeholder feedback for EQ12

Q16 was an open-ended question that asked the respondents to assess, elaborate and possibly provide examples where the PPP would have been better implemented through a market-based instrument on an EU level rather than on an MS level. 111 respondents (42%) provided an answer to this question. Eight of those indicated that the answer was provided in the uploaded position paper or responded 'don't know'. Most answers were received from business associations and business companies (52, 47% of those who submitted the answer), EU citizens (23, 21%) and non-governmental and environmental organisations (22, 20%). Other respondents who answered this question included others (7, 6%), public authorities (5, 5%), and academic/research institutions (2, 2%).

The answers mentioned both market-based instruments that should be better implemented at the EU level and sectors where the EU-wide market-based instruments were necessary.

Interim draft

Two market-based instruments – EPR and ETS were mentioned mostly by business associations and companies as desirable or working tools on the EU level. Another instrument – Payment for Ecosystem Services (PES) – was mentioned by a wider respondent group, including instances of businesses, non-governmental organisations, public authorities, and EU citizens. The use of such instruments via EU action was noted across several sectors including Agriculture, Water, Waste, Textile, Chemicals, Packaging, Aviation and Transport.

As found by the analysis for EQ11, where respondents favoured EU action over national action, the benefit highlighted was the potential for EU action to achieve a harmonious approach to implementing the PPP.

6. What are the conclusions and lessons learned?

The purpose of this supporting study to the fitness check is to evaluate the implementation of the PPP in EU environmental policy and for selected EU funding programmes. The fitness check is partly a response to the findings of the European Court of Auditors (ECA), who in their special report on the PPP concluded that the principle is applied to varying degrees across environmental legislation, and recommended to assess the scope for strengthening the application of the principle, and to protect EU funds from being used to finance projects that should be funded by the polluter. In the Zero Pollution Action Plan, the European Commission announced that it would respond in 2024 with recommendations based on the fitness check.

To recap, the principle is applied where the polluter bears the costs of their pollution including the cost of measures taken to prevent, control and remedy pollution and the costs it imposes on society' (ECA, 2021). Assessing the principle means not asking simply if policy itself is becoming more or less ambitious, but instead asking who pays for it (the polluter, the user, society etc).

For the purposes of this analysis costs are defined as follows:

- Costs of pollution prevention and control, in the form of investments and expenses which stem from provisions to prevent or control pollution (including accidental pollution).
- Costs of administrative and enforcement measures needed to implement measures taken to prevent, control or remedy pollution, including labelling, reporting, registration, monitoring, and assessment needed to provide information.
- Costs of environmental damage. These are the costs of pollution borne by wider society that involve costs to remedy environmental damage caused by pollution, or to address externalities resulting from allowable residual pollution or accidental pollution.

Policies in scope of the fitness check are those covered under the 8th EAP and the EGD. All parts of EU acquis that influence the environmental outcomes targeted in the 8th EAP are therefore in scope of the fitness check. For the analysis and presentation of findings, policies have been grouped by 8th EAP and policy area, as follows: Climate change; Waste and recycling; Water; Air quality; Noise; Chemicals risk management; Nature, biodiversity, soil and land; Horizontal (environmental liability, environmental crime, built environment); EU funding and State aid. The complete list of 72 policies and strategies in scope of the fitness check is provided in Table 1-1 together with legislation for EU funds and state aid.

The study has been conducted in line with the EU Better Regulation Guidelines and so assesses the effectiveness, efficiency, relevance, coherence and EU added value of the application of the principle. Conclusions are presented for the mandatory elements of the evaluation report as outlined by the Guidelines, which cover:

- To what extent was the intervention successful and why?
- How did the EU intervention make a difference and to whom?
- Is the intervention still relevant?

The conclusions presented are based on the evidence reviewed for each of the evaluation questions and references are made to the analysis in section 5 of this report as well as the state of play described in section 4.

6.1. To what extent was the intervention successful and why?

6.1.1. Effectiveness

The extent to which the PPP is fully applied in EU policies impacting on environmental protection - and the improvement of the quality of the environment - is examined in terms of how the principle is applied in the policies to address the costs of pollution. The analysis shows that:

- The application of the PPP varies by the type of pollution cost and by policy area. While the PPP is generally well implemented in policies to address the costs of pollution prevention and control (48 of 72 policies, 67%), there is potential to strengthen the implementation of the PPP where provisions are incurring a cost that is not borne by the polluter (notably regarding costs for administrative and enforcement measures) and within policy areas defined for zero pollution to water and natural capital and biodiversity. There is also potential to strengthen the role of horizontal policies that address the costs of environmental damage which is absent from 46 policies (64% of total).

- Command and control mechanisms are most commonly used to regulate the polluter's actions, and therefore the PPP is most commonly implemented through command and control mechanisms in EU policy (81 policy provisions identified as implementing the PPP, 76% of the total). However, prominent examples to apply the PPP in EU policy are via Market Based Instruments (MBIs) that place a cost on externalities including tradeable permit schemes, sanctions, subsidies and incentives, liability and compensation schemes and extended producer responsibility schemes. These examples include the EU ETS and Energy Taxation Directive, extended producer responsibility and plastic bag fee to implement the Batteries Regulation or Plastic Bags Directive), or sanctions incurred via the Environmental Liability Directive.

- Member State and regional differences in implementation of the PPP have occurred, particularly where MBI have been used to apply the PPP and there is a greater degree of flexibility afforded Member States in the use and design of schemes which has led to differences in the way they are used to apply the PPP between Member States and between sectors. The use of minimum rates of excise duty can minimise differences (e.g., Energy Taxation Directive). The varied Member State approach to applying the PPP is reflected in the varied revenue generated from environmental taxes.

- Policy revisions in the appraisal period (2014-2023) have had a limited impact on the way the PPP is referenced in EU policy. Changes in the legal text that amend the way the PPP is implemented were identified in only 4 policies (Waste FD, Extractive Waste Directive, EQS Directive, and the Eurovignette Directive). However, the limited changes to the legislation identified are not necessarily reflective of how implementation of the PPP has changed over time.

The extent to which the PPP as applied in EU policies is impacting on environmental protection and the improvement of the quality of the environment has been reviewed in terms of the extent to which costs are borne by the polluter. The analysis shows that that corporations and households are paying for the majority of national expenditure on environmental protection compared to national governments (total expenditure for EU27 Member States was estimated at €340 billion in 2022). Levels of spending have been stable at EU level and between Member States as a percentage of GDP over the evaluation period.

There is also considerable evidence from existing policy evaluation to show how the compliance costs to address the costs of pollution are being met by businesses. While such costs are not exclusive to the polluter, nor comprehensive relative to the scope of policies reviewed for the supporting study, it covers the most significant costs incurred by businesses and provides an additional dimension for understanding how polluters are meeting the costs of pollution in the EU. The review of compliance costs shows that administrative costs are commonly borne by competent authorities and EU institutions. Whilst inconsistent with the application of the PPP provide evidence of overhead costs of implementing the PPP via EU policy which are reviewed for the efficiency analysis.

The extent to which the PPP is effective in delivering efficient environmental improvements is difficult to disentangle as there is no clear correlation between broader pollution trends and expenditure on environmental protection by corporations and households, which suggests that expenditure on environmental protection are not a determining factor on achieving the environmental improvements at EU27 level.

Nonetheless, there is evidence to show that the PPP is effectively contributing to environmental improvements at the same time as having a limited impact on market competitiveness, as follows:

- Existing policy evaluation shows that prevention and control costs are borne by the polluter at the same time as reductions in pollution are achieved.

- MBI are effective in creating a price signal that places a value on pollution which are achieving reductions in pollution. Except under the EU ETS where there is a standard EU carbon price, there is variation between Member States in the expected effectiveness of MBI to deliver environmental improvements owing to the varied use of taxes and pollution charges and varying degrees of ambition when used.

- There are co-benefits arising from the implementation of the PPP at company level whereby the PPP is spurring innovation including technological advances.

- There is general consensus that the macroeconomic impact of the PPP on economic sector activity is small based on its application via taxes. To fully assess the impact of how the PPP is applied on competitiveness, further analysis at enterprise level would be beneficial for better understanding the impacts.

Conversely, the PPP is less effectively contributing to environmental improvements where sanctions are used to address costs of pollution owing to the varied Member State approach in its implementation. For example, under the ELD, the varied approach to establishing environmental liability has led to different degrees of effectiveness in addressing costs of environmental damage between Member States and sectors. Moreover, several other factors have been found to be limiting the effective application of the PPP, including:

- The ongoing conflict between the effective application of the PPP and EHS where the latter are subsidising environmentally harmful activities.

- The use of EU funding to subsidise clean up actions that potentially conflicts with the effective application of the PPP and contributes in market distortion where Member States take a different approach to subsidising clean up actions.

- Unintended gaps in implementation where costs of pollution are not being addressed by policy owing to legacy pollution, diffuse pollution or allowable residual pollution. This is illustrated by the ongoing costs of environmental externalities where costs are not borne by the polluter.

6.1.2. Efficiency

The analysis shows that the PPP is fair in that it shifts the costs of pollution away from society and towards the polluters causing it. However, there is a risk of undesirable distributional effects where lower income households are disproportionately impacted by the costs of pollution which may make the application of the PPP unfair.

In practice, the distributional effects depend on the way costs are recovered. Regressive effects can be avoided through a careful design of policies implementing the PPP as well as compensation mechanisms. As a result, a fair application of the PPP through carefully designed mechanisms to ensure an acceptable distribution of costs and benefits not only does not cause concerns with regards to the just transition, but it directly contributes to the fairness of the transition. In general terms, evaluating the distributional impacts of EU policy is key to conducting policy evaluation and impact assessment according to the European Commission's Better Regulation Guidelines finding that undesirable distributional effects are mitigated.

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The distributional effects of implementing the PPP can only be considered on a case-by-case basis as there is no comprehensive data. While the distributional effects vary between Member States and policies used to implement the PPP, the magnitude of the effects described are generally minor and effects addressed by recycling the revenue generated. Case studies for how the PPP is implemented in EU and national policy provide evidence that market based incentives can deliver efficient environmental improvements. Taxes and charges in particular send price signals that spur private investment, including in innovative eco-design or application and development of best available technology for addressing pollution. Environmental taxes have also the advantage of raising public revenues in a non-distortionary manner. Moreover, where rates of tax are high enough, they reduce environmental pollution significantly.[460] The OECD finds that high efficiency gains are achieved via auction of pollution rights and pollution charges (including taxes). Case studies for how the PPP is implemented in EU policy support this finding that market-based incentives deliver efficient environmental improvements, but also suggest that applying the PPP via a combination of MBI and command and control measures can have a more efficient outcome. Extended Producer Responsibility schemes for example have resulted in increased rates of separate collection of waste that can be problematic in the general waste streams (e.g., batteries), increased recycling rates and reduced landfilling or incineration of covered products and materials, but there is little evidence that EPR schemes have worked successfully as a tool for Design for Environment (Braun et al. 2023).[461] The reason is that EPR fees in Member States do not sufficiently differentiate between products designed for reuse, remanufacturing, repair, or recycling, thus offering little incentive for producers to make upstream design changes aimed at waste prevention.

460 Fischer, C. (2023), "Legacy of Tom Tietenberg in Research", International Review of Environmental and Resource Economics: Vol. 17: No. 4, pp 421-447. http://dx.doi.org/10.1561/101.00000157.

461 Braun, A., Laubinger, F., Börkey, P. (2023). New Aspects of EPR: Extending producer responsibility to additional product groups and challenges throughout the product lifecycle. OECD Environment Working Papers, No. 184, OECD Publishing, Paris, https://dx.doi.org/10.1787/cfdc1bdc-en.https://www.oecd-ilibrary.org/environment/new-aspects-of-epr-extending-producer-responsibility-to-additional-product-groups-and-challenges-throughout-the-product-lifecycle_cfdc1bdc-en

At the same time, there can be an administrative burden that negatively impacts on efficiency e.g. where there are challenges in establishing who the polluter is, enforcing the principle as well as monitoring and reporting the costs of pollution. However, there is insufficient data to quantify these costs at EU level, not least as they are not systematically covered by policy provisions (particularly in the case of monitoring and reporting how the PPP is applied). The partial application of the PPP to address these costs implies that it is not wholly fair and consistent with a just transition and that there is scope for improvement to ensure costs of implementation are more fully addressed by the polluter rather than society.

While the type and design of legal instrument used to apply the PPP has a clear impact on the overall efficiency, in the absence of a systematic framework to monitor and measure progress, it is not possible to review efficiency gains in a comprehensive and consistent manner. We identify potential scope to reduce the costs of administering the PPP where costs to identify the polluter may be presenting a challenge for Member States. This particularly applies for 15 policies: Waste FD, MSFD, Water FD, UWWTD, BWD, EQS Directive, GWD, Floods Directive, AAQD, NEC Directive, END, and the Nature Directives. There is no data available to assess the scale of impact and further evidence is required to better understand the potential for burden reduction.

Additional opportunities to simplify the application of the PPP have been identified but there is insufficient data to assess the potential for efficiency gains. Opportunities include: a more systematic approach to enforcing the application of the PPP; the use of one policy to address horizontal aspects of the PPP, where shortcomings in addressing the costs of pollution are consistent across policies; and the use of insurance schemes to address potential costs of accidental pollution.

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6.1.3. Coherence

The analysis shows no discernible issues in terms of *coherence* of application of the PPP across the policy areas contributing to the 8th EAP. The analysis of inter-relations of application of the PPP between different policy areas shows no observable tensions, mutually conflicting or non-supportive ways of application.

One identified limitation is the way in which ELD addresses the costs of environmental damage. This is due to a weakness of the ELD to adequately support application of the PPP for biodiversity (species and natural habitats), water and land (soil) damage as a result of differences in interpretation of the term 'significant damage' between Member States and the lack of clarity on thresholds for determining what constitutes significant damage to biodiversity and water in the ELD. The Commission has published guidelines on environmental damage introducing clarifications and broader definitions for 'biodiversity damage' and 'water damage'. As more Member States and competent authorities familiarise with the guidelines, a more coherent implementation of the ELD should arise.

Additional challenges we identified that arguably affect the success of the intervention concern the *consistency* of application of the PPP across different policy areas and between the three categories of costs. There is a generally lower degree of application of the PPP in the policy mechanisms intended to internalise costs for environmental damage compared to pollution prevention and control with mixed application for administrative measures. There are also identified limitations of the PPP achieving its objectives in a consistent manner with respect to overall variations in its implementation in different policy areas (e.g. higher levels of application in the policy areas of climate change and waste and lower levels in those of water, air, noise, soil, biodiversity and nature).

Issues in terms of consistency of application were also identified where Member States have considerable discretion in implementing the PPP.

Analysis of the EU's application of the PPP in an international context and the EU's support for the application of the PPP outside its borders was also conducted. Regarding the effects of application of the PPP in EU policies on third countries, this has jurisdictional limitations. This has been addressed, in part, via restrictions on export of the wastes that have harmful, toxic impacts in third countries through the Waste Shipments Regulation. However, EU's flagship initiatives to reduce the EU's external pollution footprint are still not fully implemented. This primarily concerns restrictions of the export of certain products which are no longer allowed in the EU market and wastes that have harmful environmental impacts in third countries (such as subjecting plastic waste and electrical and electronic waste to the controls and restrictions of the UN Basel Convention)[462].

6.2. How did the EU intervention make a difference?

There are examples of benefits from EU action to apply the PPP. Essentially these are to facilitate market stability by minimising the distributional effect of the PPP between Member States. In sum, EU action is found to make a difference in the following ways:

- In broad terms, compared to national GDP, there is evidence of minimal variation between Member States in how the costs of pollution are being addressed.
- Market stability for industry by providing a clear price signal for how costs of pollution are addressed, e.g. where EU action has facilitated the adoption of BAT by industry under the IED.
- A more harmonised approach to applying the PPP via national action, where national action is needed to address the cost of pollution, E.g. where common provisions to establish EPR schemes have facilitated a more uniform approach to adopting environmental taxes or pollution charges in the case of waste management policies.
- Minimised risk of market distortion with the use of the common Do No Significant Harm Principle to avoid conflict between EU funding and the PPP in a consistent manner.

The evidence suggests current national and EU competences and Treaty legal bases support the implementation of the PPP in environmental policy. However, there is a degree of tension between the subsidiarity principle and the PPP which influences how the PPP is implemented in EU policy. For example, where local and regional authorities are essential to developing technical prescriptions under the Waste Framework Directive which override EU competence. Despite this, there is scope for EU level action to strengthen the implementation of the PPP by establishing a minimum level of Member State ambition for the costs polluters pay.

6.3. Is the intervention still relevant?

The analysis shows that considerable externalities of pollution persist, despite differences in the rate of internalisation of costs across policy areas. Given wider pollution trends, internalising these current and emerging costs through the mechanisms of the PPP will continue to be highly relevant.

462 Zero Pollution Action Plan status of implementation. Available at: Actions - European Commission (europa.eu)

Despite this, complexities remain. For example, the PPP has potential to incentivise technological innovation for more sustainable production processes. However, while technologies can play an important role in reducing levels of pollution, they can also lead to unintended pollution effects and potential is often uncertain. As such, the necessity for a strong policy framework backed by the implementation of the PPP persists, and the PPP continues to be relevant to the needs of the EU in the future.

Moreover, while the objectives of the PPP are relevant to the needs of the EU as put forward by the European Green Deal, potential contradictions, such as regarding the need for a just transition, can pose a challenge. Given that pass-through of internalised costs to final consumers can disproportionally affect disadvantaged households, this may diminish the PPP's ability to contribute to a just transition.

Despite these complexities, the analysis suggests that the PPP's objectives remain relevant to the European Green Deal's targets. This particularly applies to its objective of reducing pollution levels via price signals, which corresponds to all of the Green Deal's headline targets.

In sum, given persistent pollution, current lack of internalisation across the policy areas, the EU's needs as specified in the European Green Deal, the PPP's objective to reduce pollution through price signals in a fair way remains highly relevant to the needs of the EU. Moreover, in the face of emerging environmental issues, the PPP is expected to continue to be relevant in the future.

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APPENDICES

Appendix 1. Evaluation question matrix

Appendix 2: Policy context

Appendix 3: Stakeholder consultation – Synopsis report

Appendix 4: List of references

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APPENDIX 1. EVALUATION QUESTION MATRIX

Evaluation question matrices were developed for each of the evaluation criteria according the Better Regulation Guidelines. The matrices present the judgement criteria to conduct the assessment, the indicators to examine progress, the approach to analysis and data source for each sub-question. The matrices were amended since the inception report to better reflect findings on the implementation of the PPP in EU policy.

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A1. Effectiveness

We evaluate the effectiveness of the application of the PPP to conclude on the extent to which EU environmental policies in scope are ensuring the costs of pollution are met by the polluters and that EU and national funds are not supporting clean-up actions that should be covered by the polluter. This will be based on the three cost categories, and with reference to the priority objectives of the 8th EAP.

Table 6-1: Approach to evaluation questions and sub-questions for effectiveness

Sub-questions	Assessment criteria	Indicators	Data analysis approach	Data sources/data collection methods
1. The extent to which the PPP is fully applied in all policies impacting on environmental protection and the improvement of the quality of the environment.				
EQ1a. To what extent is the PPP implemented in EU environmental policies?	The PPP is applied consistently in policy to internalise costs for a) prevention and control b) administrative measures c) environmental damage.	• Percentage of legislation with legal reference to PPP in recitals, and/or articles • Percentage of legislation with policy mechanisms that apply the PPP based on the rating in the state of play	To determine how the PPP is implemented, a review of the legal text for the policies in scope was carried out to identify: • References to PPP in the legal text (recitals and/or articles). • Policy provisions used to ensure the costs are borne by the polluter (based on the rating in the state of play). Conclusions are drawn on gaps in implementation for each of the three cost categories relevant to the application of the PPP (Costs of pollution prevention and control; Costs of associated administrative measures; and Costs of environmental damage). The focus of the analysis is on the current situation (2023).	Legislative text Where available, policy impact assessments and evaluations (to establish how the PPP and the integration principle were factored in the development of options) ECA (2021) and other related literature.
EQ1b. What policy mechanisms are used to implement the PPP in EU policies?	The PPP is consistently applied between policy instruments.	• Percentage of legislation applying PPP via the following instruments: command and control, market-based instruments, voluntary actions • Percentage of cost categories where the PPP is applied via the following instruments:	The policy provisions used to apply the PPP were categorised to identify common approaches taken. For the purposes of this analysis, the "policy mechanism" refers to the policy provisions that ensure the costs are borne by the polluter. These have been grouped by a standard typology: command and control, market-based instruments and voluntary actions[463]. The overall RAG rating used in the state of play (section 4.2) was also used here to identify which policy mechanisms are more effectively used to	Where available, EU policy implementation assessments based on MS reporting under relevant policy instruments. Where available, EU policy implementation assessments based on MS

463 Command and Control, include legally binding rules to specify behaviour and where legal certainty and legal sanctions are needed. Market Based Instruments: include taxes, levies, penalties, liability and compensation schemes, subsidies and incentives, deposit-refund systems, labelling schemes, tradeable permit schemes. Voluntary actions, including recommendations, technical standards, 'pure' voluntary bottom-up initiatives (self-regulation). Such examples are characterised by their flexibility.

Table 6-1: Approach to evaluation questions and sub-questions for effectiveness				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
		command and control, market-based instruments, voluntary actions	apply the PPP (i.e. where policy mechanisms are rated 'green' or 'amber'). The focus is on the current situation (2023).	reporting under relevant policy instruments. Stakeholder consultation with Member State competent authorities.
EQ1c. To what extent is the PPP implemented by Member States for the pieces of legislation covered in 1a?	The PPP is consistently translated into Member State legislation transposing EU Directives. Where Member States have a significant degree of choice in how they implement the PPP, the PPP is applied consistently in policy to internalise costs for a) prevention and control b) administrative measures c) environmental damage.	• Percentage of legislation where MSs have a significant degree of choice in how they implement the PPP based on ○ No (%) of directives ○ No (%) which provide framework rather than specific measures ○ No (%) with nationally derived targets etc. • Member State revenue generated by environmental taxes as a share of national GDP	The provisions used to apply the PPP in EU policy have been reviewed to identify where there is a significant degree of Member State choice in how they implement the PPP. In such cases, the risks to effective application of the PPP at EU level were reviewed based on the degree of choice and the potential for differences in the application of the PPP at Member State level. As in EQ1b, the effective application of the PPP was assessed based on the extent to which the provisions implemented incur a cost that is borne by the polluter. The analysis focussed on EU policy. A detailed assessment of all national arrangements was not practicable. The significance in the degree of Member State choice was based on the following characteristics: • The type of legal instrument to implement the policy, (i.e. whether it is a regulation, directive or strategy). The use of a directive establishes a common goal together with a framework to guide implementation but ultimately it is for the Member State to identify, adopt and implement measures. • Nationally derived targets, where the Member State decides the precise scale of ambition which determines the extent to which the PPP is applied. For example, END which does not set limit or target values for environmental noise, which is for the competent Member State authorities to decide. • Voluntary actions (where the policy mechanism which applies the PPP is defined but participation is optional). Underpinning the implementation of EU policies is Member State use of environmental taxes. The revenue generated	Where available, policy evaluations and ECA (2021) (to establish strengths and weaknesses)

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Table 6-1: Approach to evaluation questions and sub-questions for effectiveness				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
			was reviewed as a share of national GDP to ascertain the differences in applying the PPP via MBI. The conclusions identify EU policy with significant choice in how MS applies the PPP and the potential this has to influence the effectiveness of its application. Note, we do not draw conclusion about the effectiveness of the policy, only in the context of the application of the PPP. The focus of the analysis is on the current situation (2023).	
EQ1d. To what extent are costs of pollution met by polluters?	The PPP is consistently applied between economic sectors so that costs of pollution are internalised.	• National expenditure on environmental protection • Administrative and compliance costs of EU policy to ascertain the scale of costs met by businesses as a proxy for polluters	We reviewed national expenditure on environmental protection (NEEP) by governments, corporations and households as a proxy for the extent to which corporations and households, in particular, are covering costs of pollution. The focus of the analysis is on the current situation (2023). *Note, the analysis does not analyse how the NEEP compares to the associated damage costs of pollution. This is reviewed for EQ2 to conclude on the possible rate of internalisation achieved via the PPP.* In addition, this question reviewed administrative and compliance costs of EU policy to ascertain the scale of costs met by businesses as a proxy for polluters in many cases. Cost data are gathered primarily for provisions where there is high degree of application of the PPP (i.e. the cost to implement the provision is largely or partially borne by the polluter, rated 'green' or 'amber' for the state of play). Data are grouped by 8th EAP priority objective. Costs data (quantitative and qualitative) was extracted from existing policy evaluations and their support studies. Where no existing policy evaluation is available, no cost data have been compiled at policy level.	Eurostat [ENV_AC_EPNEIS1] Where available, policy evaluations and impact assessments.
EQ1e. Has implementation of PPP improved over time?	Implementation of the PPP has improved over time across EU policies.	• Implementation progress in pieces of legislation (Percentage of legislation with legal reference to PPP in recitals, and/or provisions; Percentage of legislation with policy	The question reviewed changes in legal references to PPP in recitals, and/or articles, and changes to the policy mechanisms that apply the PPP over the appraisal period (2014-2023) to determine how the application of the PPP has evolved. In addition, potential planned changes to policies in 2023/2024 were reviewed to determine how	Where available, policy evaluations and ECA (2021) (to establish improvements over time)

Table 6-1: Approach to evaluation questions and sub-questions for effectiveness				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
		mechanisms that apply the PPP by year of introduction)	these may influence the application of the PPP in the future. Drawing on findings for EQ1b and EQ1c, the analysis also examined how the changes may have influenced the effective application of the PPP based on the type on policy mechanism used or the degree of Member State choice in how they implement the PPP.	
2. The extent to which the PPP is effective in delivering efficient environmental improvements.				
EQ2a. To what extent has the PPP contributed to the reduction of pollution?	By putting a price on pollution, the PPP is contributing to achieving the six priority objectives of the 8th EAP.	• 8th EAP headline indicators for pollution trends and associated damage costs • NEEP by corporations and households as a proxy for costs of pollution borne by the polluter	The pollution trends for 8th EAP headline indicators published by the EEA[464] were reviewed to establish overall pollution trends and associated damage costs. The extent to which the PPP has contributed to these trends was reviewed based on expenditure on environmental protection by corporations and households (using NEEP data The extent to which NEEP compares to the associated damage costs of pollution was also reviewed to support overall conclusions on whether the rate of internalisation has changed over time.	Eurostat datasets Stakeholder consultation activities. ECA (2021) and other related literature. IEEP (2021) on costs of environmental externalities.
EQ2b. How do policy mechanisms used to apply the PPP provide environmental protection and contribute to the improvement of the environment?	The PPP is effectively implemented in EU policies across all the mechanisms used to implement the PPP.	• Qualitative evidence of environmental improvements achieved as a result of actions taken to implement the PPP (at EU and national levels)	A review was undertaken of how the specific policy mechanisms used to apply the PPP (categorised for EQ1b) are contributing to the trends reviewed for EQ2a. Analysis focussed on Command and Control and Market-based instruments as the key mechanisms used to apply the PPP.	Eurostat datasets EEA datasets and thematic reports e.g. on status of implementation of a particular policy and/or impacts on the environment. EU evaluations of specific policies showing impacts that have been realised. MS reporting on implementation of a particular policy and/or EU level assessment. Stakeholder consultation.
3. Any factors limiting the effective application of the PPP.				

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464 https://www.eea.europa.eu/en/topics/at-a-glance/state-of-europes-environment/environment-action-programme

Table 6-1: Approach to evaluation questions and sub-questions for effectiveness				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
EQ3a. To what extent are EHS conflicting with the effective application of the PPP?	Polluters are not benefiting from EHS that promote pollution.	• Fossil fuel support • Examples of other energy subsidies harmful to	Owing to Member States differences in how EHS are identified, monitored and reported, there is no accurate information on the level of EHS used or which sectors are most affected by them, except in the case of fossil fuel subsidies which are reported in accordance with the Energy Governance Regulation.	Based on the draft guidance which was developed as part of the current study as a discrete task from the fitness check[465].
EQ3b. To what extent are EU funds used to cover costs for environmental clean-up?	Polluters are not benefiting from EU subsidies to cover costs of clean up action.	• EU subsidies (EUR) • Actions subsidised by EU funds	A review was undertaken on i) the type of "clean up" actions subsidised by EU funds and ii) the extent to which selected EU funds are contributing to clean up actions. Clean up actions are defined as structural investments and rural development schemes. Research and development is not defined as a clean-up action. EU funds in scope are Cohesion Policy Funds, CAP, LIFE+, InvestEU, RRF. State Aid Rules are also assessed. Conclusions were drawn on the extent to which the types of clean up action are undermining the effective application of the PPP.	Desk research of: Annual EU budget documentation (including data visualisation tools presenting data on performance), Member State programmes for implementing EU budget programmes and evaluations of relevant programmes. Stakeholder consultation.
EQ3c. Are there any unintended impacts?	Risk of unintended impacts are monitored and policy mechanisms to implement the PPP are reviewed and amended as appropriate to minimise potential adverse effects and/ or optimise potential synergies.	• Unintended impacts contributing to the price put on pollution	The purpose of this question is to identify unintended impacts occurring as a result of the way the PPP is applied in EU policy that are limiting the overall effectiveness of the policy. Unintended impacts reviewed include: • Unintended gaps in implementation where environmental externalities are occurring as a result of how environmental policy has been implemented. • Distributional effects where there is evidence of varying economic sector capacity to pass-through costs to downstream users.	Desk research, primary source of information will be policy evaluations and Fitness Checks. Stakeholder consultation will be a key source information to gather information for case studies.

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465 Draft Guidance document for reporting of non-energy Environmentally Harmful Subsidies (EHS) (October 2023)

Table 6-1: Approach to evaluation questions and sub-questions for effectiveness				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
			• National differences in implementation (namely where MBI are used to implement the PPP) that have led to varying degrees of environmental policy stringency between Member States, regions or municipalities, which may be creating an unequal internal market (where less stringent use of the PPP is giving a potential competitive advantage to economic actors). This is examined separately for EQ3d as regards impacts of the PPP on competitiveness.	
EQ3d. What is the impact on competitiveness (within the EU and compared to third countries)?	Sectoral competitiveness is not hindered by implementation of the PPP and the price placed on pollution. No displacement of business between MS or to third countries.	• Macroeconomic impact on economic sector activity in terms of production levels (qualitative analysis)	To respond to this question, we first reviewed the main theoretical arguments regarding the impact of the PPP on competition. We then undertook a comparative analysis of stringency in the way the PPP is applied between Member States, and compared with third countries as well as at sector level to examine the impact on competitiveness. As an indicator of how the PPP is impacting on competitiveness, we examined the stringency of environmental policy as well as enterprise productivity to identify economic sector sensitivities to more stringent application of the PPP.	OECD analysis on the impact of environmental policies on competitiveness

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A2. Efficiency

This criterion examines the distributional effects of the PPP as implemented in EU policy, to review whether it is fair and consistent with a just transition at EU level (EQ4) and the extent to which the application of the PPP at Member State level (EQ5) and EU level (EQ6) are contributing to efficient policy. In reviewing the evidence, potential for greater fairness in the application of the PPP (EQ4c) and improved efficiency have been examined (EQ6c). The focus of the analysis will be current implementation, including reviewing policies that were entered into force for 2023.

Table 6-2: Approach to evaluation questions and sub-questions for efficiency				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
4. The extent to which the PPP is fair and consistent with a just transition including how it affects different stakeholder groups, including vulnerable groups.				
EQ4a. Why are the distributional effects of the application of the PPP generally fair?	The PPP is fair in that it shifts the costs of pollution away from society and towards the polluters causing it.	Distribution of national expenditure on environmental protection by households and corporations by Member State	The distributional effects were reviewed in terms of the differences between Member States and between households and corporations as two key polluting stakeholder groups. To respond to the question, national expenditure on environmental protection was reviewed as a share of national GDP to identify the distributional effects associated with how the costs of pollution are being met by the polluter - between Member States and between households and corporations. The resulting analysis was compared with findings from related studies and literature that have reviewed the distributional effects on households and corporations for specific examples.	Eurostat [ENV_AC_EPNEIS1] Relevant policy evaluation on the distributional effects of EU policies
EQ4b: Are the distributional effects of policies applying the PPP exceptionally unfair in the sense of inconsistent with a just transition when targeting vulnerable groups and regions?	Application of the PPP is consistent with a strong transition performance of Member States for social and economic aspects of a just transition	Comparison between the distribution of pollution costs and the transition performance of Member States for economic aspects of a just transition	To review whether the costs of the PPP are fair and consistent with a just transition, the possible distributional effects of national expenditure on environmental protection reviewed for EQ4a were compared with Member State ranking according to the "Transitions Performance Index" (TPI) to identify correlations where differences in national expenditure on environmental protection may be having a positive or negative impact.	JRC Transitions Performance Index Relevant literature on the distributional effects on households and corporations (including IEEP (2021) on costs of environmental externalities, European Commission 2023 annual report on taxation)
EQ4c. Could measures have been taken to improve the fairness of the implementation?	Application of the PPP is well designed, to reduce distortions by internalising negative externalities (e.g., the costs of pollution and other environmental costs) while at the same time providing some additional public revenue	Lessons learned for implementation	To respond to this question, we reviewed how issues of fairness are addressed in EU policy and national initiatives and whether there is scope for improvement.	Evidence to inform this analysis was primarily compiled from literature review and compared with findings for EQ4a and 4b.

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Table 6-2: Approach to evaluation questions and sub-questions for efficiency				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
5. Whether (and if so, why) there are significant differences in the (efficient) application of the PPP across EU policies and between Member States.				
EQ5a. Are there significant differences in implementation between policy areas and Member States affecting efficiency?	There is efficient implementation of the PPP between policy areas and Member States.	• Costs of applying the PPP (EQ4a)	The focus of this analysis is on the differences in the efficient application of the PPP via such environmental taxes and pollution charges. At Member State level, efficiency was assessed based on the cost of implementation compared to the environmental impacts described for the case study, it was not possible to compile this analysis at the EU level.	Member State experiences were drawn on via a review of case studies on the use of economic instruments to address pollution and resource use, compiled by the IEEP (2017).
EQ5b. If so, what are the main reasons for this?	Significant differences in implementation are relative to the scale of pollution.	• Lessons learned for implementation (strengths and weaknesses)	The purpose of this analysis is to identify the reasons why there are differences between Member States in implementing the PPP. One of the main drivers that have led to differences is the varied use of environmental taxes and pollution charges which are used by Member States to implement the provisions of certain EU policies. To review the impact of such differences in how the PPP is implemented under EU policy, we compared with the benefits of implementing the PPP under national taxes.	As above for EQ5a.
6. Whether policy could be made more efficient via recourse to the PPP.				
EQ6a. What have been the costs of the PPP (overall and between different stakeholder groups)?	The costs to administer the PPP are minimal and borne by the polluter.	• Administrative costs to implement the PPP (qualitative)	Based on the policy provisions identified for the state of play, the available evidence on the costs of applying the PPP in EU policy were reviewed. Costs were reviewed for the main activities to administer the PPP in EU policy including costs of: • Identifying the polluter • Enforcing the PPP in EU policy • Monitoring and reporting the costs of pollution	Costs data (quantitative and qualitative) was reviewed from existing policy evaluations and support studies.
EQ6b. Does the PPP improve the efficiency of environmental policy (and reduce the overall costs of	The PPP makes policy more efficient by providing an incentive that leads to changes in behaviour (low cost abatement), promoting	• Qualitative evidence of efficiency gains achieved	To respond to this question, literature on the economic theory behind the PPP was reviewed. Examples of practical implementation by Member States were used to demonstrate how the identified efficiency gains are happening in practice.	Key literature on the theory of the PPP has been compiled by the OECD . Member State experiences were also drawn on via a review of case studies on the use of economic

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Table 6-2: Approach to evaluation questions and sub-questions for efficiency				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
meeting environmental objectives)?	development and deployments of new technologies. It can as part of this provide funds to support technology investment.		At Member State level, efficiency was assessed using a qualitative approach based on the cost of implementation compared to the environmental impacts described at national level.	instruments to address pollution and resource use, compiled by the IEEP (2017).
EQ6c. Is there scope for improvements in efficiency via simplification and/ or burden reduction?	The PPP is implemented with appropriate level of administrative burden relative to the benefits achieved.	• Lessons learned for potential efficiency gains via simplification and/ or burden reduction	The extent to which there is scope for improvements in efficiency via simplification and/ or burden reduction in the application of the PPP was examined based on the costs to administer the PPP (reviewed for EQ6a) and the potential efficiency gains (reviewed for EQ5 and EQ6b).	Evidence compiled for EQ5 and EQ6b

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A3. Relevance

This criterion examines whether the PPP was, is and will be relevant to the needs of the EU. The "needs" relate to the environmental objectives in the European Green Deal, specifically the priority objectives of the 8th EAP. Relevance therefore is closely tied to the analysis of the intervention logic, especially to the 'needs' and 'objectives' identified therein. In this case, relevance relates to the extent to which environmental costs of pollution exist as externalities – imposed on society but not reflected in prices paid or incurred by the polluter – and the degree to which pollution levels can be influenced by the application of the PPP.

Table **6-3: Approach to evaluation questions and sub-questions**				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
EQ7. Whether the PPP is able to respond to current, new or emerging environmental issues and changes in technology.				
EQ7a. To what extent are the objectives of the PPP appropriate for helping internalise	Risk of pollution and environmental damage remains significant	• Extent to which pollution costs are internalised (linked to EQ 1 analysis)	To determine whether the objectives of the PPP match the need of tackling environmental issues, this EQ reviewed the rationale, needs and objectives behind the PPP, starting from the intervention logic. It also reviewed relevant pollution cost categories for each of	Desk research including policy impact assessments and evaluations of relevant policies. Eurostat/Prodcom data

Table **6-3: Approach to evaluation questions and sub-questions**				
pollution costs in the appraisal period?		• MS authority perception on relevance of EU policy incentives for producers and consumers to address pollution	the 8th EAP priority objectives and the extent to which they exist as externalities (i.e. costs not covered by the polluter, see EQ2a) to determine the relevance of the principle in relation to the needs.	Stakeholder responses in the survey, interviews and workshops
EQ7b. To what extent are the objectives of the PPP appropriate for internalising continuing, new or emerging pollution costs and incentivising changes in technology?	Risk of pollution and environmental damage remains significant	• Expected development of pollution costs • Expected mitigating effects of emerging technologies • Stakeholder assessment on incentive provided by the PPP to innovate Working draft	Based on the analysis provided in EQ7a, an assessment was undertaken of the future relevance of the PPP to ensure the costs of pollution are borne by the polluter. To do so, the assessment reviewed emerging and future environmental challenges and technological developments, and how they may affect the extent to which costs of pollution are borne by the polluter.	Desk research, including overview of foresight reports (e.g. 2022 Strategic Foresight Report of the Commission), policy impact assessments and evaluations of relevant policies. Technologies developed and introduced. Stakeholder responses in the survey, interviews and workshops
EQ8. The extent to which the PPP is consistent with the needs of the EU as set out in the European Green Deal				
EQ8a. To what extent are the scope and objectives of the PPP relevant to the needs of the EU as set out in the EGD?	The scope and objectives of the PPP are relevant to address the needs as set out in the EGD. In the absence of the PPP, the needs set out in the EGD would need additional measures to be addressed.	• Extent to which PPP objectives contribute to the attainment of the EGD headline targets and relevant EU quantitative or qualitative targets, e.g. through Fit for 55, 8th EAP, etc represented by the 8th EAP priority objectives.	An assessment was undertaken to compare the objectives of the PPP (to provide price signals to efficiently reduce pollution and facilitate a just transition) to the needs of the EU as specified in the EGD. To do this, the logic of the PPP is defined to establish how it is intended to reduce pollution levels while facilitating a just transition. Then, an analysis of the PPP's logic was undertaken to establish to the relevance to the needs specified by the EGD with reference to the headline targets of the EGD (based on evidence compiled for EQ2 on how the PPP framework contributes to these targets). Lastly, a review was undertaken for the extent to which price signals to reduce pollution supports the just transition in relation to the EU needs set out in the EGD.	Assessment of effectiveness. EGD headline targets Objectives as in the intervention logic of the PPP Stakeholder responses in the survey, interviews and workshops

A4. Coherence

The coherence criterion examines two specific aspects. First, how well the application of the PPP works across the different policies, policy areas and 8th EAP priority objectives. Second, how well policies at EU level (i.e. EU institutions and agencies) work together with those at national level (EU Member States) and international level.

The data collection and analysis in response to the Evaluation Questions 1 and 5 was used to answer the coherence evaluation questions. Answers to Question 1 (in Effectiveness) provides an understanding of the degree of implementation of the PPP in relevant EU policies, and the extent to which the PPP is applied in relevant policies across Member States. Building on the answers to these questions, question 9a identifies the coherence of application of the PPP at the EU and MS levels, through assessing overlaps, inconsistencies, contradictions and synergies across relevant mechanisms and instruments. Targeted consultation will provide further insights into the coherence and consistency of application of the PPP, identifying trade-offs with different policy areas.

Question 10a examines whether the application of the PPP is addressing environmental costs which are being triggered outside the EU by the EU economic activity. Question 10b will focus on reviewing implementation of the PPP outside the EU through selected case studies on green taxation in non-OECD countries and whether this is supported by EU interventions. This allows assessment of how the application of the PPP outside the EU compares to, and is consistent with, the application of the PPP in the EU based on the analysis of the Effectiveness questions.

Table 6-4: Approach to evaluation questions and sub-questions

Sub-questions	Assessment criteria	Indicators	Data analysis approach	Data sources/data collection methods
EQ9. The extent to which the application of the PPP is consistent and coherent within the EU, across policies impacting on environmental protection and the improvement of the quality of the environment.				
EQ9a. Is the PPP coherently and consistently applied across policies contributing to the 8th EAP priority objectives at EU level and Member State level?	The PPP is coherently and consistently applied across EU policies contributing to the 8th EAP priority objectives, with minimal overlaps or contradictions. The PPP is coherently and consistently applied within and across Member States through policies contributing to the 8th EAP priority objectives, with minimal	• Numbers of overlaps, contradictions/inconsist-encies and/or synergies of PPP application identi-fied across policies con-tributing to the 8th EAP priority objectives at EU level • Numbers of overlaps, contradictions/inconsist-encies and/or synergies of PPP application identi-fied across Member	Analysis focused on establishing whether there are any tensions and/or synergies in terms of how the PPP is applied between EU policies in scope of the fitness check. To do this, an assessment of coherence and consistency of application of the PPP between the different policies was carried out based on the evidence compiled for the state of play, effectiveness analysis (EQ1-3) and policy literature review. Assessment of *consistency* reviewed the degree of variation in application of the PPP across policies grouped by 8th EAP priority objectives and policy areas.	Relevant EU and MS environmental policies or mechanisms (defined in Task 1) including policy impact assessments and evaluations of relevant policies MS-level policy instruments e.g. based on MS implementation reporting and EU assessment. Stakeholder responses in the survey, interviews and workshops

Table 6-4: Approach to evaluation questions and sub-questions				
	inconsistencies/differences in implementation.	States policies contributing to the 8th EAP priority objectives	Assessment of *coherence* reviewed the potential for conflicting or mutually non-supportive mechanisms used to apply the PPP between policies grouped by 8th EAP priority objectives and policy areas (except EU funds which are covered in EQ3b). Analysis is presented by policy area and in relation to the three cost categories used for the fitness check (Costs for pollution prevention and control measures; Costs for administrative measures; Costs for environmental damage or externalities).	
EQ10. The extent to which the application of the PPP is consistent and coherent outside the EU.				
EQ10a What environmental costs are being triggered outside the EU by the EU economic activity and to what extent are those being addressed by EU policies through application of the PPP?	Environmental costs in third countries triggered by EU economic activity are adequately addressed by EU policies through application of the PPP.	• Selected key environmental impacts outside the EU as a result of EU economic activity and whether these are being addressed by EU policies through application of the PPP • Extent to which the PPP is referred to in Trade and Sustainable Development chapters of EU trade agreements • Adequacy of accompanying sustainability impact assessment in trade negotiations	A review was undertaken to establish how the application of the PPP in EU policies is directly or indirectly addressing pollution outside its borders i.e., have an impact on EU's environmental footprint abroad by reducing the pollution which occurs as a result of the EU's economic activity. The starting point for this was a review of policies in scope of the fitness check to identify those EU policies that apply the PPP in a way that can impact the reduction of pollution and associated costs caused by the EU outside its borders. In addition, activities listed in the EU Zero Pollution Action Plan aimed at reducing pollution inside and outside its borders were examined. Desk research was carried out to identify environmental costs triggered by EU's economic activity in third countries with some evidence was found in academic literature. Targeted review of the EU's trade agreements and related academic literature was carried out to establish the extent to which EU's trade policy influences the reduction of pollution outside its borders.	Desk research, including case law and treaty law on PPP, literature review. Relevant EU policies/instruments including policy impact assessments and evaluations of relevant policies. Stakeholder responses in the survey, interviews and workshops
EQ10b Is the PPP applied outside the EU, and is this supported by EU interventions?	Green taxation instruments are implemented in selected third countries and are effectively internalising the external costs of pollution	• Types and extent of application of green taxes, charges and fees in selected third countries	The analysis will focus on green taxation in selected non-OECD countries and how effectively various green taxation instruments in those countries internalise the external costs of pollution or incentivise pollution reduction.	Desk research on selected international policies, e.g. OECD recommendation on PPP, Rio Declaration, including case law and treaty law with references to PPP; Relevant policies/instruments in one non-EU country case study on implementation of PPP; Relevant EU policies/instruments

Not for distribution

Table 6-4: Approach to evaluation questions and sub-questions				
	and/or incentivising pollution reduction. The European Commission is engaged in international policy dialogue on green taxation with third countries in international fora and through EU in-country delegations.	• Evidence of green taxation instruments effectively internalising external costs of pollution • Evidence of EU-led initiatives in international fora and interventions in developing countries aimed at strengthening the PPP application in third countries	In addition, the Zero Pollution Action Plan (primarily the section on promoting worldwide change for zero pollution) was reviewed. This focussed on the implementation status for key actions to establish to what extent the environmental diplomacy of the EU is engaged in reducing pollution at source outside its borders through strengthening of the PPP application in third countries.	including policy impact assessments and evaluations of relevant policies; European Commission Report on green taxation in non-OECD countries[466] will provide the principal source of information, supplemented by targeted consultation as well as any other relevant sources identified through these. Documents on EU positions in relevant international fora; Where available, international policy implementation assessments. Limited number of relevant EU trade agreements with third countries. Stakeholder responses in the survey, interviews and workshops

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A5. EU added value

Under the principle of subsidiarity (Article 5 of the TFEU), the EU should only act when the objectives can be better achieved by EU level action rather than Member State action. This criterion will assess the extent to which the principle of subsidiarity is applied.

Table 6-5: Approach to evaluation questions and sub-questions				
Sub-questions	**Assessment criteria**	**Indicators**	**Data analysis approach**	**Data sources/data collection methods**
EQ11. Is the current split of responsibilities between the EU and Member States for the PPP the right split?				

466 Report on Green taxation in non-OECD countries: A review of experience and lessons learned, Directorate-General for Environment (2023). The report underlines that environmental taxes have the potential to deliver multiple benefits by addressing the economic drivers behind the environmental challenges facing non-OECD countries, enhancing efficient use of resources, and mobilizing revenue. This report collates the results of a literature review in non-OECD countries, focusing on environmental taxes that are not carbon or energy taxes. The report also includes the results of five "deep dives" to examine five environmental tax instruments in depth in Ghana, Guyana, Morocco, Vietnam and Zambia.

Table 6-5: Approach to evaluation questions and sub-questions				
EQ11a. In the absence of EU level action, to what extent would Member States be able to apply the PPP?	Internalising associated costs of pollution can be achieved by national-level intervention	• Challenges in applying the PPP that are not addressed by national level intervention	The purpose of this question is to establish whether Member States would have been able to apply the PPP in national policies without EU action. To do this, a review was undertaken of the policies where Member States have a significant degree of choice in how they implement the PPP (identified for EQ1c) to conclude on the risks associated with Member State implementation of the PPP in the absence of EU action.	Relevant legislative text and split of responsibilities between the EU and Member States. Stakeholder consultation.
EQ 11b. Were there clear benefits from EU level action?	Intervention at EU level facilitates a uniform implementation of the PPP and ensures a fair playing field between Member States and across sectors	• Success factors for applying the PPP as a result of EU intervention	The purpose of this question is to assess the degree to which the benefits in applying the PPP (identified for EQ2 and EQ6) were achieved via EU level action. To do this, the way in which EU action has influenced the benefits identified for EQ2 was reviewed.	Desk research including review of BRG and related policy guidance. Stakeholder consultation.
EQ12. Do current national and EU competences and Treaty legal bases support the implementation of the PPP in environmental policy?				
EQ12a. Is the current split leading to the most effective and efficient implementation?	EU level action and national level action is contributing to the application of the PPP to ensure costs of pollution are effectively and efficiently internalised.	• Lessons learned in EU and national levels of implementation (success factors and weaknesses).	This question reviewed how national vs EU level action have triggered the cost borne by polluter to conclude on the extent to which EU or national action is a contributing factor for the revenue generated by the polluter for environmental protection. Where national action was found to be a leading factor, the analysis reviewed the tension between the PPP and the subsidiarity principle to conclude on whether the current split is leading to the most effective and efficient implementation.	Desk research Stakeholder consultation.
EQ12b. How could the current split have been improved to ensure the most effective and efficient implementation?	Lessons learned from implementation of the PPP in all EU and national policies are applied to ensure best possible implementation.	• Drivers of success factors and weaknesses in EU and national levels of implementation.	Taking into account the tension between the principle of subsidiarity and the PPP described for EQ12a and the benefits of EU level action (identified for EQ11b), this question will review the potential of EU and national action to improve the application of the PPP. Analysis will conclude on where:	Evidence compiled for #1

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Table 6-5: Approach to evaluation questions and sub-questions				
			• There is scope for EU-level action where currently there is none to improve effectiveness and efficiency in the implementation of the PPP; • There is room for further EU-level intervention beyond existing EU-interventions to improve effectiveness and efficiency. This may include introducing the PPP as a specific item for consideration in the EU's Better Regulation agenda; and • EU-level action has not delivered benefits beyond those that would have likely been achieved through national interventions alone.	

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APPENDIX 2. POLICY CONTEXT

A2.1 Introduction

Appendix 2 compiles information for the policy context and evidence used to establish how the PPP is implemented in EU policies and funding programmes. For each policy area, information was compiled on:

- The **environmental pressure** that has led to a cost, justifying the need for policy intervention and relevance of the PPP. The environmental pressure is described in terms of the main polluting source, the environmental impact and associated damage costs (where available).
- A **policy overview** to introduce each of the policies in scope and provide context for understanding their interaction with one another, outlining their objectives, the actions/measures/instruments, monitoring arrangements and enforcement approach within each.
- The **policy provisions legal instruments used to implement the PPP** which provides additional detail to the description summarised for the state of play.
- **EU funding support for potential clean up actions:** For each policy area, we examine the relevant EU funding streams to ascertain if they enable or facilitate polluters to avoid incurring the associated societal costs. First, we track EU expenditure for the budget programmes in scope to determine the total amount and proportion of total funds allocated to the relevant policy area. Second, we note the actions these funds subsidise. Third, we note the intended beneficiaries and fourth, we note how the proofing mechanism is designed to avoid conflict with how the PPP is applied in related policies.

According to the approach employed for the main report, policies are grouped by 8th Environment Action Programme (EAP) and by policy area.

The list of policy references reviewed to extract the evidence are in Appendix 4.

A2.2 Climate change

A2.2.1 Description of environmental pressure

Climate change is a key environmental, economic and social challenge globally. Overall, the EU has reduced their GHG emissions by 24% from 1990 to 2019.[467] Most Member States have contributed to this; counterbalanced by an increase in a few.[468] Energy supply, industry and transport are the highest emitting sectors, and while emissions in most sectors have decreased over this period, domestic and international transport saw a notable rise. Overall, the annual costs of GHG emissions (in CO_2e) in the EU27 are estimated to have been €402 billion in 2016. [469]

In this context, the EEA monitor trends in total GHG emissions in Europe as one if its headline indicators for climate change mitigation. Total GHG emissions in the EU decreased by 32% between 1990 and 2020. Over the appraisal period, total GHG emissions steadily increased

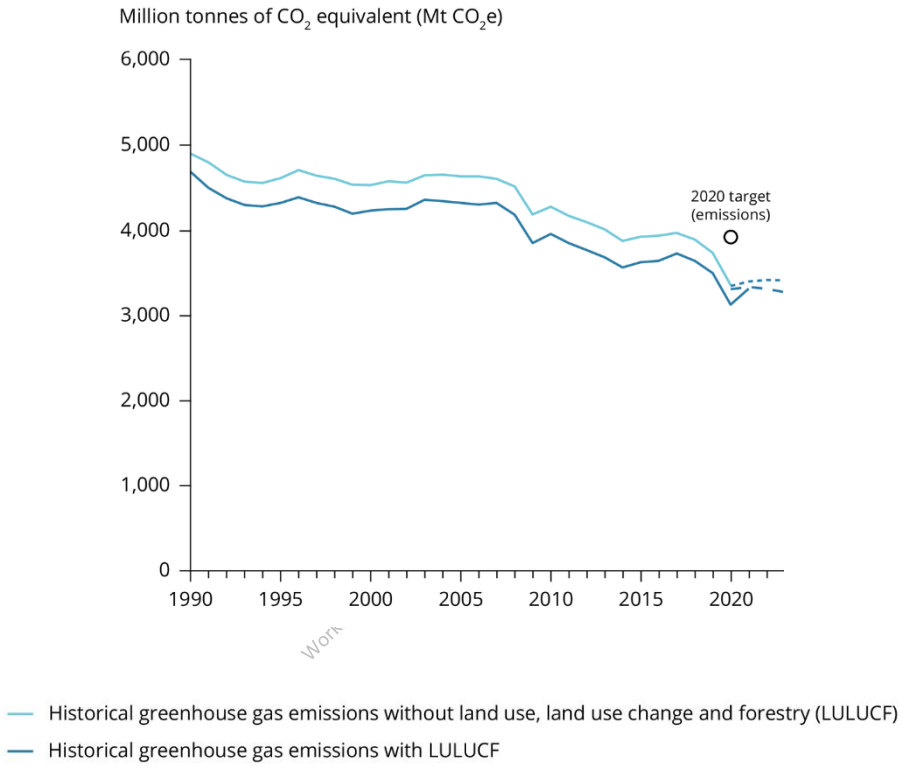
467 EC (2019). https://climate.ec.europa.eu/eu-action/climate-strategies-targets/progress-made-cutting-emissions_en

468 EEA (2021). The European environment – state and outlook 2020. https://www.eea.europa.eu/soer/publications/soer-2020

469 https://environment.ec.europa.eu/system/files/2021-11/Green%20taxation%20and%20other%20economic%20instruments%20%E2%80%93%20Internalising%20environmental%20costs%20to%20make%20the%20polluter%20pay_Study_10.11.2021.pdf

from 2014 to a peak in 2017, decreased to back to 2014 levels by 2019, and then sharply decreased in 2020. This can be attributed to a reduction in emitting activities during the COVID-19 pandemic, with preliminary figures for 2021 estimating a subsequent increase by 5% in 2021, which nonetheless is expected to remain below 2019 levels.

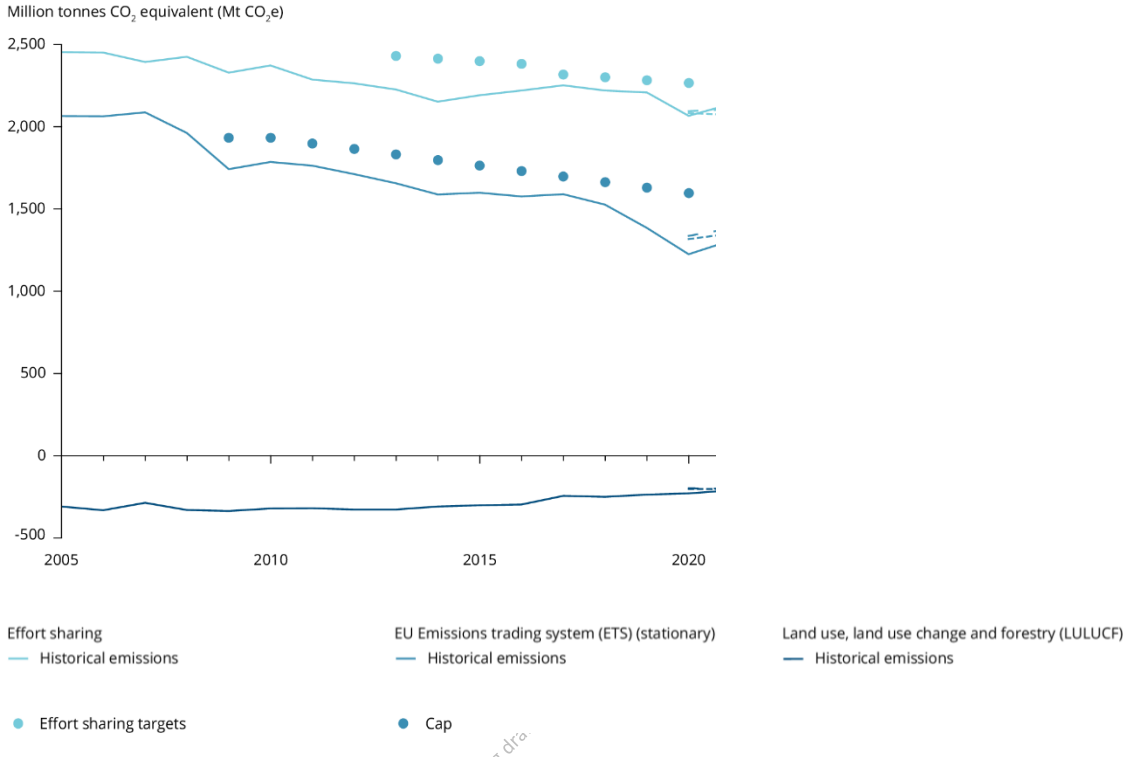
Figure 6-1 Historical trends of EU GHG emissions



Source: EEA (2022) https://www.eea.europa.eu/ims/total-greenhouse-gas-emission-trends

The EEA also presents a breakdown of total GHG emissions from the sectors targeted by the three of the key policies which address GHG emissions and removals in the EU. Figure 6-1 shows the GHG emissions from sectors covered by the EU Emissions Trading System (ETS), Effort Sharing Regulation and the legislation on emissions from land use, land use changes and forestry (LULUCF) respectively. Emissions under the EU ETS sectors decreased slightly in 2014, remained stagnant until 2017, and then decreased from 2017-2020. The sectors targeted by the Effort Sharing Regulation experienced a decrease in emissions in 2014, but increased between 2014 and 2017. Therefore, it appears that the increase observed in overall GHG emissions from 2014-2017 (see Figure 5-2) can be attributed to the sectors regulated by the Effort Sharing Regulation.

Figure 6-2 Emissions from effort sharing, ETS and LULUCF trends in the EU-27



Source: EEA (2022) https://www.eea.europa.eu/ims/total-greenhouse-gas-emission-trends

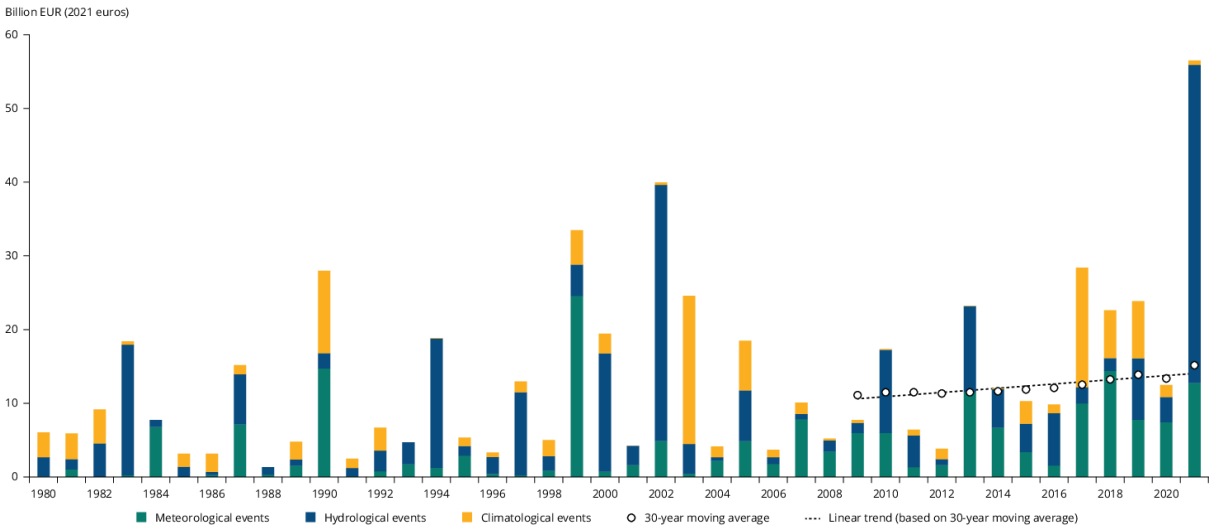
In 2020, the LULUCF sector represented a net carbon sink of 230Mt CO_2e, corresponding to the absorption of 7% of total GHG emissions.[470] Over the last decade, the carbon sink within the EU has shrunk by about a third. Preliminary estimates for 2021 suggest that the sink decreased by 8% compared with 2020. Over the appraisal period, the carbon sink has shrunk (i.e. emissions from LULUCF have increased) steadily, with a slightly sharper increase in emissions between 2016 and 2017. Data presented by the EEA breaks down the emissions from LULUCF by sector, and shows that increased emissions from forest land drove this trend between 2016 and 2017.[471]

Weather and climate related extremes caused economic losses estimated at EUR 560 billion in EU Member States (EUR 56.6 billion of which is from 2021). Hydrological events account for over 45% of the total losses, with meteorological events accounting for almost a third of the total, heat waves for 13% and the remaining 8% for droughts, forest fires and cold waves. A relatively small number of events are responsible for a large proportion of economic losses, resulting in a high variability from year to year making trend analysis of economic losses is difficult. However, statistical analysis of a 30-year moving average shows that economic losses are increasing over time. Over the appraisal period, the linear trend of economic loss has steadily increased, with particularly large losses in 2017 and 2021.

470 https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-land

471 https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-land

Figure A1-1: Economic losses from climate-related extremes in Europe



Source: EEA (2022) https://www.eea.europa.eu/ims/economic-losses-from-climate-related

A2.2.2 Policy overview

PO1 achieving the 2030 greenhouse gas emission reduction target and climate neutrality by 2050

The EU has implemented various abatement measures to mitigate climate change. One of the most significant policy measures is the EU's greenhouse gas (GHG) emission reduction targets under the EU 2030 climate and energy framework[472], updated as part of the European Green Deal to reduce GHG emissions by at least 55% by 2030 compared to 1990 levels. To achieve this target the EU has implemented a range of policies, including the EU Emissions Trading System (ETS)[473] and the Effort Sharing Regulation (ESR)[474].

Relevant policies and measures in the EU tend to fall under two categories: to mitigate climate change or adapt to its effects. The EU has implemented various abatement measures to mitigate climate change. One of the most significant policy measures is the EU's greenhouse gas (GHG) emission reduction targets under the EU 2030 climate and energy framework[475], updated as part of the European Green Deal to reduce GHG emissions by at least 55% by 2030 compared to 1990 levels. To achieve this target the EU has implemented a range of policies, including the EU Emissions Trading System (ETS)[476] and the Effort Sharing Regulation (ESR)[477]. Additionally, the EU has implemented policies to reduce emissions from the energy sector including the Renewable Energy Directive[478] and the Energy Efficiency Directive[479]. Furthermore, the EU has set out measures to reduce emissions across other

472 EC (2021). 2030 climate & energy framework. https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-energy-framework_en

473 EC (2023). Emissions Trading System Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:02003L0087-20180408

474 EC (2018). Effort Sharing Regulation. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018R0842

475 EC (2021). 2030 climate & energy framework. https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-energy-framework_en

476 EC (2023). Emissions Trading System Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:02003L0087-20180408

477 EC (2018). Effort Sharing Regulation. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018R0842

478 EC (2018). Renewable Energy Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG&toc=OJ:L:2018:328:TOC

479 EC (2018). Energy Efficiency Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0210.01.ENG

specific sectors including the Alternative Fuels Infrastructure Directive[480] and the Common Agricultural Policy[481].

Table A1-6-6: EU ETS Directive 2003/87/EC policy overview	
Policy objectives	The EU ETS aims to deliver substantial reductions in greenhouse gas emissions in a flexible and cost-effective manner. Under the "European Climate Law", the EU must become climate neutral by 2050. [482] It must also reduce net emissions by at least 55% by 2030 in comparison to 1990 levels. The most recent revision of the directive was officially adopted by the Council in April 2023, which revised the ETS to ensure it is fit to contribute to the objectives of the EGD and Fit for 55. Relevant UN SDG is SDG13 – Climate Action
Approach to implementation	• The EU ETS sets an overall cap on emissions, requiring polluters to purchase emission allowances (EUAs) to cover the GHG emissions they produce, but allowing these to be traded to ensure these are achieved in the most cost-effective areas of the sector. The EU ETS is currently in Phase 4 (covering the period 2021-2030), which was initiated in 2021 and then updated in 2023 to align the emissions cap with the EGD. Phase 3 was in operation before Phase 4, covering the period from the start of the appraisal period for this work until 2020. • In the early stages of the EU EST, allowances were allocated via grandfathering based on companies' historical emission levels and a surplus of EUAs. This failed to generate a significant carbon price or to create substantial transformations towards decarbonisation. • Phase 3 saw the default method of allowance allocation modified to auctioning, to address these inherent issues. Some free allowance allocation based on benchmarks remained as protection for industries at risk of carbon leakage.[483] • In Phase 4, auctioning is the default method of allowance allocation. Companies require permits to cover the GHG emissions they produce, and auctioning these allowances creates a carbon price and therefore an incentive to reduce greenhouse gas emissions and meet the overall cap on emissions. This directly implements the PPP, as companies who are producing the greenhouse gas emissions are required to purchase EU allowances (EUAs) to cover all their emissions. Companies can trade EUAs (which have either been allocated for free, for those industries at risk of carbon leakage, or bought via auction) as required. Therefore, before allowances are surrendered at the end of each trading year, companies who have successfully reduced emissions and possess excess allowances can sell to another operator who may be short of allowances (or companies can keep them for future use). This creates a carbon price, and incentivises decarbonisation, facilitating achievement of the overall emissions cap.
Monitoring and reporting	Operators of EU ETS installations must follow several monitoring and reporting requirements. Operators have an obligation to monitor their emissions using a monitoring plan which must comply with defined minimum criteria, approved by the competent authority. They must also submit annual emission reports, which must be verified by an independent verifier. Verifiers must be accredited by a national accreditation body to guarantee their competence an impartiality. Competent authorities are responsible for ensuring compliance and can do so by imposing penalties that are effective, proportionate and dissuasive.[484]

480 EC (2014). Alternative Fuels Infrastructure Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0094

481 EC (2022). Common Agricultural Policy. https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-glance_en#documents

482 EC (2021) European Climate Law https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119

483 https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/development-eu-ets-2005-2020_en

484 Page 19 https://climate.ec.europa.eu/system/files/2016-11/review_of_eu_ets_en.pdf

Table A1-6-6: EU ETS Directive 2003/87/EC policy overview	
	Article 21 of the EU ETS requires all implementing countries to submit an annual report, known as an 'Article 21 report', which should detail how monitoring, reporting, verification and accreditation (MRVA) , permitting, inspection and enforcement is carried out in their Member State. The EC then publishes a technical report summarising the implementation of all these aspects based on the MS submissions.[485]
Approach to enforcement	Sanctions can be utilised under the EU ETS to ensure compliance, however, this approach is used sparingly as countries generally operate through preventative measures, for example, organising regular meetings and maintaining open communication with the operator. The extent to which penalties are applied, their magnitude and the infringement for which they are applied varies significantly between nations, although the most frequently observed penalties are for failing to submit an emission report or failing to monitor according to the approved monitoring plan.[486] The approach to inspections also varies by Member State as the ETS Directive does not explicitly require inspections. Therefore, some Member states do not carry out inspections at all as it is regarded as the job of verifiers to ensure compliance.

Table A1-6-7: Effort Sharing Regulation 2018/842[487] policy overview	
Policy objectives	The EU ESR aims to deliver greenhouse gas emission reductions from 2021-2030 in non-ETS sectors, including domestic transport, buildings, agriculture, small industry and waste sectors (these sectors account for 60% of total EU domestic emissions) through setting national targets and assigning annual emissions budgets for Member States. The ESR follows the Effort Sharing Decision, Decision 406/2009/EC, which set targets in these sectors from 2013-2020. Under the European Climate Law, the EU must become climate neutral by 2050.[488] It must also reduce net emissions by at least 55% by 2030 in comparison to 1990 levels under the EGD. The Regulation was amended in 2023 to align targets and budgets with the objectives of the EGD and Fit for 55. Relevant UN SDG is SDG13 – Climate Action
Approach to implementation	• The ESR sets binding national targets for each Member State to reduce greenhouse gas emissions in the sectors outlined above. These targets are based on criteria including the Member States' share of the EU's total emissions in these sectors and GDP per capita. They are designed to ensure a fair distribution of effort among the Member States. • Each Member State also receives annual emissions budgets, which is the maximum amount of greenhouse gas emissions it is allowed to produce in the non-ETS sectors. This ensures that the costs of reducing emissions are borne by the polluters in each Member State.[489] Crucially, the ESR sets emission targets and budgets for Member States but does not legislate for how these emission reductions should be achieved. Member States have control over what policies and measures to implement to meet these targets.

485 https://op.europa.eu/en/publication-detail/-/publication/c295a008-e79d-11ec-a534-01aa75ed71a1/language-en

486 Page 107 - https://op.europa.eu/en/publication-detail/-/publication/c295a008-e79d-11ec-a534-01aa75ed71a1/language-en

487 Regulation (EU) 2023/857 of the European Parliament and of the Council of 19 April 2023 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R0857

488 EC (2021) European Climate Law https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119

489 https://climate.ec.europa.eu/eu-action/effort-sharing-member-states-emission-targets/effort-sharing-2021-2030-targets-and-flexibilities_en

Table A1-6-7: Effort Sharing Regulation 2018/842[487] policy overview	
	• The ESR allows Member States to use certain flexibility mechanisms, which include allowing Member States to purchase credits from emissions reductions in other countries, or borrow allowances between different compliance periods, to achieve their emissions reduction targets. These flexibility mechanisms are subject to limits and safeguards to ensure that they do not undermine the effectiveness of the regulation or result in the transfer of emissions reductions to other countries. • The Commission is responsible for setting the national targets and emission budgets, but Member State governments are responsible for managing their emissions and implementing policies and measures to meet them. This ultimately determines whether the polluter pays principle is being implemented.
Monitoring and reporting	Compliance assessment and monitoring of progress made towards the goals of the ESR is based on a comprehensive framework of monitoring, reporting and verification (MRV). This incorporates provisions from both the ESR itself, as well as from the Monitoring Mechanism Regulation (MMR) (Regulation (EU) No 525/2013).[490] The MMR establishes a framework for monitoring and reporting of GHGs to track progress towards EU climate and energy targets, in addition to the EU's commitments under international agreements such as the UNFCCC and the Paris Agreement. [491] Member States are obliged to report annually on their greenhouse gas emissions to the European Commission. The MMR and ESD also require Member States to report every second year on national policies and measures implemented in order to achieve their targets under the ESD and on their emission projections. [492] The reporting requirements within the MMR for which Member States are required to that specifically relate to the ESD are: • **Annual GHG emissions:** Member States are required to report on their GHG emissions under the Effort Sharing sectors by 15 January each year (year X) for the year X-2 in accordance with UNFCCC reporting requirements. • **Transfer of AEAs:** Member States must determine and report on information on concluded transfers of AEAs by 15 January each year (year X) for the year X-1 to the Commission. • **Policies and Measures (PAMs):** Member States must report biannually on the PAMs in place to implement emission reductions from Effort Sharing sectors, including planned future PAMs.
Approach to enforcement	GHG inventories submitted by Member States are reviewed by technical experts at the European Commission, with the European Environment Agency, to conduct quality assurance and ascertain the transparency, accuracy, and completeness of submitted data. Member States can utilise flexibility instruments in advance of this compliance check to ensure they reach their assigned targets.[493] If a Member State's emissions are found to have exceeded its actual emission allocation after the flexibility mechanisms have been applied, they can be subject to certain penalties and have to take corrective measures. [494] For example, a deduction can be made from a Member States emission allocation for the following year, equal to the excess emissions (in tonnes of CO_2e) multiplied by an abatement factor of 1.08.'[495]

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490 EC (2016) Effort Sharing Decision Impact Assessment https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016SC0247

491 EC (2013) Monitoring Mechanism regulation https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R0525

492 EC (2016) Effort Sharing Decision Impact Assessment https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016SC0247

493 Page 90 - https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016SC0247

494 Page 12 - https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016SC0247

495 Page 90 - https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016SC0247

There are several other notable policies contributing to climate change mitigation including:

- Ecodesign Directive 2009/125/EC
- EU Ecolabel Regulation (EC) No 66/2010
- Fluorinated greenhouse gases Regulation (EU) No 517/2014
- Ozone depleting substances (ODS) Regulation (EC) No 1005/2009
- Energy Taxation Directive 2003/96/EC
- Renewable Energy Directive (RED) 2018/2001/EU
- Energy Efficiency Directive (EED) 2012/27/EU
- Energy Performance of Buildings Directive 2018/844/EU
- Alternative Fuels Infrastructure Regulation Regulation COM/2021/559 final
- CO2 emission performance standards
- ReFuelEU Aviation
- FuelEU Maritime

Additional information is outlined below for the Ecodesign Directive and Ecolabel Regulation. For the remaining policies, a more succinct outline is included in Table A1-5.

The Ecodesign Directive provides a mechanism to set requirements that energy-related products that must be adhered to before they can be placed on the market and used. It is intended to optimise the environmental performance of energy-using products (e.g., improved energy efficiency), such that the impact to the environment is minimised (e.g., decreased natural resource requirements). 'Energy-related products' are defined as "any good that has an impact on energy consumption during use which is placed on the market and/or put into service, and includes parts intended to be incorporated into energy-related products".[496]

As large volumes of natural resources are required to power energy-related products and devices, the legislation stipulates that 'action should be taken at the design phase' to identify and minimise the pollution caused during the life cycle of the product.[497] Emissions to air, water and soil should be investigated as part of this assessment, as well as pollution through physical effects such as noise and vibration. The Directive applies to units sold in quantities above 200,000 however does not apply to the transport sector.

A 2019 amendment to the Directive brought all energy-related products into the scope of the legislation. The Ecodesign regulation also aims to harmonise legislation across the EU, as national-level approaches to ecodesign regulation may unintentionally create barriers to trade and distorted competition in the internal market (e.g., lenient environmental legislation may create favourable market conditions for energy intensive products). Implementing measures set out the relevant ecodesign parameters that must be adhered to at the product level. Ecodesign parameters are designed for all stages of the product life-cycle (from raw material selection to end-of-life) and for each phase, relevant environmental aspects should be considered, e.g., predicted consumption of materials, anticipated emissions to air, water and soil, expected generation of waste. It additionally sets out which parameters must be used for evaluating the potential to improve environmental outcomes, e.g., weight and volume of the product, use of hazardous substances, etc.

496 Centre for Strategy and Evaluation Services, 2012, Evaluation of the Ecodesign Directive (2009/125/EC) Final Report. Available at: Evaluation of the Ecodesign Directive (2009/125/EC) - Publications Office of the EU (europa.eu)

497 Directive 2009/125/EC of the European Parliament establishing a framework for the setting of ecodesign requirements for energy-related products Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related productsText with EEA relevance (europa.eu)

Table A1-6-8: Ecodesign requirements for sustainable products policy overview	
Policy objective	To ensure the functioning of the internal market (free movement of goods) and protection of the environment by requiring products to reach an adequate level of environmental performance
Approach to implementation	It requires the manufacturer of energy-related products to assess the product model through its life cycle to determine its ecological profile, as per the environmental aspects identified in the implementing measure. This assessment must be used to identify design solutions to ensure the product achieves the necessary environmental performance against benchmarked data. Benchmarks are identified by the Commission in the implementing measure. All MS must take a harmonised approach to implementation to prevent discrepancies in national-level legislation. Implementing measures are set by the Commission (subject to consultation with MS representatives) and manufacturers are responsible for ensuring product compliance with the legislation.
Monitoring and reporting	The legislative text does not set out specific regular reporting requirements, other than to state that MS must update the Commission about the results of market surveillance. It states that, where manufacturers use a management system to assess the conformity of a product, reports must be drawn up and retained so that environmental product performance can be reviewed. The legislation also specifies that where self-regulatory initiatives are undertaken, they must contain a well-designed monitoring system and a plan for monitoring and reporting.
Approach to enforcement	Competent bodies are assigned by public authorities to carry out independent, technical verification of products to ensure they comply with the associated implementing measure. It specifies that surveillance authorities should communicate and exchange information to facilitate improved surveillance. Penalties for infringements are set at the MS-level, and should be "effective, proportionate and dissuasive". The legislation aims to harmonise sustainable product design across the EU. Where MS would prefer to maintain national provisions, this must be communicated to the Commission with a full technical reasoning, and the Commission must approve the application.

The EU Ecolabel scheme is a voluntary initiative to recognise (through labelling) products that have a high level of environmental performance throughout the product life cycle. For products to be granted an EU Ecolabel, it must be demonstrated that they achieve the best environmental performance on the Community market. The legislation stipulates that environmental performance criteria should be "market oriented and limited to the most significant environmental impacts of products during their whole life cycle".[498] The Ecolabel regulation applies to any goods or services available on the internal market (exempting medicinal products) and requirements must be coordinated with specifications set out in the Ecodesign directive to ensure a coherent and standardised approach to labelling. As a voluntary initiative, Ecolabel criteria can be developed by "any interested party". Common procedural rules must be followed and the process must be overseen by the Commission.

General requirements include:

- Basing criteria on the environmental performance of products
- The requirements a product must adhere to qualify
- Scientific criteria, including environmental impacts, substitution of hazardous chemicals, increased durability, as well as health and safety and social and ethical considerations.

498 Regulation (EC) No 66/2010 of the European Parliament on the EU Ecolabel. Available at: Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel (europa.eu)

Table A1-6-9: Ecodesign requirements for sustainable products policy overview	
Policy objective	To establish a voluntary eco-label award scheme to promote products with a reduced environmental impact during their life cycle. To provide consumers with accurate, non-deceptive, science-based information on the environmental impacts of products.
Approach to implementation	Competent bodies are assigned by Member State governments and their role is to ensure that labelling processes are conducted in a "consistent, neutral and reliable manner".
Monitoring and reporting	The legislative text does not set out specific regular reporting requirements. For parties leading the development/revision of ecolabel criteria, the regulation specifies they must produce reports on proposals for draft criteria supported by technical data.
Approach to enforcement	This is a voluntary initiative.

PO2 enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change

The EU has also implemented various abatement measures for adaptation to climate change. The EU's Adaptation Strategy[499], launched in 2013, sets out a framework for addressing the impacts of climate change and increasing resilience in different sectors, such as water management, agriculture, and forestry. Additionally, the EU has introduced regulations and standards to improve the resilience of infrastructure, such as the EU Directive on the assessment and management of flood risks[500]. Through these abatement measures, the EU aims to increase the resilience of its Member States to the impacts of climate change and ensure that they are prepared to adapt to future challenges.

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A2.2.3 Implementing the PPP

EU approach

The PPP is not referenced directly in the legislation for the EU ETS, however, the principle is mentioned in the supporting evaluation and impact assessments. The EU ETS Directive implements the PPP by setting an overall cap on GHG emissions, creating a market price for the externality of GHG emissions and therefore producing a financial incentive for companies to reduce and prevent their GHG emissions. The cap decreases linearly to align with the EU's emission reduction commitments. The original Phase 4 linear reduction levels predated the European Climate Law, [501] so the cap reductions were updated in 2022 to align the with the 2030 target of reducing GHG emissions by at least 55% by 2030 in comparison to 1990 levels. This ensures that the burden for reducing emissions is placed on EU companies in the ETS sectors, in line with the PPP. Decarbonisation will require financial investment, meaning that those who are emitting GHG are ultimately responsible for paying for mitigation.

Free allowances have traditionally been allocated via grandfathering (based on historical emissions) to protect companies in sectors at risk of carbon leakage. Where this applied, companies did not have to pay for their emissions allowances. Evaluation findings suggest that free allowance allocation may have hampered implementation of the PPP as free allowances in an ETS constitute a subsidy. However, the latest update to the ETS involves phasing out free allowances and phasing in a carbon border adjustment mechanism.[502] Even with free allocations, opportunity costs still apply to EU ETS operators, and the mechanism avoids carbon leakage (providing a strong incentive to switch from fossil fuels to biomass).

499 EC (2021). Climate Adaptation Strategy. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN

500 EC (2007). EU Directive on the assessment and management of flood risks. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060

501 EC (2021) European Climate Law https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119

502 https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en

Nonetheless, it leads to a loss of auctioning revenues for Member States, and some reviews conclude it does not sufficiently apply the PPP.[503]

The EU ESR implements the PPP by setting legally binding national level GHG emissions reduction targets for non-ETS sectors combined (e.g. waste, transport, agriculture, and buildings). Member States are then responsible for implementing policies and measures to ensure that these targets are met. The target given to each Member State varies depending on GDP and levels of historical emissions. Therefore, the PPP is implemented at Member State level as targets are designed to delegate burden to the degree of pollution they are responsible for. Implementation of the PPP will depend on the specific policies and measures selected by Member States to meet their targets (most common is the use of taxes that put a price on carbon).

Table A1-5 outlines additional policies that contribute to climate change mitigation in the EU together with an overview of the way in which the PPP is applied in these cases is presented below.

Table A1-5: Approaches to implementing the PPP in other climate change policies

Policy	Approach to implementing the PPP
Fluorinated greenhouse gases Regulation (EU) No 517/2014	There is no reference to the PPP in the recitals or the provisions of the legislation. The F-gases regulation sets rules on the containment, use, recovery and destruction of fluorinated gases, including restricting the placing on the market of specific products and equipment that contain F-gases, restrictions on certain uses of F-gases and quantitative limits for the placing on the market of hydrofluorocarbons. The PPP is implemented through requiring manufacturers of products and equipment containing F-gases or causing emissions of F-gases to comply with restrictions or bans and to phase down their F-gas usage through setting annual quotas. There is a planned revision in progress[504]. It is unclear how the revision will impact the approach to implementing the PPP.
Ozone depleting substances (ODS) Regulation (EC) No 1005/2009	There is no reference to the PPP in the recitals or the provisions of the legislation. The ODS regulation requires undertakings to take measures to prevent leakages and emissions of ODS. Whilst primarily targeted at protecting the ozone layer, its measures and requirements align with the broader goal of mitigating climate change, for example through targeting CFCs and HFCs which have high global warming potentials (GWPs). By encouraging the phasedown of ODS, the Regulation also implements the PPP in relation to climate change by requiring producers to comply with bans, restrictions or phasedowns of substances which also have significant GWPs. There is a planned revision in progress. It is unclear how the revision will impact the approach to implementing the PPP.
Energy Taxation Directive 2003/96/EC	There is no reference to the PPP in the recitals or the provisions of the legislation. Seeks to address externalities by introducing minimum taxation rates for electricity, and motor, aviation and heating fuels. The PPP is implemented through imposing minimum tax rates on energy products with higher greenhouse gas emissions, such as fossil fuels. The Directive also sets provisions for exemptions or reduced tax rates for specific energy products or sectors deemed to be environmentally friendly, incentivising cleaner alternatives and sustainable practices. There is a planned revision in progress [505]. It is unclear how the revision will impact the approach to implementing the PPP.

503 5 B. Anderson, J. Leib, R. Martin, M. McGuigan, M. Muûls, L. de Preux, U. J. Wagner, "Climate Change Policy and Business in Europe Evidence from Interviewing Managers", 2011; http://cep.lse.ac.uk/pubs/download/occasional/op027.pdf

504 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0150

505 https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021PC0563

Table A1-5: Approaches to implementing the PPP in other climate change policies	
Policy	**Approach to implementing the PPP**
Renewable Energy Directive (RED) 2018/2001/EU[506]	There is no reference to the PPP in the recitals or the provisions of the legislation. The RED is a framework intended to increase the share of renewable energy sources in the EU's energy consumption. It included national renewable energy targets, which Member States must meet by providing incentives for the development and deployment of renewable energy, such as feed-in-tariffs and tax incentives. As transitioning to renewable energy sources requires financial investment, setting targets for Member States implements the PPP to some extent by ensuring that Member States bear this cost. There is a planned revision in progress. It is unclear how the revision will impact the approach to implementing the PPP.
Energy Efficiency Directive (EED) 2012/27/EU[507], amended by Directive (EU) 2023/1791	There is no reference to the PPP in the recitals or the provisions of the legislation. The EED includes provisions which require Member States to establish targets for energy efficiency. It also includes provisions on minimum requirements for efficiency in energy use and for efficiency in energy supply, aiming to promote energy-efficient technologies and practices. It also establishes a framework for energy audits and management systems. This incurs a cost borne by the energy consumer (the polluter) to increase their efficiency and therefore mitigate GHG emissions. A revision was adopted in September 2023 and entered into force October 2023. There is no reference to the PPP in the changes made.
Energy Performance of Buildings Directive 2018/844/EU[508]	There is no reference to the PPP in the recitals or the provisions of the legislation. The Energy Performance of Buildings Directive requires Member States to establish minimum energy requirements for new and existing buildings, including the use of energy performance certificates for buildings. This implements the PPP by requiring Member States to take action to improve the energy efficiency of buildings but does not necessarily implement the PPP. There is a planned revision in progress[509]. It is unclear how the revision will impact the approach to implementing the PPP.
Alternative Fuels Infrastructure Regulation COM/2021/559 final	There is no reference to the PPP in the recitals or the provisions of the legislation. The alternative fuels infrastructure regulation aims to promote the use of alternative fuels and reduce the dependence of the transport sector on fossil fuels and the resulting greenhouse gas emissions. It requires Member States to set national targets for the deployment of alternative fuels infrastructure and develop measures to meet these objectives. Costs are primarily incurred by operators at maritime ports and airports who are required to comply with rules to provide access.
CO_2 emission performance standards	There is no reference to the PPP in the recitals or the provisions of the legislation. Vehicle manufacturers are required to comply with EU fleet-wide CO_2 emission targets applying from 2020, 2025, and 2030. Financial penalties apply to vehicle manufacturers if targets are exceeded.
ReFuelEU Aviation	Aims to increase the uptake of sustainable fuels by aircraft to reduce their environmental footprint.[510] The mandating of sustainable aviation fuels will present a cost to airlines and reduce air quality emissions.

506 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0557

507 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0027

508 https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32010L0031

509 https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021PC0563

510https://www.consilium.europa.eu/en/infographics/fit-for-55-refueleufueleu/#:~:text=The%20regulations%20on%20ensuring%20a%20level%20playing%20field,aircraft%20and%20ships%20to%20reduce%20their%20environmental%20footprint.

Table A1-5: Approaches to implementing the PPP in other climate change policies	
Policy	**Approach to implementing the PPP**
FuelEU Maritime	Aims to increase the use of renewable and low-carbon fuels and reduce the GHG emissions from the maritime sector. Costs will fall on economic operators.[511]

In addition, to the above, the Ecodesign Directive indirectly implements the PPP as manufacturers are responsible for ensuring the environmental impact (and efficiency) of their products throughout all life cycle stages. Implementing measures set out minimum energy efficiency and environmental performance standards at the product-level, and manufacturers must ensure their products are compliant with the required specifications. The legislation sets out that where a manufacturer exists outside of the EU, the importing entity is responsible for ensuring the products are compliant. This is a preventive approach, as energy efficient products have lower energy input requirements and therefore reduce environmental pollution. The scope of the regulation relates to energy efficiency, but in testing products pollution to air, water and soil should be investigated. It is the responsibility of the manufacturer to ensure they are aware of updates to the Ecodesign Working Plan, adapt their products and production processes to ensure compliance with the Directive, and bear the costs of ongoing compliance and market surveillance.

Costs associated with the Ecodesign Directive include developing the framework/implementing measures and for implementing and enforcing the regulation. Member States are responsible for implementing and enforcing the Directive, whilst industry and businesses are responsible for ensuring their products comply with the relevant product specifications. A 2012 evaluation of the Ecodesign Directive projected costs for the period 2012-2017 would total €18 290 000 to the Commission and €2 800 000 on average per MS.[512] In 2021, the Directive was estimated to have saved €120 billion in energy expenditure across the EU.[513] Data on costs to industry was limited at the time of evaluation but it was anticipated any cost increases may be passed onto consumers.

The Ecodesign Working plan sets out priority product groups where significant energy and material efficiency savings can be made. Early working plans (2009-2011) included air conditioning systems, electric and fossil-fuelled heating equipment, food preparing equipment, industrial and lab furnace ovens, and refrigerating and freezing equipment, amongst other things.[514] For the period 2012-2014, priority products included steam boilers, power cables, enterprise servers and smart appliances.[515] For the period 2016-2019, building automation and control systems, electric kettles, hand dryers, lifts, solar panels/inverters, refrigerated containers and high-pressure cleaners were added to the priority list.[516] For the period 2022-2024, low temperature emitters (radiators, convectors), professional laundry appliances and

511https://www.consilium.europa.eu/en/press/press-releases/2023/03/23/fueleu-maritime-initiative-provisional-agreement-to-decarbonise-the-maritime-sector/#:~:text=The%20main%20objective%20of%20the%20FuelEU%20Maritime%20initiative%2C,traffic%20and%20avoiding%20distortions%20in%20the%20internal%20market.

512 Centre for Strategy and Evaluation Services, 2012, Evaluation of the Ecodesign Directive. Available at: Evaluation of the Ecodesign Directive (2009/125/EC) - Publications Office of the EU (europa.eu)

513 European Commission, 2022, Ecodesign for sustainable products. Available at Ecodesign for sustainable products (europa.eu)

514 European Commission, 2009, Establishment of the working plan for 2009-2011 under the Ecodesign Directive ENTR-2008-01191-00-00-EN-REV-00 (europa.eu)

515 European Commission, presentation detailing the Ecodesign working plan for 2012-2014. Available at PPT - (Draft) Ecodesign Working Plan 2012-14 PowerPoint Presentation, free download - ID:705648 (slideserve.com)

516European Commission, 2016, Ecodesign Working Plan 2016-2019. Available at: eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0773

dishwashers, universal external power suppliers and electrical vehicle chargers were added to the list.[517]

In 2022, the Commission published their proposed amendments to the Ecodesign Directive, with the intention to repeal the initial Directive, citing that "consumption and production in the EU is not sustainable and not adequately addressed by existing EU product and market rules".[518] Specific to the Ecodesign directive, the impact assessment identified that the environmental impacts of products are not being sufficiently considered at the design stage, resulting in frequent replacing of products with associated energy intensive processes. The Commission propose to extend the scope of the Directive beyond energy-related products, with the preferred option identified as extending the scope to all physical goods.[519] It was stated that this option would allow for Sustainable Products Initiative (SPI) measures[520] to be put in place for all products, as well as providing a mechanism to capture new and emerging products whose environmental impacts are not yet known. It was estimated that extending the scope to all physical products could cover an additional "16% of GHG emissions, 42% of human toxicity impacts and 18% of primary energy consumption".[518] A number of priority products were identified as part of the other impact assessment options (energy-related products **including** transport, textiles, furniture, high impact intermediary products, chemicals) and could be used as a reasonable starting point for implementing further changes. With reference to the PPP, it would be the responsibility of manufacturers and importers to ensure their products are updated to comply with the legislation, and to bear the relevant research and development/compliance costs.

Alongside the Ecodesign Directive there is a voluntary EU Ecolabel scheme initiative to recognise (through labelling) products that have a high level of environmental performance throughout the product life cycle. For products to be granted an EU Ecolabel, it must be demonstrated that they achieve the best environmental performance on the Community market. The legislation stipulates that environmental performance criteria should be "market oriented and limited to the most significant environmental impacts of products during their whole life cycle".[521]

The Ecolabel Regulation indirectly implements the PPP by providing a voluntary mechanism to identify and label products that have a higher level of environmental performance than others. This is in addition to minimum standards and requirements stipulated by the Ecodesign Directive. The regulation is unique in that it is a) voluntary and b) encourages interested parties to develop technical criteria through coordination with the Commission. The EU Ecolabel Product Catalogue details all products with an EU Ecolabel, from the following sectors: clothing and textiles, coverings, do-it-yourself (DIY), electronic equipment, furniture, gardening, lubricants, household items, paper products and personal care products. The PPP is indirectly implemented as it is the responsibility of manufacturers to ensure their products meet the minimum requirements for an EU Ecolabel, and to initiate proceedings to be granted the label.

National approaches

517 European Commission, 2022, Ecodesign and Energy Labelling Working Plan 2022-2024, EUR-Lex - 52022XC0504(01) - EN - EUR-Lex (europa.eu)

518 European Commission, 2022, Executive Summary of the Impact Assessment Accompanying the document Proposal for a Regulation of the European Parliament and of the Council SWD_2022_83_2_EN_resume_impact_assessment_part1_v3.pdf (europa.eu)

519 European Commission, 2022, Impact Assessment Accompanying the document Proposal for a Regulation of the European Parliament and of the Council establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC SWD_2022_82_1_EN_impact_assessment_part1_v2.pdf (europa.eu)

520 The SPI refers to the product policy legislation as referred to in the Circular Economy Action Plan A new Circular Economy Action Plan (europa.eu)

521 Regulation (EC) No 66/2010 of the European Parliament on the EU Ecolabel. Available at: Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel (europa.eu)

As the cap for the EU ETS and provisions for purchasing/trading allowances are set at EU level, there is no variation at Member State level in how the PPP is implemented. However, the targets and emissions budgets for non-ETS sectors set in the ESR are allocated based on GDP, population and GHG emissions. Therefore, Member States inherently will need varied approaches to meet their targets and have the flexibility to choose the measures and policies necessary to achieve those targets. Examples of measures implemented to encourage GHG emissions reductions in ESR sectors across 8 Member States have been identified in a secondary review.[522] A selection of examples of measures which implement the PPP are given below:

Table A1-6: Policies and measures implemented by Member States under the ESR

National level intervention	Approach to implementing the PPP
Croatia	
Emission tax for small industry	Croatia has implemented a CO_2 emission tax for non-ETS stationary sources emitting more than 450 tons of CO_2 per year, with lower rates of tax paid by those sites investing in energy efficiency, renewable energy sources and other ways of decarbonising. This directly implements the PPP by requiring small businesses who are emitting CO_2 to pay a tax, whilst incentivising investment in low carbon practices.
France	
Tax on heavy cars (over 1,800kg)[523]	In France, a tax must be paid on all vehicles exceeding 1800kg, at a rate of €10 per additional kilogram. This implements the PPP by charging operators of heavier cars which require more fuel to operate and incentivises consumers to choose vehicles with a lower carbon impact.
Germany	
National Emissions Trading System for transport and buildings[524]	This national emissions trading system establishes a cap and trade scheme for emissions for heating and transport (not covered by EU wide emissions trading scheme). This implements the PPP as a carbon price is established for emissions in these sectors, incentivising polluters to reduce their emissions.
Tax exemptions for EVs[525]	To combat emissions from the transport sector, there is a tax exemption of up to 10 years for EVs, which will be grated up until December 31 2030. This implements the PPP by ensuring that drivers who purchase and use high emitting vehicles pay a tax, whilst incentivising EVs and creating favourable market conditions for low-carbon options.
Spain	
Tax on fluorinated gases	From 2016 onwards a national tax of €15/tonne CO_{2e} was in place for F-gases. This charges users of products containing F-gases and incentivises producers to use alternatives.

In addition to variations taken in implementation of EU level policies, some Member States have also implemented additional measures to deal with the pressures of climate change that implement the PPP. These are implemented independently of the EU level instruments analysed above.

522 https://caneurope.org/content/uploads/2022/03/LIFE-UNIFY_ESR-Report-2022-1.pdf

523 https://www.france24.com/en/live-news/20201015-suvs-targeted-in-new-french-weight-tax

524 https://eeb.org/wp-content/uploads/2022/03/German-Emissions-Trading-System-for-buildings-and-transport.pdf

525 https://www.vda.de/en/topics/electromobility/staatliche-foerderprogramme

Table A1-6-10: Policies and measures taken to address climate change at Member State level that implement the PPP	
National action	**Approach to implementing the PPP**
Carbon tax in the Netherlands [526]	The tax, in place since 2021, covers all EU ETS installations and is imposed on emissions exceeding EU ETS benchmarks minus a predefined reduction path. The imposed tax on CO_2 operates on a system of baselines and credits, with emissions exceeding the baseline being subject to taxation. To allow sufficient time for Dutch industries to adjust to the levy, it started at €30 per ton of CO_2 in 2021 and progressively increases by €10.56 annually up to a rate of €125 per ton of CO_2 by 2030. As the levy takes the form of a minimum CO_2 price, it is adjusted based on the EU ETS price from the previous year.
Peat tax subsidy/carbon price floor in Finland [527]	The use of peat as an energy source in Finland is subsidised. The taxation rate for peat is set at €3 per MWh, whereas unsubsidized it would be €29.50 per MWh. Within the government's budget, the estimated annual subsidy for peat amounts to 180 million euros. Using peat as an energy resource means losing the ecosystem services that it offers (including acting as a carbon store) and releasing large amounts of greenhouse gas emissions. In 2020, the government addressed this by implementing a carbon price floor specifically for peat, which determines the tax applicable to it. The tax is linked to the price of emission allowances, meaning that as the price of emission allowances declines, the tax on peat would increase.
Carbon tax in Sweden [528]	In 1991, Sweden implemented a carbon tax in conjunction with an existing energy tax. The tax is imposed on all fossil fuels based on their carbon content, which is directly proportional to their greenhouse gas emissions. This eliminates the need to measure actual emissions, making the system significantly simpler. Notably, sustainable biofuels, which do not contribute to a net increase in atmospheric carbon, are not subject to carbon taxation. The initial carbon tax rate was set at SEK 250 (~€25) per tonne of emitted fossil carbon dioxide when it was introduced in 1991. Over time, it has been gradually raised to reach SEK 1,330 (~€122) in 2023. The gradual and incremental increase in tax levels has provided households and businesses with sufficient time to adapt, thereby enhancing the feasibility of implementing tax hikes. In the past, a lower tax rate was applied to industries not covered by the EU Emissions Trading System (EU ETS), while industries within the EU ETS were entirely exempt from the carbon tax. However, since 2018, the industry rate outside the EU ETS aligns with the general tax rate.

526 https://environment.ec.europa.eu/system/files/2021-10/Taxes%2C%20charges%20and%20fees.pdf

527 https://environment.ec.europa.eu/system/files/2021-10/Tradeable%20permits.pdf

528https://www.government.se/government-policy/swedens-carbon-tax/swedens-carbon-tax/

A2.2.4 EU funding support

Table A1-8 provides and overview of EU Funds which are directed towards climate change, the actions the fund subsidises, the beneficiaries and the related proofing mechanisms.

Table A1-6-11: EU expenditure contributing to climate change policy area

EU funds	EU subsidies	Actions subsidised by EU funds	Beneficiaries	Proofing mechanism
Horizon Europe	Article 7 of the Regulation establishes a general principle of directing at least 35% of the Horizon 2020 funds towards climate objectives.	Areas of interventions, specified in "Climate, Energy and Mobility" include funding for 1. climate science and solutions; 2. energy supply; 2. energy systems and grids; 3. buildings and industrial facilities in energy transition; 4. communities and cities; 5. industrial competitiveness in transport; 6. clean, safe and accessible transport and mobility; 7. smart mobility; energy storage.	Any legal entity (natural person or legal person).	Applicants shall refer to the DNSH (Do no significant harm) principle for the proposed research methodology and impact to assure that they do not "make a significant harm to any of the six environmental objectives" set by the EU taxonomy regulation (Horizon Europe Proposal Evaluation, 2023).
CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development).	40% of CAP expenditures will be targeted towards climate action (2023-2027)), whereby 47% of EAFRD and 33% of EAGF will target climate expenditures.	Climate change mitigation and adaptation, reduction of greenhouse gas emissions, carbon sequestration enhancement, sustainable energy usage[529].	Main beneficiaries are EU farmers. List available here	DNSH principle applies. Cross-compliance requirements: • GAEC 1[530] aiming to 'safe-guard against conversion to other agricultural uses to preserve carbon stock' • GAEC 2: aiming at 'Protec-tion of carbon-rich soils'

529 (see EU specific objective 'To contribute to climate change mitigation and adaptation, including by reducing greenhouse gas emissions and enhancing carbon sequestration, as well as to promote sustainable energy' in Annex I CAP Strategic Plans regulation).

530 See Annex III of CAP Strategic Plan Regulation

Table A1-6-11: EU expenditure contributing to climate change policy area				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
				• GAEC 3 aiming at 'Maintenance of soil organic matter'
Cohesion policy funds	12.7bn expenditure is planned under 'Climate change adaptation', 9bn under 'Renewable energy', 21.8 bn under 'Energy efficiency, 5.4bn under 'smart energy systems' and 18bn under 'sustainable urban mobility'.[531]	Several relevant intervention fields: • 'Research and innovation processes, technology transfer and cooperation between enterprises, research centres and universities, focusing on the low carbon economy, resilience and adaptation to climate change' (029)[532] • Energy efficiency and demonstration projects for businesses (038-040), • Energy efficiency renovation of existing housing stock (041-042; 044-045), 'Construction of new energy efficient buildings' (043), • Support to entities that provide services contributing to the low carbon economy and to resilience to climate change, including awareness-raising measures (046), • Renewable energy (047-052),	Public or private bodies, entities with or without legal personality, or natural persons. Data not yet available on actual beneficiaries.	Climate proofing of investments with expected lifespan of at least 5 years. CPR Art 2(42) defines this process as one preventing *'infrastructure from being vulnerable to potential long-term climate impacts whilst ensuring that the 'energy efficiency first' principle is respected and that the level of greenhouse gas emissions arising from the project is consistent with the climate neutrality objective in 2050'* • Thematic enabling condition 2.1: Strategic policy framework to support energy efficiency renovation of residential and non-residential buildings • Thematic enabling condition 2.2. Governance of the energy sector (incl. consistency with the long-term greenhouse gas emission

531 According to the data complied for the cohesion open data platform

532 See Annex I CPR

Table A1-6-11: EU expenditure contributing to climate change policy area				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
		• High efficiency co-generation, efficient district heating and cooling with low lifecycle emissions (055) • Replacement of coal-based heating systems by gas-based heating systems for climate mitigation purposes (056), • Distribution and transport of natural gas substituting coal (056), Adaptation to climate change measures and prevention and management of climate related risks (058-060), Other measures to reduce greenhouse gas emissions in the area of preservation and restoration of natural areas with high potential for carbon absorption and storage, e.g. by rewetting of moorlands, the capture of landfill gas (080).		reduction objectives under the Paris Agreement) • Thematic enabling condition 2.3. Effective promotion of the use of renewable energy across sectors and across the Union • Thematic enabling condition 2.4. Effective disaster risk management framework. (incl. climate adaptation) • DNSH, objectives1 and 2: 'Climate Change Mitigation' and 'Climate Change Adaptation' • EIA/SEA, to the extent relevant.
LIFE +	The financial envelope for the LFFE implementation mentions Climate Action as one of the two structures of Project funding. The basic act specifies 61% budget contribution to the climate.	In the field of "Climate Action" there are 2 subprogrammes: (I) Climate Change Mitigation and Adaptation" (947 million euros) , (ii) Clean Energy Transition, 997 million euros.	Funding is targeted at legal entities established either in an MS or an overseas country or in a third country associated with LIFE, including legal entities established under Union or international law.	The LIFE Programme directly supports the six environmental objectives set by the EU taxonomy regulation, thus DNSH (Do no significant harm) principle applies.
European Fund for Strategic Investments and InvestEU	At least 30% of the InvestEU Programme shall finance	Investments addressing climate change, climate adaption and	Any natural or legal persons (based in an EU or any third	The application of the 'Do No Significant Harm' (DNSH)

Table A1-6-11: EU expenditure contributing to climate change policy area				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
	investments supporting to EU's climate objectives.	mitigation as specified in the Annex II. Working draft	eligible country) can benefit from the Project. This includes private entities, public sector entities, mixed entities, Non-profit organizations.	principle could be regarded as such. Operations under the *sustainable infrastructure window* are subject to climate, environmental and social sustainability proofing to minimise negative impacts and maximise benefits for the climate, environment and social dimension (see Article 8 of the Regulation.) This is described in the Technical guidance on sustainability proofing for the InvestEU Fund.
Recovery and Resilience Facility	Overall estimated climate expenditure amounts to about 40% of the RRF. [533] Specifically, 'Sustainable mobility' actions make up 31% of NRRPs. 'Energy efficiency' adds up to 28%, 'renewable energy and networks' are at 13%, R&D&I in green activities (e.g. climate change mitigation, circular economy) at 6%, and Climate change adaptation at 5%.Other climate change mitigation (e.g.. sustainable industry) actions stand at 2.2%.	There are several intervention fields related to this policy area, incl. 24 under sustainable mobility, and 25 under the other categories listed under 'EU subsidies'[534]	Public administration, public sector and private sector entities. Beneficiary data is not available for RRF (only top 100 will be published for each MS as per the requirements of REPowerEU)	DNSH, objectives1 and 2: 'Climate Change Mitigation' and 'Climate Change Adaptation' EIA/SEA, to the extent relevant.

533 See RRF scoreboard data

534 See Annex VI of the RRF Regulation (available here in a separate document)

A2.3 Transition to a circular economy

A2.3.1. Description of environmental pressure

Each year, the European Union (EU) produces approximately 2.7 billion tonnes of waste, with 4% of this being classified as hazardous. Since 2010, total waste (excluding major mineral wastes) has increased for the EU 27, in parallel with an increase in GDP. This rise in waste production has been driven primarily by secondary waste from increased waste incineration and waste sorting operations. Plastic pollution is a global problem due to its ability to alter habitats and natural processes, reducing ecosystems' ability to adapt to climate change, directly affecting people's livelihoods, food production capabilities and social well-being. The environmental, social, economic and health risks of plastics need to be assessed alongside other environmental stressors, like climate change, ecosystem degradation and resource use.[535]

Solid waste causes air and water pollution, GHG emissions, produces hazardous gases and leachates, massive land use and exposure to dangerous chemicals. Despite efforts to decrease waste production, the quantity of waste has increased: between 2010 and 2018, the total amount of generated waste increased by 5% in Europe, reaching 114 million tonnes. In addition to reducing waste generated, effective waste management is essential to minimize the environmental impacts of waste generated. Waste that has not been disposed of effectively has serious implications for the environment including excess release of methane gas from landfills and carbon dioxide from waste incinerations and effects on wildlife via waste in waterways in marine life, and the natural environment.[536]

Working draft

A 2021 study identified that household consumption since 1996 has increased in both value and volume with the exception of during the Financial Crisis.[537]Reducing consumption will be key to reducing the impact of increasing consumption in the EU. In light of the European Commission's circular economy action plan (CEAP), published in March 2020, the benefits of adopting a circular economy that favours sustainable growth have been emphasised in recent times. The EU's commitment to transition towards a circular economy is one of the main building blocks of the European Green Deal and will reduce pressure significantly on natural resources whilst also contributing towards the UE's 2050 climate neutrality target and halting biodiversity loss.[538] The alternative to a circular economy, resembles more traditional conceptualisations of production and consumption that have been adopted in capitalist societies until of late, this cycle is more linear, whereby resources are taken, manufactured, consumed and thrown away. This results in the unsustainable-use of finite raw materials however and causes significant quantities of waste.[539]

Depending on where the product is made, by-products and run-off from plants may enter into the local environment, e.g., air, water or soil, thus potentially affecting biodiversity and damaging the environment. Pollutants emitted to the environment may end up in crops and food and increase human exposure to potentially hazardous substances. When products are disposed of at the end-of-life stage, pollution from waste creates enormous polluting pressure on the environment, and plastic pollution has been a major focus of international initiatives in recent years (e.g., ongoing negotiations to establish an international legally binding instrument

535 Plastic Pollution (unep.org)

536 How Our Trash Impacts the Environment - Earth Day

537 Letondu (2021). Consumption in Europe: Trends and breaks. https://www.eesc.europa.eu/sites/default/files/files/letondu-consumption_in_europe.pdf

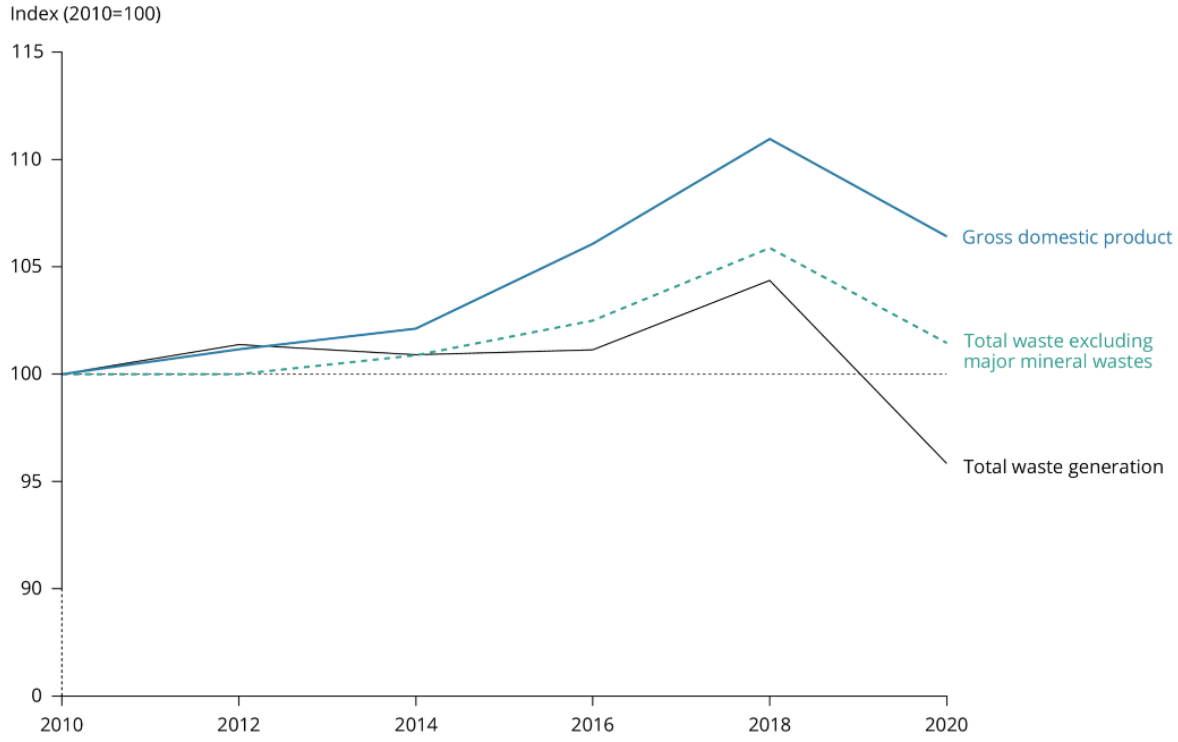
538 Circular economy action plan (europa.eu)

539 What is the circular economy - and why is the world less circular? | World Economic Forum (weforum.org)

on plastic pollution).[540] As such, initiatives to progress towards sustainable production and consumption patterns (across the product life-cycle) will reduce pollutant pressures across a range of environmental media.

In this context, the EEA monitor trends in both the EU Material Footprint and total waste generation as their headline indicators for Priority Objective #3, a regenerative circular economy. Total per capita waste generation decreased by 4.2% in the EU from 2010-2020, however, this is largely driven by a significant decrease in 2020 as a result of the pandemic which is not expected to be permanent. Trends in waste generation are strongly coupled with economic growth and GDP (see Figure 6-3). Over the appraisal period, waste generation remained stable from 2014-2016, increased steadily from 2016-2018 and then decreased sharply from 2018 to 2020. Major mineral wastes, including hard rocks, concrete, soils and others which are produced largely from the mining and construction sectors represent a large proportion of waste generated (64% in 2020). However, they usually represent a lesser environmental concern because of their inert nature.

Figure 6-3 Waste generated in the EU-27 compared to GDP



Source: EEA (2022)[541]

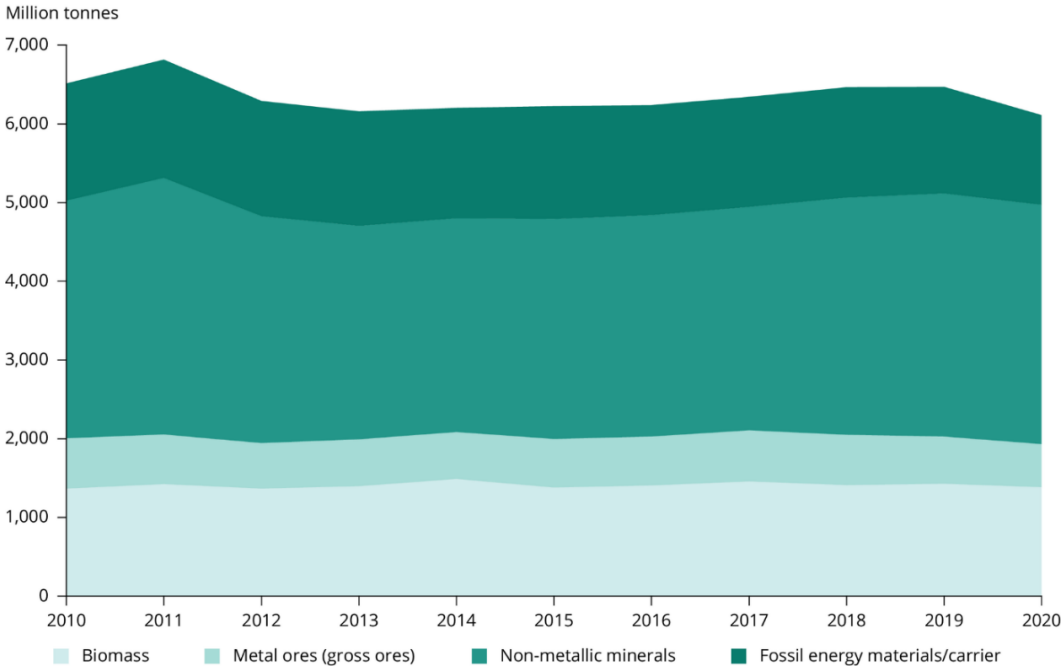
Since 2010, the EU's material footprint – the amount of raw material extracted to manufacture the goods and services consumed by EU citizens - has decreased slightly and was 6.1 billion tonnes in 2020. Despite some reduction in the use of raw materials, EU27 consumption is above the global average and some estimates suggest exceeds the planet's safe operating space for resource extraction.[542] Consumption of non-metal minerals accounted for 50% of the footprint in 2020 (and largely was driving this trend), biomass for 23%, fossil fuels for 19% and metals for 9%.

540 UN Environment Programme, 2022, 'UNEA Resolution 5/14 entitled "End plastic pollution: Towards an international legally binding instrument". Available at: UNITED (unep.org)

541 https://www.eea.europa.eu/ims/waste-generation-and-decoupling-in-europe

542 https://eplca.jrc.ec.europa.eu/ConsumptionFootprintPlatform.html

Figure 6-4 EU Material Footprint, expressed in million tonnes of raw material equivalent



Source: EEA (2022) https://www.eea.europa.eu/ims/europe2019s-material-footprint

A2.3.2 Policy overview

Working draft

Key to advancing towards a regenerative growth model, decoupling economic growth from resource use and environmental degradation, and accelerating the transition to a circular economy (PO3 of the 8th EAP) are waste management policies. The Waste FD is the EU's legal framework for treating and managing waste in the EU, including provisions for recycling and waste collection. Certain categories of waste require specific approaches. Therefore, as well as the overarching legal framework, the EU has many laws to address different types of waste, including the Packaging Waste Directive[543], the WEEE Directive[544], the ELV Directive[545], the Batteries Directive[546], and the Single-use plastics Directive[547].

EU waste policy aims to contribute to the circular economy by reducing the amount raw materials consumed and maximising the value of materials along the production and consumption chain[548]. The Waste FD is the EU's legal framework for treating and managing waste in the EU. It introduces an order of preference for waste management called the "waste hierarchy" [549]. Key features of the Waste FD are presented in **Table A1-6-12**. Alongside the Waste FD is the EU's circular economy action plan[550] provides a framework of measures which aim to achieve the EU's waste and resource objectives.

543 EC (2018). Packaging Waste Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31994L0062

544 EC (2018). WEEE Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02012L0019-20180704

545 EC (2020). ELV Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32000L0053

546 EC (2018). Batteries Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02006L0066-20180704

547 EC (2019). Single-use Plastics Directive. https://eur-lex.europa.eu/eli/dir/2019/904/oj

548 Environmental Protection Agency (2023) The Circular Economy | Environmental Protection Agency (epa.ie)

549 EC (2018). Waste Framework Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705

550 EC (2015). Circular Economy Action Plan. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN

Relevant UN SDG to EU waste policy are SDG6 – Clean water and sanitation, SDG12 - Responsible consumption and production, and SDG14 – Life below water.

Certain categories of waste require specific approaches. Therefore, as well as the overarching legal framework, the EU has many laws to address different types of waste, including the Packaging Waste Directive[551], the WEEE Directive[552], the ELV Directive[553], the Batteries Directive[554], and the Single-use plastics Directive[555]. These specific policies are reviewed taking a light-touch approach, focussing on how they contribute to the objectives of the Waste FD.

Table A1-6-12: Waste FD policy overview

Policy objectives	• Waste prevention and management - addressing the adverse impacts of the generation and management of waste on the environment and human health, and for improving efficient use of resources which are crucial for the transition to a circular economy.[556] • It contributes to the European Green Deal aim of promoting growth by transitioning to a modern, resource-efficient and competitive economy. • Relevant UN SDG to EU waste policy are SDG6 – Clean water and sanitation, SDG12 - Responsible consumption and production, and SDG14 – Life below water.
Approach to implementation	Establishes a framework for waste management. It requires Member States to take measures to ensure that waste management costs are covered by the parties responsible for producing the waste, where possible. Member States should be able to demonstrate that the measure in question is adequate to attain the objective of preventing and reducing littering in the natural and marine environment, does not go beyond what is necessary to attain that objective and does not constitute a means of arbitrary discrimination or a disguised restriction on trade between Member States[557]. There is also an obligation to set up separate collection for at least paper, metal, plastic and glass waste that Member States had to meet by 2015, and should introduce separate collection of bio-waste, hazardous waste produced by households and textile waste. Where appropriate, hazardous bio-waste and packaging waste containing hazardous substances should be subject to specific collection requirements. Requirements include: • A set of measures taken by Member States to ensure that producers of products bear financial responsibility or financial and organisational responsibility for the management of the waste stage of a product's life cycle.[558] • Member States shall take the necessary measures to ensure that any original waste producer or other holder carries out the treatment of waste himself or has the treatment handled by a dealer or an establishment or undertaking which carries out waste treatment operations or arranged by a private or public waste collector.[559] • Member States may decide, in accordance with Article 8, that the responsibility for arranging waste management is to be borne partly or wholly by

551 EC (2018). Packaging Waste Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31994L0062

552 EC (2018). WEEE Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02012L0019-20180704

553 EC (2020). ELV Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32000L0053

554 EC (2018). Batteries Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02006L0066-20180704

555 EC (2019). Single-use Plastics Directive. https://eur-lex.europa.eu/eli/dir/2019/904/oj

556 Article 1 Directive (EU) 2018/ of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (europa.eu)

557 Directive (EU) 2018/ of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (europa.eu)

558 Article 3 CL2008L0098EN0030020.0001_cp 1..1 (europa.eu)

559 Article 15 CL2008L0098EN0030020.0001_cp 1..1 (europa.eu)

Table A1-6-12: Waste FD policy overview	
	the producer of the product from which the waste came and that distributors of such product may share this responsibility.[560] • Member States should establish specific food waste prevention measures, to demonstrate how to prevent food waste, in their waste prevention programmes.[561] • Member States should measure progress made in the reduction of food waste. To measure that progress and to facilitate the exchange of good practices across the Union both between Member States and between food business operators, a common methodology for such measurement should be established. • Member States should take measures aimed at preventing all forms of abandonment, dumping, uncontrolled management or other forms of discarding of waste. Member States should also take measures to clean up litter present in the environment, irrespective of its source or size and regardless of whether waste has been discarded wilfully or by negligence.[562]
Monitoring and reporting	The Directive requires Member States to report the data outlined in its provisions on a yearly basis[563]. The responsibility lies with the Member States to establish a monitoring framework that enables them to adequately ensure that producers of products and organisations on their behalf, implement their extended producer responsibility obligations.
Approach to enforcement	The Directive requires Member States to outline provisions on effective, proportionate, and dissuasive penalties applicable to any infringement cases. • Furthermore, in the requirements for extended producer responsibility schemes, the Directive sets out minimum requirements, stating that Member States are asked to establish adequate monitoring and enforcement frameworks that ensure that producers implement their extended producer responsibility.[564] • Article 34 of the Directive requires establishments and undertakings that carry out waste treatment operations, collect or transports waste on a professional basis or produce hazardous waste to undergo periodic inspections by competent authorities. • Article 35 outlines a series of recording requirements for the establishments and undertakings aforementioned. In the case of irregularities observed during inspections, a series of procedures are possible, including Sanctions, fines and penalties, court procedures, and permit withdrawals. • In 2018, the Commission issued early warning reports to 14 Member States that it deemed at risk of missing the 2020 target of 50% preparation for re-use/recycling for municipal waste. Alongside the early warning reports, the Commission devised country-specific actions with the collaboration of national authorities to close the gap to meeting targets. [565]

A2.3.3 Implementing the PPP

EU approach

The Waste FD requires that the costs of waste management, including for the necessary infrastructure and its operation, shall be borne by the original waste producer or by the current

560 Article 15 CL2008L0098EN0030020.0001_cp 1..1 (europa.eu)

561 Article 29 Directive (EU) 2018/ of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (europa.eu)

562 Directive (EU) 2018/ of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (europa.eu)

563 Article 37 CL2008L0098EN0030020.0001_cp 1..1 (europa.eu)

564 Article 8a CL2008L0098EN0030020.0001_cp 1..1 (europa.eu)

565 EUR-Lex - 52018DC0656 - EN - EUR-Lex (europa.eu)

or previous waste holders[566]. Member States are required to establish an effective system of quality control and traceability of municipal waste to monitor waste management to ensure targets are met. They are required to draw up implementation plans to facilitate with meeting their waste management targets. Among other things they are required to contain information on funding for waste management in line with the PPP (Annex IVb).

Derogation is allowed from separate collection (Article 11) where it would entail disproportionate economic costs taking into account the costs of adverse environmental and health impacts of mixed waste collection and treatment, the potential for efficiency improvements in waste collection and treatment, revenues from sales of secondary raw materials as well as the application of the polluter-pays principle and extended producer responsibility.[567] There is a planned revision in progress[568]. It is unclear how the revision will impact the approach to implementing the PPP.

In addition, to the primary policies in scope of the fitness check, the approach to implementing the PPP in secondary policies is outlined below.

Table A1-6-13: Approaches to implementing the PPP in other waste policies

Policy	Approach to implementing the PPP
Batteries Directive	There is no explicit reference to the PPP in the legal text but provisions implement the PPP as follows: • The collection schemes require distributors to take back waste portable batteries or accumulators at no charge when supplying portable batteries or accumulators, unless an assessment shows that alternative existing schemes are at least as effective in attaining the environmental aims of this Directive. [569] • The Directive also requires MSs to ensure that producers of industrial batteries and accumulators, or third parties acting on their behalf, shall not refuse to take back waste industrial batteries and accumulators from end-users, regardless of chemical composition and origin.[570] • Furthermore, the Directive requires MSs to ensure that producers of automotive batteries and accumulators, or third parties, set up schemes for the collection of waste automotive batteries and accumulators from end-users or from an accessible collection point in their vicinity.[571] • Revision adopted in July 2023[572]. Revision includes several provisions that will strengthen the implementation of the PPP.
End of Life Vehicles Directive	There is no explicit reference to the PPP in the legal text but provisions implement the PPP as follows: • Collection: The ELV Directive requires MSs to ensure that the last holder and/or owner can deliver the end-of life vehicle to an authorised treatment facility without any cost as a result of the vehicle having no or a negative, market value. Member States should ensure that producers meet all, or a significant part of, the costs of the implementation of these measures; the normal functioning of market forces should not be hindered. [573]

566 Article 11b Directive (EU) 2018/ of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (europa.eu)

567 Article 10 Directive (EU) 2018/ of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (europa.eu)

568 https://environment.ec.europa.eu/publications/proposal-targeted-revision-waste-framework-directive_en

569 Article 8 (2) l_26620060926en00010014.pdf (europa.eu)

570 Article 8 (3) l_26620060926en00010014.pdf (europa.eu)

571 Article 8 (4) l_26620060926en00010014.pdf (europa.eu)

572 https://eur-lex.europa.eu/eli/reg/2023/1542/oj

573 Section I resource.html (europa.eu)

Table A1-6-13: Approaches to implementing the PPP in other waste policies	
	• Producers are also required to ensure that vehicles are designed and manufactured in such a way as to allow the quantified targets for reuse, recycling and recovery to be achieved[573]. • There is a planned revision in progress[574]. It is unclear how the revision will impact the approach to implementing the PPP.
Landfill Directive	There is reference to the PPP in the recitals and provisions that refers to Member State action to implement the PPP. Provisions to implement the PPP are as follows: • Despite the following statement: "Whereas under the polluter pays principle it is necessary, *inter alia*, to take into account any damage to the environment produced by a landfill"[575], the Directive's main provisions encourage MSs to establish a waste hierarchy, landfill classification, permitting and licensing requirements, technical standards, monitoring and reporting requirements, waste acceptance criteria and closure and aftercare procedures. The provisions have resulted in landfill taxes being introduced in 23 Member States as of 2021. The extent to which the PPP is implemented varies amongst MSs, depending on their individual approaches to landfill regulation. • There is no planned revision to the legislation.
Ship Recycling Regulation	There is no explicit reference to the PPP in the legal text but provisions implement the PPP as follows: • General requirements for ship owners include being responsible for the recycling of the ship, ensuring it is recycled at ship recycling facilities in the European list and maintenance of the ship, ensuring the ship's compliance with the requirements of the administrations of the MS[576] • Before a ship is recycled, its owner must also provide the company carrying out the work with specific information about the vessel and prepare a ship recycling plan. This, for instance, identifies the type and amount of hazardous materials and waste that will be generated from the obsolete vessel.[577] • There is no planned revision to the legislation.
Waste Shipments Regulation	There is no explicit reference to the PPP in the legal text but provisions implement the PPP as follows: • All waste shipments for transboundary movements of hazardous wastes and their disposal are subject to procedures of prior written notification and consent. This requires a contract between the notifier responsible for the shipment and the consignee for the recovery or disposal of the notified waste. Costs are incurred by the notifier responsible. • There is a planned revision in progress[578]. It is unclear how the revision will impact the approach to implementing the PPP.
Packaging Waste Directive	There is reference to the PPP in the recitals and provisions that refers to Member State action to implement the PPP. Provisions to implement the PPP are as follows: • The Directive requires that all those involved in the production, use, import and distribution of packaging and packaged products become more aware of the extent to which packaging becomes waste, and that in accordance with the PPP they accept responsibility for such waste.[579] • Furthermore, the Directive states that Member States may, in accordance with the principles governing Community environmental policy, inter alia, the

574 https://environment.ec.europa.eu/publications/proposal-regulation-circularity-requirements-vehicle-design-and-management-end-life-vehicles_en

575 Section I https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31999L0031

576 Article 6 EUR-Lex - 32013R1257 - EN - EUR-Lex (europa.eu)

577 Article 7 EUR-Lex - 2004_3 - EN - EUR-Lex (europa.eu)

578 https://environment.ec.europa.eu/publications/proposal-new-regulation-waste-shipments_en

579 Section I CL1994L0062EN0060010.0001.3bi_cp 1..1 (europa.eu)

Table A1-6-13: Approaches to implementing the PPP in other waste policies	
	PPP, and the obligations arising out of the Treaty, adopt measures to implement those objectives.[580] • There is a planned revision in progress[581]. It is unclear how the revision will impact the approach to implementing the PPP.
Waste Electrical and Electronic Equipment Directive	There is no explicit reference to the PPP in the legal text but provisions implement the PPP as follows: • The Directive requires MSs to encourage producers to take full responsibility for the WEEE collection, in particular by financing the collection of WEEE throughout the entire waste chain, including from private households, in order to avoid separately collected WEEE becoming the object of suboptimal treatment and illegal exports, to create a level playing field by harmonising producer financing across the Union and to shift payment for the collection of this waste from general tax payers to the consumers of EEE, in line with the 'polluter pays' principle.[582] • There is no planned revision to the legislation.
Single-use plastics Directive (EU) 2019/904	There is reference to the PPP in the recitals that refers to the use EPR schemes to implement the PPP by Member States. Provisions to implement the PPP are as follows: • Operators placing on the market of single-use plastics are required to comply with restrictions and labelling requirements and incur the cost of doing so. • There is no planned revision to the legislation.
Plastic Bags Directive (EU) 2015/720	There is no explicit reference to the PPP in the legal text but provisions implement the PPP as follows: • Member States are required to set either or both of the following: annual consumption targets set to limit the number of lightweight plastic bags per person, and fees so that lightweight plastic carrier bags are not provided free of charge at the point of sale of goods or products. The cost is borne by the consumer. • There is no planned revision to the legislation.
Extractive Waste Directive 2006/21/EC	There is reference to the PPP in the recitals that refers to environmental liability under the ELD. Provisions to implement the PPP are as follows: • Operators are required to apply for a permit. The application includes a waste management plans with all measures necessary to prevent or reduce adverse effects on the environment and human health incurred by management of extractive waste and they incur the costs of doing so. • There is no planned revision to the legislation.

National approaches

The Waste FD provides flexibility to Member States and their implementation of the provisions. This has a direct bearing on the way the PPP is implemented. A 2013 report assessing Member State performance in waste management illustrates how the Waste FD was being implemented in 10 Member States[583]. It noted the following:

- the Waste FD was most commonly implemented through the use of landfill controls, including taxes (in all of the MSs) and bans (such as Estonia, where it is prohibited to accept, or deposit unsorted municipal waste in landfills and in Lithuania (where a ban on landfilling biodegradable waste from gardens, parks and greeneries is in place).

580 Article 15 CL1994L0062EN0060010.0001.3bi_cp 1..1 (europa.eu)

581 https://environment.ec.europa.eu/publications/proposal-packaging-and-packaging-waste_en

582 Article 12 CL2012L0019EN0010010.0001.3bi_cp 1..1 (europa.eu)

583 Waste and Recycling Policy - Library (europa.eu)

- Pay-as-you-throw schemes were also found to be implemented at a municipal level (Czechia, Estonia, Poland and Slovakia), but in Greece - besides a landfill tax - no incentive systems favour prevention and participation to separate collection are in place.
- Some Member States such as Latvia and Slovakia conducted a series of awareness campaigns on waste collection and management in households in order to better inform the public.

The report examined the extent to which the 10 Member States were implementing the PPP in the context of waste, including mechanisms such as the Extended Producer Responsibility (EPR) systems. EPR schemes have been successfully implemented in most MS in relation to tyre consumption. The European tyre industry has made several moves towards achieving a Circular Economy by developing tyres with enhanced performance and longevity, introducing new vehicle technologies that optimise tyre maintenance, for example by alerting drivers of dysfunctionalities and establishing an organised and thorough end-of-life process that is operating under EPR. In the case of Czechia, Estonia and Greece, the report concludes that whilst efforts have been made to hold polluters responsible for their waste pollution, they largely fail to cover the entirety of the costs incurred. In Greece for example, some producer responsibility schemes have been enacted but they do not cover the full costs of separate collection and recycling of main waste streams specific types of waste. [584]

The Commission published a series of Early Warning reports in 2018 for Member States they deemed at risk of failing to meeting the targets set by the Directive, including the 2020 target of reaching 50% preparation for re-use/recycling for municipal waste. These reports were submitted to 14 Member States: Bulgaria, Croatia, Cyprus, Estonia, Finland, Greece, Hungary, Latvia, Malta, Poland, Portugal, Romania, Slovakia and Spain, included a list of country-specific action recommendations for improving performance[585]. Some of the recommendations provided by the commission are detailed below:

- Recommendations in relation to the *management of municipal waste* included improving EPR schemes to at least comply with the general minimum requirements of the Directive, introduce measures to encourage households to sort waste for effectively and improve monitoring and reporting practices.
- Recommendations in relation to the management of *construction and demolition waste* included promoting waste prevention, using economic instruments and expanding the use of green public procurement to require recycled content.
- Recommendations in relation to management of *hazardous waste* included improving the quality of waste management plans, adopting reliable and interoperable electronic record-keeping and tracing systems and setting out and enforcing the shared responsibility of waste producers provision set out in the Directive. [586]

584 Circabc (europa.eu)

585 Implementation of the Waste Framework Directive (europa.eu)

586 resource.html (europa.eu)

A2.3.4 EU funding support

Table A1-11 outlines the EU funding and subsidies contributing to achieving the objectives of waste and recycling policies. It also presents the beneficiaries of the funding and the proofing mechanisms applied.

Table A1-6-14: EU expenditure contributing to waste and recycling policy objectives

EU fund	EU subsidies	Actions subsidised by EU funds	Beneficiaries	Proofing mechanism
Horizon Europe	The following clusters directly refer to waste and recycling • **Cluster 4,** Digital, Industry and Space (EUR 13 462 000 000) • **Cluster 5** Climate, Energy and Mobility (EUR 13 462 000 000) • **Cluster 6** Food, Bioeconomy, Natural Resources, Agriculture and Environment (EUR 8 952 000 000)	Areas of intervention include, for example, manufacturing technologies (e.g., low-waste plants, highly recyclable and reusable batteries), ensuring a sustainable supply of raw materials.	Any legal entity (natural or a legal person)	Applicants shall refer to the DNSH (Do no significant harm) principle for the proposed research methodology and impact to assure that they do not "make a significant harm to any of the six environmental objectives" set by the EU taxonomy regulation (Horizon Europe Proposal Evaluation, 2023).
CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development)	CAP finances waste reduction and efficient management. No specific expenditure data is available.	EU specific objective 'To promote employment, growth, gender equality, including the participation of women in farming, social inclusion and local development in rural areas, including the circular bio-economy and sustainable forestry' (see Annex I of CAP Strategic Plan regulation). Interventions can include (I) Investments in tangible and intangible assets supporting	Main beneficiaries are EU farmers. List available here	DNSH principle applies.

Table A1-6-14: EU expenditure contributing to waste and recycling policy objectives				
EU fund	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
		environmentally respectful use of by-products, as well as the reuse and valorisation, (ii) investments in recycled water irrigation.		
Cohesion policy funds	6.3bn expenditure is planned under 'Circular economy'.[587]	Several relevant intervention fields: • 'Research and innovation processes, technology transfer and co-operation between enterprises, focusing on circular economy '(030)[588], • Household waste management (067-068), Commercial, industrial waste management (069-070), Promoting the use of recycled materials as raw materials (071-072),	Public or private bodies, entities with or without legal personality, or natural persons. Data not yet available on actual beneficiaries.	• Thematic enabling condition 2.6. Updated planning for waste management • DNSH, objective 4: 'Circular Economy Including Waste • Prevention and Recycling'. • EIA/SEA, to the extent relevant.
LIFE +	Waste and Recycling activities are categorized under "Circular Economy and Quality of Life" subprogram, which receives EUR 1.345 billion funding.	1) Innovative solutions contributing recycled materials, components or products with additional value, 2) Innovation solutions to identify, track, separate, prevent and decontaminate the waste containing hazardous substances589.	Funding is targeted at legal entities established either in an MS or an overseas country or in a third country associated with LIFE, including legal entities established under Union or international law.	The LIFE Programme directly supports the six environmental objectives set by the EU taxonomy regulation, thus DNSH (Do no significant harm) principle applies.

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587 According to the data complied for the cohesion open data platform

588 See Annex I CPR

589 https://www.rvo.nl/sites/default/files/2023-01/LIFE%20Priority%20topics.pdf

Table A1-6-14: EU expenditure contributing to waste and recycling policy objectives				
EU fund	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
InvestEU	Policy window "Sustainable Infrastructure" incorporates waste management and is projected to receive €9.9 billion in fundings.	Annex II of the main Regulation specifies environmental and resource projects targeting waste collection, management and treatment and other green-related infrastructure, such as wastewater, can be eligible for funding. Working draft	Any natural or legal persons (based in an EU or any third eligible country) can benefit from the Project. This includes private entities, public sector entities, mixed entities, Non-profit organizations. Financing and investment operations under the InvestEU are publicly available. The InvestEU portal provides data on all investment opportunities.	The application of the 'Do No Significant Harm' (DNSH) principle could be regarded as such. Operations under the *sustainable infrastructure window* are subject to climate, environmental and social sustainability proofing to minimise negative impacts and maximise benefits for the climate, environment and social dimension (see Article 8 of the Regulation.) This is described in the Technical guidance on sustainability proofing for the InvestEU Fund.
Recovery and Resilience Facility	'Transition to a circular economy, waste prevention and recycling' actions make up 3.6% of NRRPs.[590]	There are six specific intervention fields associated with this area: • Household waste management: prevention, minimisation, sorting, reuse, recycling measures (code 042) [591] • Commercial, industrial waste management: prevention, minimisation, sorting, reuse, recycling measures (code 044). • Use of recycled materials as raw materials compliant	Public administration, public sector and private sector entities. Beneficiary data is not available for RRF (only top 100 will be published for each MS as per the requirements of REPowerEU)	• DNSH, objective 4: 'Circular Economy Including Waste • Prevention and Recycling'. • EIA/SEA, to the extent relevant.

590 See RRF scoreboard data

591 See Annex VI of the RRF Regulation (available here in a separate document)

Table A1-6-14: EU expenditure contributing to waste and recycling policy objectives				
EU fund	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
		with the efficiency criteria (code 045bis). • Rehabilitation of industrial sites and contaminated land compliant with efficiency criteria (code 046bis). • Support to environmentally-friendly production processes and resource efficiency in SMEs (code 047). • Support to environmentally-friendly production processes and resource efficiency in large enterprises (code 047bis).		

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A2.4 Zero pollution ambition

Key EU policies to facilitate the transition to a zero-pollution ambition, including for air, water and soil and protecting the health and well-being of Europeans (PO4 of the 8th EAP) are grouped by water quality, air quality, noise quality and chemical risk management.

A2.4.1 Water quality

Description of environmental pressure

Marine waters are impacted by pollution from activities taking place directly within the marine environment, but they are also often a sink for riverine and land based nutrient or chemical pollution. Nutrient and chemical pollution in the marine environment often stems from land-based activities that need to be managed (EEA SOER, 2020)[592] via various policy mechanisms across the EU. Pollution control measures for marine and coastal environments thus overlap the policy domains of marine, freshwater and terrestrial environments.

Nutrient pollution, specifically, often causes eutrophication of marine and coastal waters. Approximately 33% of the assessed areas in European seas do not have Good Environmental Status (GES) concerning eutrophication and almost 25% of the EEA assessed areas exceed thresholds for nutrient enrichment and eutrophication. The trend over time also suggests very little or no recent improvement to eutrophication levels despite decreasing inputs of nitrogen and phosphorous to marine and coastal waters. The EEA assessment of eutrophication indicates that nutrient levels exceed threshold values in 40% of the assessed sites (via EEA SOER, 2020) and more than 97% of the Baltic Sea is still eutrophic (Helcom, 2018)[593]. In contrast, the Celtic Seas and the Bay of Biscay, the Macronesian and most of the Mediterranean Sea have good or high status (EEA SOER, 2020).

Chemical pollution in marine or coastal environments has been found by the EEA to be degrading European marine ecosystems, with 80% of assessed areas designated as 'problem areas'. Beyond chemical pollution there is also the growing issue of marine litter, primarily made up of plastics. For example, 77% of coastal marine areas to European seas do not have GES when it comes to marine litter. Almost 75% of Europe's marine and coastal areas are designated as problem areas for marine litter, based on EEA assessment criteria. Plastics constitute up to 95% of the waste that accumulates on shorelines, the sea surface and the sea floor[594].

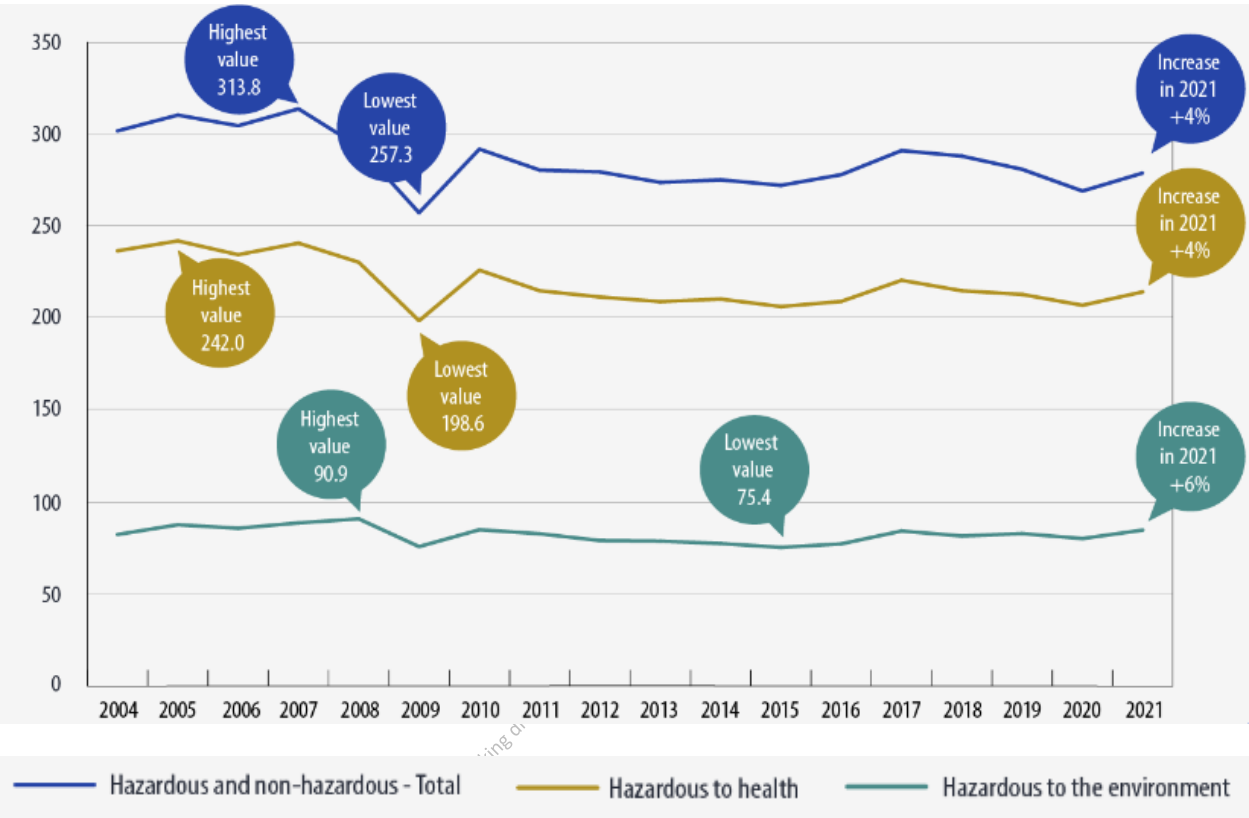
In terms of industrial emissions to water, the chemical sector is the main source of a number of pollutants, including arsenic, copper, mercury, nickel, polycyclic aromatic hydrocarbons (PAHs), total nitrogen, and total phosphorus (often emitted via the waste and wastewater management sector). Production of chemicals in the EU provide an indication of the challenge the chemical sector presents to water quality and chemical status of water bodies. A particular pressure is the production (and consumption) of persistent, bioaccumulative and toxic chemicals which present a hazard to both health and environment (Figure 6-5). The mineral industry is also an important source of industrial cadmium and lead emissions, while over 60% of industrial chromium emissions are accounted for by paper and wood production and processing.

592 https://www.eea.europa.eu/soer/publications/soer-2020

593 Helcom (2018) State of the Baltic Sea — second Helcom holistic assessment 2011-2016, No 155, Baltic Marine Environment Protection Commission, Helsinki, Finland (www.helcom.fi/ baltic-sea-trends/holistic-assessments/state-of-the-balticsea-2018/reports-and-materials/) accessed 21 August 2019.

594 https://www.eea.europa.eu/publications/zero-pollution/ecosystems/marine-pollution

Figure 6-5 Production of chemicals in the EU, 2004-2021 (million tonnes; % change compared with 2020)



Source: Eurostat[595]

In this context, nutrient pollution is an important indicator to monitor water pollution and eutrophication. Several EU policies are contributing to improvements in nutrient pollution in water bodies including the ND, WFD, GWD, UWWTD, DWD, IED, NECD, Nature Directives and Regulation on the CAP. Thus, it provides a useful point of comparison for understanding how the PPP is being applied by multiple policies. There are also global commitments that underpin the EU's ambition to reduce nutrient pollution. The UN Sustainable Development Goal (SDG)[596] 14 to conserve oceans, seas and marine resources includes SDG 14.1 to reduce marine pollution, including nutrient pollution by 2025. The Kunming-Montreal Global Biodiversity Framework 2030 targets adopted under the Convention on Biological Diversity (CBD) include reducing pollution, halving nutrient loss and pesticide risk (Target 7)[597].

Figure 6-6 shows that average nitrate concentrations in European groundwater were similar in 1992 and 2020. However, average concentrations increased to a peak in 2008, and subsequently decreases until 2020, including over the appraisal period. The exception to this is a large increase in average concentration in 2018, which is attributable to increased concentrations reported by France. Although there are not significant changes at European level, there is significant variation in trends between groundwater bodies. Average river nitrate concentrations in Europe decreased from 1992-2009 but have levelled off since then. Average phosphate concentrations in European rivers more than halved from 1992-2012, and average total phosphorus in European lakes have gradually reduced since 1992. Agriculture remains a major contributor to nitrogen and phosphorus pollution. Overall, the average nitrate and

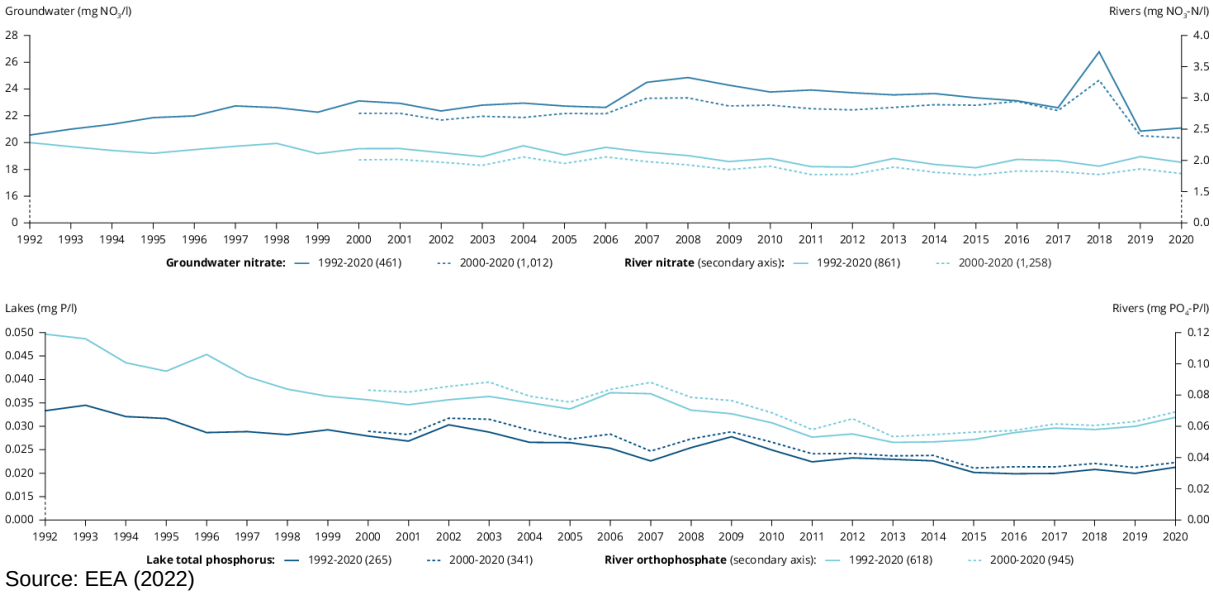
595 Eurostat (2022) Production and consumption of chemicals up in 2021. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20221216-3#:~:text=In%202021%2C%20214%20million%20tonnes,%25%20more%20than%20in%202019).

596 https://sdgs.un.org/goals

597 Target 7 (cbd.int)

phosphate concentrations in rivers and total phosphorus concentration in lakes have decreased. There has been no overall decrease in nitrate concentration in groundwater.

Figure 6-6 Nutrients in European water bodies



Source: EEA (2022)
https://www.eea.europa.eu/ims/nutrients-in-freshwater-in-europe

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A qualitative description is provided in the table.

Table 6-15 Trends in nitrate and phosphate concentrations (EEA, Waterbase, EU27)

Parameter	Description of change
Nitrate concentrations in surface waters	There was a general decline in nitrate levels in rivers between 1992-2009 (2.27 mg l^{-1} to 1.95 mg l^{-1}), but levels have remained relatively stable since then[598]. Compared to the reporting period 2008-2011, annual average NO_3 concentrations in 2012–2015 reduced at 31% of all freshwater monitoring stations, with 9% showed a strong level of improvement[599]. In the 2016-2019 period 27.2% improved compared to 2012-2015 (8.1% strongly). Nevertheless, in the 2016-2019 period 26.6% of sites saw an increase in NO_3 compared to the previous reporting period, so patterns are far from consistent[600]. 64 % of all monitoring stations of surface water bodies recorded below 10 mg nitrate per litre (annual average between 2012 and 2015), while 2 % recorded concentrations between 40 and 50 mg/L and 1.8 % exceeded 50 mg/L[601]. The equivalent figures for the 2016-2019 period showed that 65.2% being below 10 mg nitrate per litre (annual average), while 2.2 % between 40 and 50 mg/L and 2.2 % exceeded 50 mg/L[602].

598 European Environment Agency. (2022). Waterbase - Water Quality ICM. Available at: https://www.eea.europa.eu/data-and-maps/data/waterbase-water-quality-icm-2 (Accessed: 25 October 2022).

599 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0257&rid=3

600 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021SC1001&from=EN

601 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0257&rid=3

602 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021SC1001&from=EN

Parameter	Description of change
Phosphate concentrations in surface waters[603], [604]	The average phosphate concentration of rivers in Europe has been in general decline since 1992, with a particularly marked decline between 1992 and 2012, when concentrations fell from around 0.12 mg PO_4-P l^{-1} to around 0.05 mg PO_4-P l^{-1}, since when concentrations have more or less levelled off or even started to increase a little (being around 0.06 mg PO_4-P l^{-1} in 2019). Total phosphorus concentrations in lakes have also seen a gradual decline, from a peak of around 0.03 mg P l^{-1} (1993) to around 0.02 mg P l^{-1} by 2019 (with no apparent increase in later years), although P stored within lake sediments can be remobilised to keep concentrations elevated even after inputs from point and non-point sources have been reduced (although this can also happen in rivers, P in riverine sediments is more likely to be flushed from the system).
Nitrate concentrations in groundwaters	In 2016-2019, 14.1% of groundwater stations still exceeded in annual average 50 mg nitrates per litre, a situation comparable to the previous reporting period between 2012 and 2015, in which 13.2% stations exceeded 50 mg/l, while in the same period of 2012-2015 5.7 % were between 40 and 50 mg/L [605]. Nitrates concentration at EU level shows that groundwater quality has improved marginally in certain MS since the adoption of the Directive, however further improvement has been very slow since 2012.[606]. A high percentage of groundwater monitoring stations still show levels that are above the maximum 50 mg nitrate/l in Malta, Germany, Luxemburg, Spain, Portugal and Belgium (Flanders region)[607]. Concentrations of nitrates more closely linked to diffuse agricultural pollution are on average not declining at all in groundwater. There are regional disparities: a total of 33 % of the groundwater bodies have shown decreasing nitrate concentrations since 1992 and a further 33 % have shown increasing concentrations[608].
Saline waters (marine, coastal and transitional)	Nutrient emissions to the Baltic Sea declined by 25 % for nitrogen between 1995 and 2014. The 2014 assessment also indicated that diffuse sources from mainly agricultural activities constitute the major part, making up 46 % of the total riverine nitrogen load and 36 % of the total riverine phosphorous load to the Baltic Sea[609]. Trends in concentrations of nitrogen (dissolved inorganic nitrogen — DIN) in the upper 10m of the water column in European seas during the season of low phytoplankton growth (SLPG) show that the majority of sites are showing a decrease in DIN over time between 1980 and 2019[610]. Relative to 1990, inputs of nitrogen (total nitrogen, TN) and phosphorus (total phosphorus, TP) have been reduced and the concentrations (TN and TP) in seawater have decreased [611].

603 https://www.eea.europa.eu/ims/nutrients-in-freshwater-in-europe

604 European Environment Agency. (2022). Waterbase - Water Quality ICM. Available at: https://www.eea.europa.eu/data-and-maps/data/waterbase-water-quality-icm-2 (Accessed: 25 October 2022).

605 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0257&rid=3

606 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0257&rid=3

607 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021SC1001&from=EN

608 EEA, 2020, 'Nutrients in freshwater (CSI 020)', European Environment Agency

609 https://www.environmentyou.eu/images/2017/ems/Water_and_Agriculture.pdf

610 https://www.eea.europa.eu/data-and-maps/figures/trends-in-dissolved-inorganic-nitrogen

611 EEA, 2019, 'Nutrient enrichment and eutrophication in Europe's seas — European Environment Agency', (https://www.eea.europa.eu/publications/nutrient-enrichment-and-eutrophication-in)

Policy overview

The MSFD[612] provides a framework regulating Member States' use of the marine environment and is the primary driver behind protection of the marine environment and aims to tackle predominant pressures such as excess nutrients, plastic litter and other types of chemical pollution. For marine and coastal environments, source specific policies linked to the MSFD, with a focus on abatement of point source and diffuse pollution include river basin management plans under the Water FD, the UWWTD and also the ND, to help tackle diffuse nutrient pollution from agriculture.

Table A1-6-16: Marine Strategy Framework Directive 2008/56/EC policy overview

Policy objectives	"Sets out a common EU approach and objectives for the prevention, protection and conservation of the marine environment in view of the pressures and impacts of damaging human activities, while allowing for its sustainable use, by means of an ecosystem-based approach."[613] Relevant UN SDG is SDG14 – Life below water.
Approach to implementation	The MSFD requires Member States to develop national marine strategies in order to achieve, or maintain where it exists, 'good environmental status' (GES) (by 2020). Marine strategies are programmes of measures to achieve GES, with associated targets and in order to: "(a) protect and preserve the marine environment, prevent its deterioration or, where practicable, restore marine ecosystems[…]; and to (b) prevent and reduce inputs in the marine environment, with a view to phasing out pollution […]" Effective measures to tackle these pressures should be implemented to achieve GES. Descriptor 8 of the criteria to achieve GES has been developed to ensure concentrations of contaminants are at levels (thresholds) not giving rise to pollution effects and Descriptor 10 defines properties and quantities of marine litter that do not cause harm to the coastal and marine environment. Member States must keep their marine strategies up to date and report on updates. Within three years of the publication of each programme of measures or update thereof, each MS must submit a brief interim report to the Commission describing progress in implementing that programme. The current phase is the second phase of the implementation cycle (2018-2023). Country-specific recommendations for implementation are included in a 2022 Staff Working Document accompanying a Communication from the Commission[614].
Monitoring and reporting	Article 11 of the MSFD states that Member States must implement monitoring programmes for the assessment of the environmental status of their marine waters, and must notify the Commission of these programmes within three months of their establishment. Member States are responsible for reporting progress to the Commission.
Approach to enforcement	The MSFD includes provision to not meet targets because of special circumstances affecting the Member States itself or which are connected to extra-national issues. However, these special cases are regulated. No specific mentions of enforcement are noted within the text.

612 Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (Text with EEA relevance). Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008L0056#d1e32-34-1 on 16 May 2023

613 European Commission (2008) Strategy for the marine environment. SUMMARY OF:

Directive 2008/56/EC — EU action in the field of marine environmental policy. Available at https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=uriserv:OJ.L_.2008.164.01.0019.01.ENG

614 European Commission (2022) SWD(2022) 55 final, Commission Staff Working Document accompanying the document Communication from the Commission: Commission Notice on recommendations per Member State and region on the 2018 updated reports for Articles 8, 9 and 10 of the Marine Strategy Framework Directive (2008/56/EC). Available at https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/implementation/pdf/SWD_2022_55_3_EN.pdf on 10 May 2023.

Source specific policies linked to the MSFD, with a focus on abatement of point source and diffuse pollution include river basin management plans under the Water FD, the Urban Waste Water Treatment Directive (UWWTD) and also the Nitrates Directive, to help tackle diffuse nutrient pollution from agriculture. More specifically, the Directive on Safety of Offshore Oil and Gas Operations (2013/30/EU) also aims to mitigate the effects of any unintended releases of hydrocarbons or other hazardous substances and the Single Use Plastics Directive is a key driver for EU policy to address marine litter. Together these policies contribute to the protection of marine and coastal waters however it is challenging to disentangle the impact of the measures implemented under each of these policies to reducing pollution[615].

The Water FD is the main law for water protection in Europe, and has been in force since 2000[616]. Abatement measures to prevent and remediate pressures on freshwater quality are predominately driven by the Water FD, complemented by the Environmental Quality Standards Directive (EQSD), the Groundwater Directive (GWD) and the UWWTD. The Water FD can be thought of as the overarching instrument integrating the EU approach to water management, with the objectives to prevent deterioration of the status of water bodies; and protect, enhance and restore all water bodies, aiming to achieve good ecological status or good ecological potential and good chemical status for surface waters, as well as good quantitative and good chemical status for groundwater.

The EQSD, is a 'daughter' of the Water FD, establishing environmental quality standards (EQS) for priority substances which are then used to determine chemical status of surface waters. Control measures to reduce, phase out or cease emissions of these key substances are then required under the Water FD. The Water FD also requires measures to prevent or limit the input of pollutants into groundwater, and the GWD (another daughter directive of the Water FD) itself sets EU-wide groundwater quality standards and emphasises that upward pollution trends must be identified and reversed. Alongside the GWD, there is the Drinking Water Directive (DWD) which sets water quality standards covering 48 parameters and requiring regular monitoring and remedial measures in the case of exceedances.

Abatement measures under the UWWTD are also integrated within the Water FD as they are among the basic measures required and their implementation is targeted towards the achievement of the Water FD objectives albeit they are addressing one single specific pressure. Requirements are orientated towards collection and specified levels of treatment for discharges of certain population sizes or sensitive areas/receiving waters, not specifying pollutant thresholds (yet). The declining concentrations of BOD and nutrients are associated with the substantial investments made by Member States in improving urban waste water treatment processes to address point source pollution from industrial and domestic sources albeit the Directive has been expensive to implement for operators, Member States and water users.[617] In the EU water management is typically based on a public and delegated private management models, with financing raised through water bills charged to households meaning it is users who pay for improvements in infrastructure.

615 https://www.eea.europa.eu/publications/zero-pollution/ecosystems/marine-pollution

616 European Commission (2023): Water Framework Directive. Available at: https://environment.ec.europa.eu/topics/water/water-framework-directive_en on 10 May 2023.

617 European Commission (2019): Executive Summary of the Evaluation concerning urban wastewater treatment. Available at: https://circabc.europa.eu/ui/group/1c566741-ee2f-41e7-a915-7bd88bae7c03/library/2c7a6568-a624-4b0d-8a88-65f69083f518/details on 5 June 2023.

Table A1-6-17: Water FD 2000/60/EC policy overview	
Policy objectives	(a) prevent further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems; (b) promote sustainable water use based on a long-term protection of available water resources; (c) aim at enhanced protection and improvement of the aquatic environment, inter alia, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances; (d) ensure the progressive reduction of pollution of groundwater and prevents its further pollution, and (e) contribute to mitigating the effects of floods and droughts Relevant UN SDG is SDG14 – Life below water.
Approach to implementation	The Directive applies to inland waters, transitional waters, coastal surface waters, and groundwaters. The objectives are achieved through the use of River Basin Management Plans (RBMPs) and Programme of Measures (PoMs). They are required by Member States to be completed every six years and set out water bodies are protected or restored to reach good status. This good status means both good chemical and ecological status. Further to the RBMPs there is a Common Implementation Strategy (CIS). These are covered in two-year work programmes. The CIS is designed to address the shared technical challenges for the Member States, the Commission, the Candidate and EEA countries as well as stakeholders and NGOs. The CIS work programme is based on a three layer organisation, with the Water Directors Meetings, the Strategic Coordination Group and the different Working Groups. For the period of 2019-2021 there were five working groups, that covered: • Ecological status; • Groundwater; • Chemicals; • Floods; and • Data and Information Sharing The main source of guidance comes from the Common Implementation Strategy, that aims to ensure the coherent and harmonious implementation of the WFD and its daughter directives. Work programmes are set out on a two-year cycle.
Monitoring and reporting	Progress towards environmental objectives is measured through the use of Key Type of Measures. For each significant pressure type or chemical substance reported, a pre-defined quantitative indicator is reported by the Member State. The indicator states the scale and extent of the pressure or chemical substance, that is to be reduced by measures to achieve the environmental objectives of the Directive. This is the indicator gap to be filled to meet the objectives. Member States have reported on the indicator gaps remaining in 2021 on the identified pressures reported in the RBMPs in 2015.
Approach to enforcement	"It is necessary to ensure the proper application of the provisions implementing this Directive throughout the Community by appropriate penalties provided for in Member States' legislation. Such penalties should be effective, proportionate and dissuasive"[618].

618 European Commission (2000). Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF on 20 April 2023.

Table 6-18: Urban Waste Water Treatment Directive (UWWTD) 91/271/EEC policy overview	
Policy objectives	To protect the environment from the adverse effects of urban waste water and waste water from certain industrial sectors. Relevant UN SDG is SDG14 – Life below water.
Approach to implementation	The UWWTD requires Member States to report to the Commission on the measures taken to implement the directive. Member States must ensure that situation reports on the disposal of urban wastewater and sludge are published by the relevant authorities or bodies every two years.[619]
Monitoring and reporting	The UWWTD requires Member States to "submit information stemming from the monitoring provisions under Art. 15 within six months upon request. The Commission subsequently publishes an implementation report based on this data (Art. 17)."[636] Member States must "report detailed information every 2 years at agglomeration and treatment plant level, according to Article 15 of the UWWTD and also on their implementation programmes, as required by Article 17 of the UWWTD."[620]
Approach to enforcement	"Active legal enforcement is a tool that the Commission uses to foster compliance with the UWWTD. Overall, more than 40 CJEU rulings were issued by June 2018 and this does not include infringement cases that were closed before reaching the Court. Infringements can lead to penalties, which in the past have ranged between EUR 2 million and EUR 25 million for lump sum fines and between EUR 2 800 and EUR 8 000 for each day of delay. Infringement procedures are generally rather slow, but they do drive Member States to gradually become fully compliant."[636]

working draft

The diffuse pollution from agricultural sources is an important driver of poor water quality. The Nitrates Directive 91/676/EEC[621] and the Sewage Sludge Directive 86/278/EEC[622] work alongside the water policy acquis to tackle the land-based sources of both chemical and nutrient pollution from the farming/agricultural sectors. Note, the IED (2010/75/EU) also regulates pollutant emissions from industrial installations including discharges of wastewater. Emission limit values for wastewater discharges are permitted and must be based on the Best Available Techniques (BAT) available to limit pollution arising from industrial production processes captured under the IED. Note the IED is grouped with air quality policies.

Table A1-6-19: Nitrates Directive 91/676/EEC policy overview	
Policy objectives	The ND was adopted in 1991 and aims to reduce and/or prevent water pollution caused or induced by nitrates from agricultural sources namely from intensive livestock production (and the spreading or discharge of livestock effluents) and the excessive use of chemical fertilisers (nitrogen and phosphorus). It also aims to reduce and prevent further pollution in the form of eutrophication. It forms an integral part of the WFD (2000/60/EC) and is closely linked to other EU policies that address air quality, climate change and agriculture. Relevant UN SDG is SDG14 – Life below water.
Approach to implementation	The Directive aims to reduce water pollution caused by nitrates used in agriculture by monitoring of waters for nitrate concentration and trophic status; identification

619 European Commission (1991). Council Directive 91/271/EC Council directive concerning urban waste water treatment. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31991L0271 on 1 June 2023.

620 European Commission, Directorate-General for Environment, Fribourg-Blanc, B., Dhuygelaere, N., Madec, C.et al., 11th technical assessment on UWWTD implementation – , Publications Office of the European Union, 2022, available at https://data.europa.eu/doi/10.2779/915400

621 Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0676 on 16 May 2023.

622 Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31986L0278 on 16 May 2023

Table A1-6-19: Nitrates Directive 91/676/EEC policy overview	
	of polluted waters or waters at risk for pollution; designation of Nitrate Vulnerable Zones (NVZ); and the establishment of Nitrate Action Programmes (NAPs), a set of measures to reduce/prevent water pollution, to be implemented on an obligatory basis by farmers located within NVZs. In addition, MSs are required to establish codes of good agricultural practices (CoGAP) to be applied on a voluntary basis outside vulnerable zones.
Monitoring and reporting	"The Nitrates Directive requires Member States to draw up and implement suitable monitoring programmes to assess the effectiveness of the action programmes. It sets basic principles and criteria for water monitoring, but aspects such as the monitoring network density, stability and frequency of sampling remain the responsibility of Member States."
Approach to enforcement	To enforce implementation, the Commission may take legal action in accordance with the infringement procedures for non-compliance (Article 258 TFEU) whereby: '*If the Commission considers that a Member State has failed to fulfil an obligation under the Treaties, it shall deliver a reasoned opinion on the matter after giving the State concerned the opportunity to submit its observations. If the State concerned does not comply with the opinion within the period laid down by the Commission, the latter may bring the matter before the Court of Justice of the European Union*'. For the ND, there have been a number of cases (both in terms of reasoned opinions and referrals to the Court of Justice) regarding MS implementation of the Directive, including a number which have clarified the interpretation of the ND (IEEP, 2012)[623].

Working draft

Table A1-6-20: Sewage Sludge Directive 86/278/EEC policy overview	
Policy objectives	Aims "to protect humans, animals, plants and the environment by ensuring that heavy metals in soil and sludge do not exceed set limits, and to increase the amount of sewage sludge used in agriculture". Relevant UN SDG is SDG14 – Life below water.
Approach to implementation	It "sets limits for the concentration of seven heavy metals in sewage sludge intended for agricultural use and in sludge-treated soils", and "bans the use of sewage sludge that results in concentrations of these heavy metals in soil exceeding these limit values".[624]
Monitoring and reporting	Member States are required to send information to the Commission every three years on the implementation of the directive in the form of a sectoral report. The report must be sent within nine months of the end of the three-year reporting period. Since January 2022, the reporting process has been simplified. This change also seeks to ensure that Member States are more transparent with regards to the information that they provide and that the public can access the information as rapidly as possible[625].
Approach to enforcement	The directive sets limits on the concentration of seven heavy metals in sewage sludge for agricultural use. These are; cadmium, copper, nickel, lead, zinc, mercury, and chromium. It also bans the use of sewage sludge that results in the concentration of heavy metals exceeding the allowed amount. It is up to Member States themselves to enforce the rules of the directive.

Implementing the PPP

623 IEEP (2012) Manual of European Environmental Policy. Nitrates from agricultural sources.

624 https://environment.ec.europa.eu/topics/waste-and-recycling/sewage-sludge_en on 26 April 2023

625 625 Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31986L0278 on 16 May 2023

EU approach

The PPP is an explicit underlying principle under the **MSFD:** Member States are required to establish and implement programmes of measures designed to achieve or maintain good environmental status in the waters concerned and the measures contained therein "*should be devised on the basis of the precautionary principle and the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay*."

The PPP is also an explicit underlying principle under the **Water FD:** the PPP is mentioned as a recovery of cost in Article 9 of the directive[626]. This should be carried out in accordance with the economic analysis that is outlined in Annex III. Thus there are legal grounds requiring the polluter to pay for prevention and remedial costs via programmes of measures. Guidance provides support to the competent authorities with the design of the programmes of measures rather than support to the stakeholders responsible for implementation. The OECD undertook analysis of the implementation of the WFD[627]. They found that Member States faced similar challenges with its implementation, particularly the identification of the polluter and its contribution to the specific water body. These challenges are related to data availability, methods and scale analysis. The OECD believe that countries would benefit from additional data, guidance and conceptual clarification.

In October 2022, the Commission announced a revision to the Water FD[628]. The amendment seeks to overcome inadequate protections of ecosystem and human health. This will be achieved by adding 24 individual substances to the list of priority substances and developing a methodology for the measurement and monitoring of microplastics and antimicrobial resistance genes in water. Alongside this, the second strand is to overcome the "implementation deficit"[628] . This will be achieved by:

- Establishing a mandatory 'watch list' for groundwater to gather more reliable data on potential groundwater pollutants;
- Adapt the surface water watch list to account for the seasonality of emissions;
- Facilitate future adaptations to the lists of pollutants through a simplified legislative process;
- Harmonise standards for pollutants that are relevant at the level of river basins; and
- Introduce a mechanism for automated data reporting that will allow faster and more direct access to raw water quality data at Member State level.

This amendment would also impact the Environmental Quality Standards and Groundwater Directives. The impact assessment carried out before the proposal was announced concluded that the benefits to society would significantly outweigh the costs. Working together with other EU legislation, this amendment would have significant benefits for society and the environment.

626 European Commission (2000). Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF on 20 April 2023.

627 OECD (2023): Implementing Water Economics in the EU Water Framework Directive. Available at: https://www.oecd-ilibrary.org/docserver/d6abda81-en.pdf?expires=1685971765&id=id&accname=guest&checksum=43F55D23E17051D6D76E5F4627ADF3CF on 5 June 2023.

628 European Commission (2022). amending Directive 2000/60/EC establishing a framework for Community action in the field of water policy, Directive 2006/118/EC on the protection of groundwater against pollution and deterioration and Directive 2008/105/EC on environmental quality standards in the field of water policy. Available at: https://environment.ec.europa.eu/system/files/2022-10/Proposal%20for%20a%20Directive%20amending%20the%20Water%20Framework%20Directive%2C%20the%20Groundwater%20Directive%20and%20the%20Environmental%20Quality%20Standards%20Directive.pdf on 1 June 2023.

While the PPP is an explicit underlying principle under the UWWTD, the ECA (2021) review concluded that the PPP is not sufficiently applied[629]. The UWWTD concerns urban waste water so the polluters are thus MS citizens and industries. The process may be managed by public authorities or by private companies (public- and delegated private management), while the infrastructure is almost always owned by the authorities. The 2019 evaluation found that "*The UWWTD also does not prescribe how Member States should finance infrastructure and the operation and maintenance of collection systems and WWTPs*"[630]. However, both the TFEU and the WFD do provide indications on how water services should be financed. Article 191(2) TFEU states that 'environmental damage should as a priority be rectified at source and that the polluter should pay'. Article 9 of the WFD, under which the UWWTD is a 'basic measure', requires that Member States ensure that adequate contributions are received from the different water uses. This is meant to recover costs of water services based on economic analyses and by taking into account the 'polluter pays' principle. When choosing their approach, Member States should consider possible social, economic and environmental effects.

Following the 2019 evaluation of the UWWTD, it was decided that the Directive should be updated. The revised Directive will better target UWWT, with expanded coverage of plants and pollutants, PPP more directly implemented via extended Producer Responsibility (EPR), and have better alignment with the European Green Deal. Notably, the 2022 revision of the UWWTD will require producers to pay for the cost of removing micropollutants, with 92% toxic micropollutants found in EU wastewaters coming from pharmaceuticals and cosmetics. The revision includes a new EPR[631] It is unclear when the revision will come into effect, with the ENVI committee set to adopt its legislative report in September of 2023[632].

The PPP is not explicitly referenced in the Nitrates Directive or the Sewage Sludge Directive. However, both policies target agricultural pollution to water at source with the aim of ensuring that environmental damage is rectified at source and that the polluter pays. [633] In this way, implementation of the PPP is indirect as there is a legal requirement for the polluter to pay for pollution.

In addition to these primary policies in scope of the fitness check, the approach to implementing the PPP in secondary policies is outlined below.

Table A1-17: Approaches to implementing the PPP for other water policies

Policy	Approach to implementing the PPP
Safety of Offshore Oil and Gas Operations (2013/30/EU)	The PPP is mentioned on the first page, of the text of the directive stating "*that environmental damage needs as a matter of priority to be rectified at source and that the polluter must pay*." The policy requires the operator to develop and implement reports to ensure safety and avoid accidents. There is no planned revision to the Directive.

629 European Court of Auditors (2021): The Polluter Pays Principle. Available at: https://www.eca.europa.eu/Lists/ECADocuments/SR21_12/SR_polluter_pays_principle_EN.pdf on 5 June 2023.

630 European Commission (2019): Executive summary of the Evaluation of the Urban Wastewater Directive. Available at: https://circabc.europa.eu/ui/group/1c566741-ee2f-41e7-a915-7bd88bae7c03/library/2c7a6568-a624-4b0d-8a88-65f69083f518/details on 6 June 2023.

631 European Commission (2022) Press release: European Green Deal: Commission proposes rules for cleaner air and water. Available at https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6278 on 19 April 2023

632 European Parliament (2023): Revision of the Urban Wastewater Treatment Directive. Available at: https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-urban-wastewater-treatment-directive-(refit)#:~:text=In%20its%20work%20programme%20for,the%20urban%20wastewater%20treatment%20directive. On 5 June 2023.

633 European Commission (2021) COM/2021/1000 final: Report from the Commission to the Council and the European Parliament on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2016–2019. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A1000%3AFIN&qid=1633953687154 on 10 May 2023.

Table A1-17: Approaches to implementing the PPP for other water policies	
Policy	**Approach to implementing the PPP**
Environmental Quality Standards Directive 2013/39/EU	The PPP is mentioned on the first page of the text of the directive stating that *"…on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay."* The legislation sets EQSs for priority substances and eight other pollutants. Identifying the source of these pollutants is the main difficulty to implementing the PPP. This is a daughter directive of the Water FD, for which the PPP is an underpinning principle. Planned revision during the appraisal period634. It is unclear how this impact the implementation of the PPP.
Bathing Water Directive 2006/7/EC	The PPP is not mentioned in the legislation. However, this is a daughter directive of the Water FD, for which the PPP is an underpinning principle. The provisions require Member State competent authorities to monitor bathing water quality and define risk management measures to prevent health hazards, especially in the context of predictable short-term pollution or abnormal situations. Indirectly, implementation of the risk management measures are relevant to the application of the PPP. There is no planned revision to the Directive.
Drinking Water Directive (EU) 2020/2184W	The PPP is not mentioned in the legislation. However, this is a daughter directive of the Water FD, for which the PPP is an underpinning principle. The provisions set water quality standards, regular monitoring requirements and provisions for remedial measures in the case of exceedances. Indirectly, implementation of the remedial measures are relevant to the application of the PPP. There is no planned revision to the Directive.
Groundwater Directive 2006/118/EC	The PPP is not mentioned in the legislation. However, this is a daughter directive of the Water FD, for which the PPP is an underpinning principle. This Directive provides criteria for assessing groundwater in the context of the Water FD, and requires that measures to prevent or limit inputs of pollutants into groundwater are included in the programme of measures. Indirectly, implementation of these measures are relevant to the application of the PPP. Planned revision during the appraisal period[635]. It is unclear how this impact the implementation of the PPP.
Ship-source pollution Directive 2005/35/EC	The PPP is not mentioned in the legislation. Provisions to implement the PPP included in the legislation where it regulates discharges of polluting substances in internal waters of a Member State, territorial seas, straits and high seas. Applies to all seas in EU waters, irrespective of its flag. Ships are responsible for compliance and incur associated costs. There is no planned revision to the Directive.
Floods Directive (Directive 2007/60/EC)	The PPP is not mentioned in the legislation. No provisions to implement the PPP identified in the legislation. There is no planned revision to the Directive.
Water Reuse Regulation (EU) 2020/741	The PPP is not mentioned in the legislation. No provisions to implement the PPP identified in the legislation. There is no planned revision to the Directive.

634 https://environment.ec.europa.eu/publications/proposal-amending-water-directives_en

635 https://environment.ec.europa.eu/publications/proposal-amending-water-directives_en

National approaches

In terms of financing the water sector, some Member States have managed to move to almost full cost recovery for their water supply and waste water sector, and to apply the 'polluter pays' principle by charging households and industries. The vast majority of Member States rely on a mix of tariffs, taxes and EU funding to finance the investments.[636] Notable examples are below.

Table A1-18: National approaches to implementing the PPP in water management

Title of national intervention	Need for the PPP	Description of the PPP applied
Danish pesticide tax (1996)	Pesticides are a common source of pollution in the water supply. They come from agriculture and impact all water users	The tax was first implemented in 1996 but was reformed in 2013 to be based on environmental load. The full revenue through this tax is reimbursed to the agricultural sector primarily through a reduction in land value tax.[637]
Dutch phosphate tax (2018)	Due to the high density of dairy cattle in the Netherlands, the phosphate in the manure represents a significant environmental concern	A trading system for phosphate rights was set up in the Netherlands. When a transaction occurs, 10% of the traded rights will be withheld and kept in a so-called phosphate bank. This bank will then serve to further encourage the development of more land-based dairy farming by providing temporary, non-tradable rights to so-called "land-based farms". These are farms that can fully absorb on their land all the phosphate from their own manure production.

Working draft

636 European Commission (2019) Commission Staff Working Document Evaluation of the Council Directive 91/271/EEC of 21 May 1991, concerning urban waste-water treatment. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52019SC0700

637 Pederson, Anders Branth (2016). Pesticide tax in Denmark. Available at: https://ieep.eu/wp-content/uploads/2022/12/DK-Pesticide-Tax-final.pdf

EU funding support

Implementing directives in the marine and coastal environmental and water policy area can be very expensive for Member States to implement. Often these costs fall on households, especially regarding water[638]. At an EU level, there are numerous funds that seek to alleviate the costs of the various directives in this area. The CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development) is narrowly focused on the agricultural sector, one of the largest water users in the EU, and seeks to help with the efficient management of water amongst other natural resources[639]. The other European- level funds are far more focused on funding large-scale infrastructure in Member States.

Table A1-19: EU expenditure contributing to marine and coasta

EU funds	EU subsidies	Actions subsidised by EU funds	Beneficiaries	Proofing mechanism
Horizon Europe	Mission area 3 of the main legal act refers to Healthy Oceans, Seas, Coastal and Inland Waters. Such Mission receives funding of EUR 13.462 billion for Cluster 5 'Climate, Energy and Mobility' and EUR 8.952 billion for Cluster 6 'Food, Bioeconomy, Natural Resources, Agriculture and Environment'.	The protection of seas, oceans and inland waters, Sequestration and storage function of ecosystems including marine ecosystems, Ocean-climate nexus, Marine renewable energy	Any legal entity (natural person or legal person)	Applicants shall refer to the DNSH (Do no significant harm) principle for the proposed research methodology and impact to assure that they do not "make a significant harm to any of the six environmental objectives" set by the EU taxonomy regulation (Horizon Europe Proposal Evaluation, 2023).
CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development)	Water, along with other environmental measures, is included in the CAP Strategic Plans. The plans devote 32% of CAP expenditure to climate, water, soil, air, biodiversity, and animal welfare.	EU specific objective 'To foster sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency' (see Annex I of	Main beneficiaries are EU farmers. List available here	DNSH principle applies. Cross-compliance requirements: • SMR 1[640] (standards set in Directive 2000/60/EC on framework for water pol-

638 European Commission (2019): Executive Summary of the Evaluation concerning urban wastewater treatment. Available at: https://circabc.europa.eu/ui/group/1c566741-ee2f-41e7-a915-7bd88bae7c03/library/2c7a6568-a624-4b0d-8a88-65f69083f518/details on 5 June 2023.

639 European Commission (2021): A Greener and Fairer Cap. Available at: https://agriculture.ec.europa.eu/system/files/2022-02/factsheet-newcap-environment-fairness_en_0.pdf on 5 June 2023.

640 See Annex III of CAP Strategic Plan Regulation

Table A1-19: EU expenditure contributing to marine and coasta				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
	11 out of 28 CAP Strategic Plans support area-based interventions that will improve water management.	CAP Strategic Plan regulation). Activities might include eco-schemes addressing water management, supporting micro-irrigation or a ban of drainage in Natura2000 areas, etc. Working draft		icy), incl. controlling diffuse sources of pollution by phosphates • SMR 2 concerning the protection of waters against pollution caused by nitrates from agricultural sources • GAEC 4 aimed at 'Protection of river courses against pollution and run-off'
Cohesion policy funds	12.7bn expenditure is planned under 'Sustainable water'.[641]	Several relevant intervention fields: Provision of water for human consumption (062-063), Water management and water resource conservation (064), Waste water collection and treatment (065-066)	Public or private bodies, entities with or without legal personality, or natural persons. Data not yet available on actual beneficiaries.	Thematic enabling condition 2.5. Updated planning for required investments in water and wastewater sectors DNSH, objective 3: 'The Sustainable Use and Protection of Water and Marine resources'. EIA/SEA, to the extent relevant.
LIFE +	Several performance indicators relate to water quality and water pollution. The funding contributes to the EU horizontal policies for the 2021-2027 MFF, including *climate mainstreaming* which	Strategic integrated projects and strategic nature projects direct funds towards actions protecting marine environment, such as improving ecological status of water bodies, water management efficiency,	Funding is targeted at legal entities established either in an MS or an overseas country or in a third country associated with LIFE, including legal entities established under Union or international law.	The LIFE Programme directly supports the six environmental objectives set by the EU taxonomy regulation, thus DNSH (Do no significant harm) principle applies.

641 According to the data complied for the cohesion open data platform

Table A1-19: EU expenditure contributing to marine and coasta				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
	includes marine, freshwater and terrestrial ecosystems. Climate mainstreaming contribution is projected to cover 61% of the project envelope.	conservation and restoration of marine ecosystems (Natura 2000 marine sites, the promotion of healthy seas).		
InvestEU	Water is included in the 1st window of the Policy (Sustainable infrastructure) which is projected to receive €9.9 billion in funding.	Projects contributing to the Trans-European infrastructure, including maritime ports, waterway infrastructure. Moreover, projects on maritime entrepreneurship and industry as well as renewable marine energy are supported.	Beneficiaries, including public, private, mixed, NGOs, targeting operations on sustainable land and water use as specified in the Annex II of the main Regulation.	The application of the 'Do No Significant Harm' (DNSH) principle could be regarded as such. Operations under the *sustainable infrastructure window* are subject to climate, environmental and social sustainability proofing to minimise negative impacts and maximise benefits for the climate, environment and social dimension (see Article 8 of the Regulation.) This is described in the Technical guidance on sustainability proofing for the InvestEU Fund..
Recovery and Resilience Facility	'Sustainable use and protection of water and marine resources' actions make up 2% of NRRPs.[642]	There are three specific intervention fields associated with this area: 1) Provision of water for human consumption (extraction, treatment, storage and distribution infrastructure, efficiency measures, drinking water	Public administration, public sector and private sector entities. Beneficiary data is not available for RRF (only top 100 will be published for each MS as per the requirements of REPowerEU)	DNSH, objective 3: 'The Sustainable Use and Protection of Water and Marine resources'. EIA/SEA, to the extent relevant.

642 See RRF scoreboard data

Table A1-19: EU expenditure contributing to marine and coasta				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
		supply) compliant with efficiency criteria (code 039bis) [643] 2) Water management and water resource conservation (including river basin management, specific climate change adaptation measures, reuse, leakage reduction (code 040). 3) Waste water collection and treatment compliant with energy efficiency criteria (code 041bis).		

643 See Annex VI of the RRF Regulation (available here in a separate document)

A2.4.2 Air quality

Description of environmental pressure

Since 2000 there has been a notable decrease in concentrations of the main air quality pollutants to the extent that air quality limit values and standards are rarely exceeded (in the case of SO_2, CO, benzene, and heavy metals). However, challenges persist for PM, NO_2 and O_3 where air quality limit values and standards are exceeded. For emissions to air, the main environmental pressures are $PM_{2.5}$, NO_x and NH_3. The impact on human health can be measured in terms of premature death. Exposure to $PM_{2.5}$ was estimated to be responsible for around 238 000 premature deaths each year in Europe are attributable to air pollution (EEA, 2023)[644], while exposure to NO_2 and O_3 was estimated to be responsible for around 70 000 and 15 000 premature deaths in 2017, respectively. The trophic status of water provides an indication of the impact of air pollution on the environment (from excessive atmospheric nitrogen deposition) with critical loads for eutrophication exceeded in 62 % of Europe's ecosystem area. (EEA, 2020) (EEA, 2020)[645].

With a focus on the most challenging pollutants, key sources include (EEA, 2020):

- $PM_{2.5}$: solid fuel combustion in households (responsible for ~45% of total emissions)
- NO_x: Road traffic and to a lesser extent industry
- NH_3: Intensively managed agricultural areas

Many Industrial activities result in direct emissions of pollutants to the atmosphere and to waterbodies. The pollutants causing the greatest levels of concern for the EU are dust, NH_3, NO_X, HCl, SO_X, VOC, TOC/COD and AOX. In 2017, industrial activity accounted for over a quarter of NO_x, PM_{10} and CO emissions, and more than half of total greenhouse gas, SO_x, and non-methane volatile organic compounds (NMVOCs) emissions[646]. The energy production sector is the dominant source of industrial NO_x, SO_x, and CO_2 emissions to air, and also accounts for approximately a third of industrial PM_{10} releases. Production and processing of metals accounts for over half of industrial CO emissions, and waste and wastewater management was the source of around half of industrial methane emissions to air. Intensive livestock production and aquaculture represents the main source of atmospheric ammonia emissions from industry, with all other sectors accounting for less than 20% of emissions together. The EEA's State of the Environment Report[647] indicates that the relative importance of different industrial subsectors in terms of pollutant emissions has not changed between 2007 and 2017.

In this context (and as monitored by the EEA)[648], progress towards achieving the European Commission's zero pollution action plan target to reduce the health impacts of air pollution is monitored by the number of premature deaths attributable to fine particulate matter ($PM_{2.5}$) exposure above the WHO air quality guideline level of 5µg/m^3. Progress shows that between 2005 and 2021, the number of premature deaths fell by 41% in the EU-27. Figure 6-7 shows the estimated number of premature deaths per 100 000 inhabitants attributable to exposure to annual $PM_{2.5}$ concentrations above 5µg/m^3 in 2021 by Member State. This shows that despite progress at EU level, air quality remains a particular challenge for many Member States, not least where the number of deaths remain above the EU average of56 per 100 000

644 Health impacts of air pollution in Europe, 2022 — European Environment Agency (europa.eu)

645 EEA (2020) The European environment – state and outlook 2020. Knowledge for transition to a sustainable Europe. The European environment — state and outlook 2020 — European Environment Agency (europa.eu)

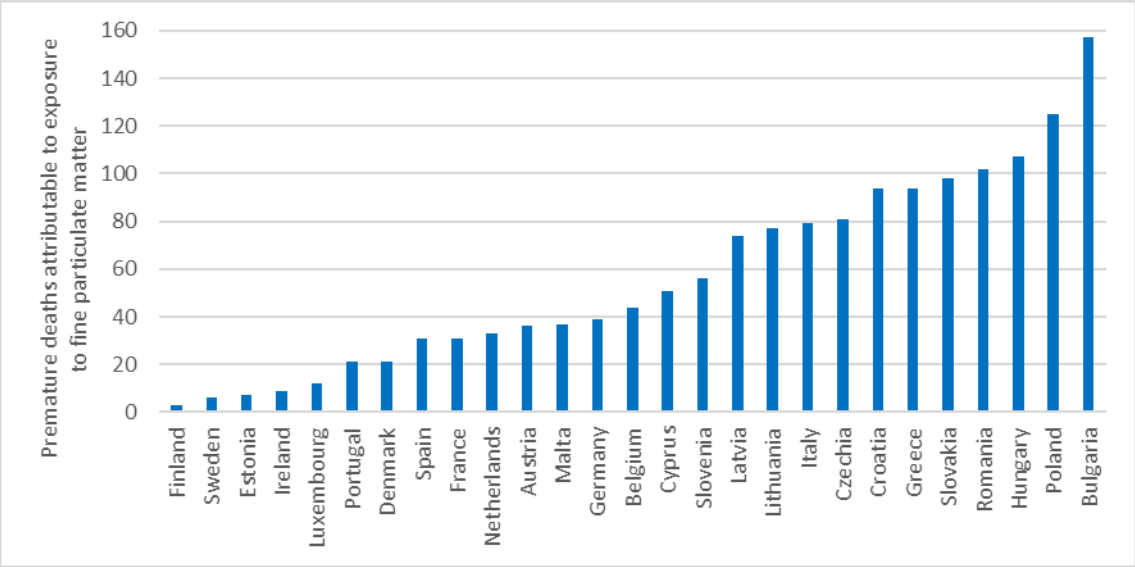
646 EEA (2019). The European environment – state and outlook 2020. p. 273. https://www.eea.europa.eu/soer/publications/soer-2020

647 EEA (2019). The European environment – state and outlook 2020. p. 274. https://www.eea.europa.eu/soer/publications/soer-2020

648 https://www.eea.europa.eu/en/analysis/indicators/health-impacts-of-exposure-to

inhabitants. This is the case in Latvia, Lithuania, Italy, Czechia, Croatia, Greece, Slovakia, Romania, Hungary, Poland and Bulgaria.

Figure 6-7 Estimated number of premature deaths per 100 000 inhabitants attributable to exposure to annual $PM_{2.5}$ concentrations above 5µg/m³ in 2021 by Member State (2021)



Working draft

Source: EEA (2023)[649]

Policy overview

Important components of the EU's approach to address air pollution are:

- Ambient air quality standards set out in the Ambient Air Quality Directives (AAQD) (2008/50/EC[650] and 2004/107/EC). Member States which exceed the limit values are required to develop and adopt air quality plans;
- National emission reduction obligations set by the National Emissions reduction Commitment Directive (NEC) (2016/2284/EU) for the most important transboundary air pollutants. Among other things, Member States are required to develop and adopt national air pollution control programmes (NAPCPs);
- Emission limits and efficiency standards for key sources of air pollution. These standards are set out at EU level in dedicated legislation and are cross referenced in air quality plans and NAPCPs.

Within this legal nexus, abatement measures to prevent and remediate pressures on air quality are driven by the AAQD and the NEC Directive.

Table A1-20: AAQD 2008/50/EC policy overview	
Policy objective	Contributing to the EGD ambition for zero pollution for a toxic free environment, the AAQD aims to: • define and establish ambient air quality objectives (SO_2, N_2O, NO_x, PM, Pb, benzene, CO, As, Cd, Hg, Ni, PaHs). • provide a framework for assessing and reporting ambient air quality. • maintain good air quality and improve where needed (defined in relation to the air quality objectives set by the Directive)

649 https://www.eea.europa.eu/data-and-maps/daviz/number-of-deaths-per-100#tab-chart_1

650 https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32008L0050

Table A1-20: AAQD 2008/50/EC policy overview	
	• enhance transboundary cooperation in reducing air pollution. Relevant UN SDG are SDG 9 – Industry, innovation, and infrastructure, SDG 3 – Good Health and Wellbeing , and SDG11 - Sustainable cities and communities.
Approach to implementation	Air quality standards (limit values and target values) are set (Chapter III).[651] Where levels are elevated above limit or target values, Member States should prepare an air quality plan or programme to address the sources responsible to ensure compliance and to keep exceedance periods as short as possible by adopting and implementing the necessary abatement measures (Chapter IV, 2008/50/EC; Article 3, 2004/107/EC).[652]
Monitoring and reporting	Member States send validated data to the Commission once a year, and continuously transmit up-to-date (near real-time) air quality data. Reporting obligations include monitoring data and information about sampling points and assessment methods, exceedance situations and alerts, about contributions from natural sources, road sanding and salting, about air quality plans and measures (Chapter II,2008/50/EC; Article 4 and 5, 2004/107/EC).[653]
Approach to enforcement	Member State authorities are responsible for overseeing the implementation of air quality plans, which typically require action by stakeholders in the transport, energy (incl. domestic heating) agricultural, or industry sectors. In cases of a breach, penalties must be effective, proportionate and dissuasive (Article 30,2008/50/EC; Article 9, 2004/107/EC). The Commission may initiate infringement proceedings against Member States for persistent non-compliance as regards what it means that the exceedance period shall be kept as short as possible and the extent to which an air quality plan has been elaborated (Article 23, 2008/50/EC).

Working draft

Table A1-21: NEC Directive	
Policy objective	Contributing to the EGD ambition for zero pollution for a toxic free environment, it aims to reduce emissions of SO_2, NO_x, NMVOC, NH_3 and $PM_{2.5}$, thereby controlling pollutants that cause acidification and ground-level ozone and reduce impacts on human health and the environment. To contribute to air quality, biodiversity, ecosystem, climate and energy policy objectives. Synergies with the following policies are highlighted in accompanying guidance to Member States for developing the NAPCPs[654]: • the air quality objectives (including long-term objectives) specified in the national, EU and international policies and guidelines; • the Union's biodiversity and ecosystem objectives in line with the 7th EAP; • and other Union policies, specifically related to climate and energy (National Energy and Climate Plans with non-ETS GHG reduction target; Renewable Energy Sources objective; Energy Efficiency objective).
Approach to implementation	Emission reduction commitments are set for SO_2, NO_x, NMVOC, NH_3 and $PM_{2.5}$ for 2020 and 2030 (and beyond) (Article 4). Member States are required to draw up, adopt and implement national air pollution control programmes (NAPCPs) to meet these commitments (Article 6). Annual emission and projection reporting is required for selected pollutants (SO_2, NO_x, NMVOC, NH_3 and $PM_{2.5}$, heavy metals, persistent organic pollutants (POPs) and black carbon) (Article 8).

651 https://environment.ec.europa.eu/topics/air/air-quality/eu-air-quality-standards_en

652 https://environment.ec.europa.eu/topics/air/air-quality_en

653 European Commission (2019). Fitness check of the Ambient Air Quality Directives. Page 18. https://circabc.europa.eu/ui/group/cd69a4b9-1a68-4d6c-9c48-77c0399f225d/library/0667d82d-2519-49cf-aa4b-2f8886379c4d?p=1&n=10&sort=modified_DESC

654 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0301(01)&from=FR

Table A1-21: NEC Directive	
	Relevant UN SDG are SDG 9 – Industry, innovation, and infrastructure, SDG 3 – Good Health and Wellbeing, and SDG11 - Sustainable cities and communities.
Monitoring and reporting	Member States are required to monitor and report annually the emissions and projections, spatially disaggregated national emission inventories, and large point source inventories (Article 8). Member States are also required to report the location of the monitoring sites and the associated indicators used for monitoring air pollution impacts (Article 9).
Approach to enforcement	In cases of a breach, penalties must be effective, proportionate and dissuasive (Article 18). The Commission may initiate infringement proceedings against Member States. In January 2023, pre-infringement proceedings were launched against 14 Member States based on failure to meet their commitments for one or more of the NEC Directive pollutants and for failure to adopt sufficient measures in their NAPCPs[655].

An overview of abatement measures and related source specific policies are presented below.

Table A1-22: Key abatement measures for air pollution and related policies	
Abatement measure	**Related source specific policy (where identified)**
Low emission zone	
Promotion of cycling	
Reduced speed limits/congestion charges	
Electric buses, trams, Euro VI or retrofitted buses	Air pollutant emissions standards for combustion engine vehicles (Euro 7) CO_2 emission performance standards for cars and vans, for lorries (and buses) Eurovignette Directive
Low-sulphur fuels for shipping fuels in port area and measures to reduce diffusive dust emissions in ports	Creating zero-emission ports are a flagship area under the Sustainable and Smart Mobility Strategy
Ban on coal for household heating/cooking	
Fuel conversion in domestic heating	
District heating	MCP Directive
Replace old stoves and boilers with clean models	Eco-design Directive
Relocation of industrial sites out of urban areas	
Energy-efficient buildings with insulation, renewable energy sources	Energy Performance of Buildings directive
Low-emission techniques for spreading manures and mineral fertilisers and animal feeding strategies	IED covers big pig and poultry farms.

Sources: EEA SOER (2020), European Commission (2020)[656]

For air pollution, the AAQD and NEC Directive work alongside other source specific policies including the Industrial Emissions Directive, Euro regulations for vehicles, the Medium Combustion Plants Directive, the Fuel Quality Directive and the Renewable Energy Directive, the Ecodesign Directive and the Nitrate Directive. Abatement measures typically target NO_x

655Bulgaria (INFR(2022)2068), Denmark (INFR(2022)2070), Ireland (INFR(2022)2073), Spain (INFR(2022)2071), Cyprus (INFR(2022)2069) Latvia (INFR(2022)2076), Lithuania (INFR(2022)2074), Luxembourg (INFR(2022)2075), Hungary (INFR(2022)2072), Austria (INFR(2022)2067), Poland (INFR(2022)2077), Portugal (INFR(2022)2078), Romania (INFR(2022)2079) and Sweden (INFR(2022)2080))

656 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Sustainable and Smart Mobility Strategy – putting European transport on track for the future. COM(2020)789.

and PM emissions from road traffic. Increasingly other pollutant sources are now being tackled, for example fuel combustion in residential stoves, inland shipping or construction and demolition activities, including emissions from non-road mobile machinery (Regulation (EU) 2016/1628). The Fuel Quality Directive and the Renewable Energy Directive establish common fuel quality rules to reduce air pollutant emissions (applies to petrol diesel and biofuels used in road transport and gasoil in non-road mobile machinery). More recently, the ReFuelEU Aviation and FuelEU Maritime initiatives have been proposed to further regulate emissions to air from international shipping and aviation. For international shipping, there are examples of existing legislation targeted to specific geographic areas including global ship fuel sulphur limits or sulphur and NO_x emission control areas, so far only established in Europe in the Baltic and North Seas. Owing to challenges in understanding the relation between emission sources and concentrations in ambient air, it is likely that a number of sources are underestimated in current monitoring. For example resuspension of PM, the condensable fraction of primary PM or international shipping and aviation.

Together the Industrial Emissions Directive (the 'IED'; 2010/75/EU)[657] and the Medium Combustion Plant Directive ('MCPD'; 2015/2193)[658] are particularly important components of reducing risks to human health and the environment from industrial emissions to air (and water). The IED requires that all installations operating above certain activity thresholds in specified industrial activities do so in compliance with a permit issued by the competent authorities. In setting permits, competent authorities can require the use of Best Available Techniques (BAT) (identified for different sectors in BAT Reference documents) to prevent and reduce environmental pollution. These are periodically reviewed and updated by the European IPPC Bureau. The IED therefore represents a significant implementation of the PPP in managing environmental pressures associated with industrial emissions by requiring approximately 50,000[659] of the largest industrial installations across the EU to take preventive action. The MCPD sets ELVs for medium combustion plant (MCP) in the EU, requiring operators to take preventive action to meet them.

Table A1-23: IED 2010/75/EU policy overview

Policy objectives	To establish rules for integrated prevention and control of pollution arising from industrial activities. To prevent or reduce emissions into air, water and land and the generation of waste from industry, thereby reducing potential risks to human health and the environment. This contributes to the EGD objective to reach a zero-pollution, competitive, climate-neutral economy by 2050. Relevant UN SDG is SDG 9 – Industry, innovation and infrastructure
Approach to implementation	• Installations in scope of the IED are required to operate in accordance with permits issued by Member States' competent authorities (Article 4). The permit extends to all environmental aspects of an installation's operating activities, including emissions, waste, resource use, noise, prevention of accidents and restoration of the site upon closure. For industrial activities set out in IED Annex I, where applicable, permit conditions should be based on relevant Best Available Techniques (BAT) conclusions (BATC) (Article 11). • Permit conditions are set out in Article 14, requiring among other things operators to set emission limit values (ELVs) for polluting substances and using BATC as the reference point. BATC can contain BAT-Associated Emission Limits (further referred to as BAT-AELs) (a numerical range of emission levels). Installation operators may apply for a derogation from BAT AELs (Article 15(4)), where they can demonstrate that achieving the BAT-AELs would lead

657 EUR-Lex (2010). Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02010L0075-20110106

658 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L2193

659 European Commission (n.d.). Industrial Emissions Directive. https://ec.europa.eu/environment/industry/stationary/ied/legislation.htm

Table A1-23: IED 2010/75/EU policy overview	
	to disproportionately higher costs compared to the environmental benefits owing to the geographic location, local environmental conditions, or technical characteristics of the installation. Application of Article 15(4) derogations has varied across the EU, as detailed by a study into their application[660].
Monitoring and reporting	Emission monitoring requirements apply to installation operators and are prescribed by permit conditions (Article 14). These are based on BATC and can include continuous or periodic monitoring arrangements depending on the pollutants and environmental compartments (air, water) that they are being released to. In addition, Article 72 requires Member State competent authorities to report to the Commission on: • Information on the implementation of the Directive; • Representative data on emissions; • Data on emission limit values; • Information on the application of BAT; • Details of the granting of exemptions in accordance with Article 15(4); and • Information on progress made concerning the development and application of emerging techniques.
Approach to enforcement	The IED sets provisions for environmental inspections of installations, requiring authorities to undertake site visits to permitted installations. Article 23 requires Member State competent authorities to establish a system of environmental inspections at permitted installations. Member State competent authorities are required to prepare a report following each site inspection visit, describing relevant findings regarding compliance with permit conditions. Article 79 requires Member States to determine a schedule of "effective, proportionate and dissuasive" penalties applicable to infringements.

Table A1-24: MCPD (EU) 2015/2193 policy overview	
Policy objectives	To control emissions of SO_2, NO_x and dust into air from MCP, thereby reducing potential risks to human health and the environment. Aims to monitor emissions of CO from MCP. This is relevant to the EGD objective to reach zero-pollution.
Approach to implementation	The MCPD covers combustion plants between 1 MW and 50 MW. It sets ELVs for 2025 and 2030 for emissions of SO_2, NO_x and dust to air from MCP (Article 6). It does not set ELVs for CO. To establish whether ELVs are needed, the MCPD requires (i) plant operators to monitor CO emissions (Annex 7); (ii) Member State authorities to report CO emissions to the Commission (Article 11(2)); and (iii) for the Commission to review the need for regulatory intervention at a minimum every ten years (Article 12). Article 12 MCPD also requires the Commission to review energy efficiency of MCP and assess the potential of setting minimum energy efficiency standards which are aligned with Best Available Techniques (BAT).
Monitoring and reporting	Article 11 requires Member State Competent Authorities to report estimated emissions of SO_2, NO_x, dust and CO, and the number of MCPs operating in different Member States, as well as providing a breakdown on plant and fuel types used, plant capacities, and the age of MCPs.
Approach to enforcement	Article 16 requires Member States to determine a schedule of "effective, proportionate and dissuasive" penalties applicable to infringements.

The approach to implementing the PPP for secondary policies in scope of the fitness check is presented below.

660 https://circabc.europa.eu/ui/group/06f33a94-9829-4eee-b187-21bb783a0fbf/library/9b59019b-df6c-4e6c-a5c2-1fb25cfe049c/details

Table A1-25: Approaches to implementing the PPP in related secondary policies in scope of the fitness check	
Policy	**Overview**
European Pollutant Release and Transfer Register (E-PRTR) Regulation (EC) No 166/2006	Requires industrial facilities in European Union Member States to provide accessible data regarding pollutant releases and transfers from industrial activity. Facilitates the application of the PPP to the industrial sector by ensuring accountability. Planned revision aims to increase data transparency and public access to environmental information by making permit summaries available online and providing opportunities for public involvement in permit-setting and review processes.

Implementing the PPP

EU approach

The PPP is an implicit underlying principle for the AAQD and NEC Directive (as two key policies used to address air quality and air pollution in the EU), but is not referred to by the provisions or the recitals of the Directives. However, the polluter is ultimately responsible for implementing the abatement measures adopted by Member State competent authorities to meet the requirements of the Directives.

The policies rely on command and control mechanisms. Member State competent authorities are responsible for (1) costs of pollution prevention and to remedy pollution (ensuring air quality standards and emission reduction commitments are met, developing plans with policies and measures to facilitate meeting the standard/ commitment/ objective), and (2) the cost of control measures (as regards monitoring and reporting, and enforcement). Guidance to facilitate implementation is directed at Member State competent authorities and reference to the PPP is not made[661].

In 2022, the European Commission had ongoing air quality infringement cases against 13 Member States for NO_2, 14 Members States for $PM_{2.5}$/PM_{10} and 1 Member State for SO_2[662]. In addition, NGOs in France, Germany, the UK, and Italy have initiated court action against competent authorities for failure to meet EU standards (where the NGOs won the cases)[663]. In January 2023, the Commission issued formal notices to 14 Member States (Bulgaria, Denmark, Ireland, Spain, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Austria, Poland, Portugal, Romania, and Sweden) to respect their reduction commitments required by the NEC Directive. This is the first step in infringement proceedings and may be followed by a reasoned opinion where the Member State fails to meet the obligation[664]. A case for personal compensation for damage caused to an individual on account of deterioration of the air resulting from the exceedance of air quality limit values has also been brought to the Court[665]. The Court concluded the Directive is 'not intended to confer rights on individuals…entitling them to compensation from a Member State under the principle of State liability for loss and

662 https://ec.europa.eu/atwork/applying-eu-law/infringements-proceedings/infringement_decisions/screen/home?lang_code=en

663 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62018CJ0636&qid=1653906483310 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62018CJ0635&qid=1653906057988 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62018CJ0664&qid=1653906483310 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62018CJ0644&qid=1653906483310 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62018CJ0638&qid=1653906483310

664 January Infringements package: key decisions (europa.eu)

665 E.g. C-61/21, JP / Ministre de la Transition écologique, Premier ministre - Right of individuals to compensation for damage to health from air pollution . EUR-Lex - 62021CJ0061 - EN - EUR-Lex (europa.eu)

damage caused to individuals as a result of breaches of EU law attributable to that Member State'.

In the case of the NEC Directive, the Commission aims to facilitate access to Union funds to support with the implementation of abatement measures (namely Horizon Europe for research and innovation, cohesion funds for structural and investment support, agricultural support under the CAP, and LIFE) (Article 7). The extent to which the costs of implementation are borne by the polluter will be assessed as part of this evaluation.

The planned revision of the AAQD (proposal published October 2022 and negotiations are in progress)[666] includes the following options with potential to strengthen the way the PPP is implemented:

- Set up a fund via payment of penalties and which can be used to compensate material damage or finance air quality measures
- Introduce minimum levels for financial penalties where competent authorities and industry or other private entities are in breach of the provisions of the Directives or measures adopted pursuant to the Directives
- Introduce right to health damage compensation (to address challenges the public face in this regard, e.g. CJEU proceedings for C-61/21,)[665], requiring competent authorities and/or industry (polluters) to pay compensation to those who have suffered damage to health from air pollution and would therefore carry mitigation costs for those who are held accountable for breaches of air quality standards (access to justice and compensation for health damage suffered from air pollution is currently not addressed)

Abatement measures are defined by the plans established by the Member State competent authority (air quality plans and national air pollution control programmes). These plans can include source control policies among the abatement policies and measures to address air pollution.

Together the Industrial Emissions Directive (the 'IED'; 2010/75/EU)[667] and the Medium Combustion Plant Directive ('MCPD'; 2015/2193)[668] are important legislation reducing (industrial) emissions to air.

As summarised in the legislative recitals, the PPP underpins the approach taken for the IED:

"(2) In order to prevent, reduce and as far as possible eliminate pollution arising from industrial activities in compliance with the 'polluter pays' principle and the principle of pollution prevention, it is necessary to establish a general framework for the control of the main industrial activities, giving priority to intervention at source, ensuring prudent management of natural resources and taking into account, when necessary, the economic situation and specific local characteristics of the place in which the industrial activity is taking place."

"(25) In accordance with the polluter pays principle, when assessing the level of significance of the pollution of soil and groundwater caused by the operator which would trigger the obligation to return the site to the state described in the baseline report, Member States should take into account the permit conditions that have applied over the lifetime of the activity concerned, the pollution prevention measures adopted for the installation, and the relative

666 Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on ambient air quality and cleaner air for Europe (recast). COM/2022/542 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A542%3AFIN

667 EUR-Lex (2010). Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02010L0075-20110106

668 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L2193

increase in pollution compared to the contamination load identified in the baseline report. Liability regarding pollution not caused by the operator is a matter for relevant national law and, where applicable, other relevant Union law."

This is translated in the provisions of the Directive, whereby the operator is responsible for its permit application and for adhering to the conditions contained therein. In this way, permits (permit conditions and compliance) are the primary policy mechanism used to apply the PPP under the IED.

The planned revision for the IED aims to provide better protection of human health and the environment with further efforts to reduce pollution in line with the aim of the EGD to reach a zero-pollution, competitive, climate-neutral economy by 2050. Key features of the revision that may relate to how the PPP is implemented include:

- Strengthened permit controls on air and water emissions (which will facilitate more consistent approach to implementing the PPP between Member States and regions)
- Transformation plans to integrate greenhouse gas emissions, resource efficiency, and water reuse (which will facilitate more consistent approach to implementing the PPP between environmental pressures)
- Ensure effective, proportionate and dissuasive penalties are in place to address disparities in penalty regimes between Member States (which will facilitate more consistent approach to implementing the PPP between Member States and regions)
- Expand coverage of intensive farming and industrial activities (which will facilitate more consistent approach to implementing the PPP between environmental pressures)

The PPP is not explicitly referred to in the MCPD. However, the provisions target the polluter. The MCPD sets ELVs, thereby requiring EU MCP operators to take preventive action to meet them.

An overview of the way in which the PPP is applied in additional policies that contribute to air quality improvements is presented in the table below.[669] Factors affecting the effectiveness of these abatement measures include the costs of implementation, often requiring significant investments e.g. for abatement technologies and access to sufficient funds at local/regional authority level, together with buy-in by local/ regional authorities and industry. The transboundary nature of air pollution can present a challenge for identifying the responsible polluter, and accordingly for defining adequate abatement measures.

Table A1-26: Approaches to implementing the PPP in other air quality policies

Policy	Approach to implementing the PPP
Euro Standards Regulation	Vehicle manufacturers are required to comply with limits on the emissions of various pollutants from cars, vans, trucks, and buses, including nitrogen oxides (NO_x), particulate matter (PM), carbon mono$_x$ide (CO), and hydrocarbons (HC). Vehicle manufacturers are required to demonstrate compliance with the emissions standards through a type-approval process, and to provide information on the emissions performance of vehicles. No planned revision to the legislation.
Eurovignette Directive	Framework for Member States to introduce road charges (tolls or vignettes) (non-mandatory). Amongst other things, this Directive aims to

669 Trinomics et al (2022) Study to support the impact assessment for a revision of the EU Ambient Air Quality Directives https://environment.ec.europa.eu/publications/revision-eu-ambient-air-quality-legislation_en

Table A1-26: Approaches to implementing the PPP in other air quality policies	
Policy	**Approach to implementing the PPP**
	internalise some of the main external costs including air pollution.[670] No planned revision to the legislation.
Fuel Quality Directive	Sets quality requirements for fuels used in road transport (petrol diesel and biofuels) and in non-road-mobile machinery (gasoil) to enable air pollutant emission reductions (namely SO_2) (and GHG emission reductions). For air, the PPP is applied via a mandatory reduction of sulphur content in fuels (requiring fuel suppliers to comply with the rules). Additional rules apply for GHG reductions (not covered in this assessment). No planned revision to the legislation.
Sulphur content of liquid fuels	Sets quality requirements for liquid fuels (gas oils and marine fuel) to enable air pollutant emission reductions (SO_2). The PPP is applied via a mandatory reduction of sulphur content in fuels (requiring fuel suppliers to comply with the rules). No planned revision to the legislation.
PVR Directives	No reference to the PPP in the legislation but provisions identified that implement the PPP where service stations are required to be equipped with a petrol vapour recovery system to capture petrol vapour and they incur the costs of purchase and installation. No planned revision to the legislation.

Table note: Related policies also include IED and MCPD which are described in more detail above.

National approaches

Table A1-27 provides an overview of some of the national approaches to applying the PPP to industrial emissions. Much of the national legislation implementing the PPP pre-dates EU interventions, including the Industrial Emissions Directive and the Medium Combustion Plant Directive. Most follow a common approach of levying fees or taxes on industrial installations in proportion to their emissions.

Table A1-27: Policies and measures taken to implement the PPP at national level	
National level intervention	**Approach to implementing the PPP**
Act No. 201/2012 Coll. on air protection (Czech Republic)	The Act requires the operators of stationary industrial emissions sources to pay a fee per tonne of PM_{10}, SO_2 and NO_x emitted. Fees were applicable prior to 2012, although the impact of the fees during this period was limited as they were not at a level that created motivation for polluters to change their practices[671].
Act No. 254/2001 Coll. (Water Act; Czech Republic)	The Water Act places an obligation on entities to pay a fee for discharging waste water into surface waters. *"The fee must be paid if the discharged waste water exceeds given limits (of concentration and weight). The fees differ per pollutant (for example, if nitrogen exceeds its given limit the fee amounts to CZK 30 / kg, if phosphor exceeds its given limit the fee amounts to CZK 70 / kg and if mercury exceeds its limits the fee amounts of CZK 20 000 / kg)."*[672]202
Gesetz über Abgaben für das Einleiten von Abwasser in Gewässer (effluent tax, Germany)	Since 1981, Germany has levied an effluent tax on the discharge of effluent to water bodies. The tax levied depends on the harmfulness of the effluent. Among others, the tax applies to emitting industrial operators. Revenues from the tax are ringfenced for action to maintain or improve water quality; in 2018 the tax generated a revenue of €266m 203202.

670https://www.europarl.europa.eu/legislative-train/carriage/jd-eurovignette-directive-revision/report?sid=6501#:~:text=The%20Eurovignette%20Directive%201999%2F62%2FEC%20on%20the%20charging%20of,%28such%20as%20congestion%2C%20noise%20and%20airpollution%29%20are%20internalised Page 1.

671 https://ieep.eu/wp-content/uploads/2022/12/CZ-Air-Pollution-Fee-final.pdf p. 8

672 https://environment.ec.europa.eu/system/files/2021-10/Taxes%2C%20charges%20and%20fees.pdf p. 13.

Table A1-27: Policies and measures taken to implement the PPP at national level	
National level intervention	**Approach to implementing the PPP**
Act No. LXXXIX of 2003 on Environmental Pollution Charges (Hungary)	The Act introduced a charge on emissions of NO_x, SO_2 and non-toxic dust in 2003. The charge is paid by point-source emitters and mainly effects industry and the power sector; domestic emitters and district heating are exempt from the charge. The charge generated a revenue of 5.6bn HUF in 2019[203202].
Wastewater fees (Poland)	Since 2002, Poland has charged fees for discharge of sewage to water or soil in efforts to internalise the costs to discharging entities, and to use fee revenues to compensate the environmental impacts[203]. The costs for industrial sewage discharge are dependent on the types of water pollutants[673].
Environmental tax for wastewater collection and treatment (Slovenia)	A tax on industrial and municipal wastewater came into force in 2012. The tax to be paid is based on the sum of the units of environmental load, achieved by direct or indirect discharge of wastewater or discharge of wastewater through public sewers into water. Tax revenues are paid into a water fund and are intended for use in water issues[203].
Sulphur tax (Sweden)	Since 1991, Sweden has implemented a tax to reduce emissions of SO_2 from combustion of peat, coal, coke and other solid and gaseous fuels. Where industrial operators are able to reduce emissions by cleaning or binding SO_2 to the ash, polluters can receive a tax rebate proportionate to the abated SO_2 emissions[203].
NO_x tax (Sweden)	Sweden has implemented a tax on NO_x emissions from stationary combustion facilities in efforts to combat acidification. Revenues from the tax are reimbursed back to plants proportional to their energy use i.e. plants with low emissions compared to energy production are net beneficiaries of funding, while plants with high emissions but low energy output are net payers[203].

673 https://ieep.eu/wp-content/uploads/2022/12/PL-Wastewater-Fee-final.pdf

EU funding support

In this section we track EU expenditure contributing to air quality and air pollutant emission reduction. First, we identify the total amount and proportion of total funds allocated to the relevant policy area. Second, we note the actions these funds subsidise. Third, we note the intended beneficiaries and fourth, we note how the proofing mechanism is designed to avoid conflict with how the PPP is applied in related policies.

Table A1-28: EU expenditure contributing to air and noise policy area

EU fund	EU subsidies	Actions subsidised by EU funds	Beneficiaries	Proofing mechanism
Horizon Europe	Cluster 5, "Climate, Energy and Mobility, with a EUR 13 462 000 000 budget, targets noise and air quality via industrial competitiveness in Transport. It is estimated that clean air contributions will be 5.800 million euros.	The financing within the scope of the Cluster 5 may involve low-emission alternative energy deployment, market uptake of zero-emission aircraft, vehicles and vessels (Regulated by the Decision).	Any legal entity (natural or legal person).	Applicants shall refer to the DNSH (Do no significant harm) principle for the proposed research methodology and impact to assure that they do not "make a significant harm to any of the six environmental objectives" set by the EU taxonomy regulation (Horizon Europe Proposal Evaluation, 2023).
CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development)	Air, along with other environmental measures, is included in the CAP Strategic Plans. The plans devote 32% of CAP expenditure to climate, water, soil, air, biodiversity and animal welfare. EAFRD is estimated to have a clean Air Contributions for the 2021-2027 from EAFRD is EUR 176m.	EU specific objective 'To foster sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency' and (see Annex I of CAP Strategic Plan regulation). Result indicator R.20 describes improved air quality to be measured by the ammonia emissions reductions from agriculture.	Main beneficiaries are EU farmers. List available here	DNSH principle applies, namely Pollution Prevention and Control, including air pollution.
Cohesion policy funds	Specific data for 2021-27 not available yet. Over the 2014-20 programming period, estimated eligible costs amounted to 19.5bn under	One relevant intervention field: Air quality and noise reduction measures (077). However, based on the estimates of contribution of cohesion policy to clean air[674] under the previous	Public or private bodies, entities with or without legal personality, or natural persons. Data not yet	Do No Significant Harm principle– No measure under cohesion policy should lead to harm to the environmental objectives of the Taxonomy Regulation (listed in Art 9). One of these relates to Pollution

674 See here

Table A1-28: EU expenditure contributing to air and noise policy area				
EU fund	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
	ERDF and 12.3 under the Cohesion Fund.	programming period, other intervention fields also contribute to this objective. For instance, IFs such as 'cycle tracks and footpaths', different energy efficiency measures and railway were also counted as such.	available on actual beneficiaries.	Prevention and Control, including air pollution. EIA/SEA, to the extent relevant.
LIFE	The LIFE programme contributes to the EU horizontal policies for the 2021-2027 MFF, including clean air financing. Overall, projected 129 million euros will be directed to clean air contribution.	Funding under "circular Economy and Quality of Life" subprogramme covers activities towards change in air quality and noise pollution reduction, including the innovative use of alternative fuels, the use of innovative logistic or passenger mobility platforms and more.	Funding is targeted at legal entities established either in a MS or an overseas country or in a third country associated with LIFE, including legal entities established under Union or international law.	The LIFE Programme directly supports the six environmental objectives set by the EU taxonomy regulation, thus DNSH (Do no significant harm) principle applies.
InvestEU	Air and Noise are included in projects related to pollution prevention and control. This could classify under "sustainable Infrastructure" policy area, receiving €9.9 billion in funding.	1) Annex II of the Regulation mentions investments that target reduced air pollution and noise are eligible for funding. 2) Annex III of the Regulation mentions Investments contributing to the implementation of plans and programmes required by the Union environmental acquis relating to air quality	Any natural or legal persons (based in an EU or any third eligible country) can benefit from the Project. This includes private entities, public sector entities, mixed entities, Non-profit organizations.[675]	The application of the 'Do No Significant Harm' (DNSH) principle could be regarded as such. Operations under the *sustainable infrastructure window* are subject to climate, environmental and social sustainability proofing to minimise negative impacts and maximise benefits for the climate, environment and social dimension (see Article 8 of the Regulation.) This is described in the Technical guidance on sustainability proofing for the InvestEU Fund.

675 https://investeu.europa.eu/what-investeu-programme/investeu-fund/how-get-financing_en

Table A1-28: EU expenditure contributing to air and noise policy area				
EU fund	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
Recovery and Resilience Facility	'Pollution prevention and control (such as air, water, noise pollution)' actions make up 2% of National Recovery and Resilience Plans (NRRPs).[676]	There is a specific intervention field devoted to 'Air quality and noise reduction measures' (code 048).[677]	Public administration, public sector and private sector entities. Beneficiary data is not available for RRF (only top 100 will be published for each MS as per the requirements of REPowerEU)	Do No Significant Harm principle– No measure under the RRF should lead to harm to the environmental objectives of the Taxonomy Regulation (listed in Art 9). One of these relates to Pollution Prevention and Control, including air pollution. EIA/SEA, to the extent relevant.

Table A1-29 provides an overview of EU funding in the context of industrial emissions policy.

Working draft

Table A1-29: EU expenditure contributing to industry policy area				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
Horizon Europe	Industry engagement plays a crucial role, especially within the context of Cluster 4 "Digital, Industry & Space" as well as Cluster 5 "Climate, Energy & Mobility". These cluster receive EUR 13.46 billion and EUR 13.462 billion respectively. Moreover, 2 funding instruments within Pillar III of Innovative Europe, Pathfinder for Advanced Research and Accelerator ,will finance breakthrough and market-	Manufacturing technologies (particularly for decarbonization), Digital technologies (including Quantum technologies), Advanced materials, Emerging enabling technologies. Special emphasis and role is given to hydrogen-related actions	All types of industry can benefit from Programme.	Applicants shall refer to the DNSH (Do no significant harm) principle for the proposed research methodology and impact to assure that they do not "make a significant harm to any of the six environmental objectives" set by the EU taxonomy regulation (Horizon Europe Proposal Evaluation, 2023).

676 See RRF scoreboard data

677 See Annex VI of the RRF Regulation (available here in a separate document)

Table A1-29: EU expenditure contributing to industry policy area				
	creating innovations, especially for SMEs and startups.			
CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development)	Annex II of Regulation 2021/2115 targets agricultural productivity and energy use as "Context" Indicators. No specific expenditure data is available.	Increased labour productivity in agriculture, forestry and food industry (several specific objectives in Annex I of the CAP strategic plan regulation)	Main beneficiaries are EU farmers. List available here	DNSH principle applies.
Cohesion policy funds	Several investments could contribute to such activities; no specific data available.	Two relevant intervention fields: Rehabilitation of industrial sites and contaminated land (073-074)	Public or private bodies, entities with or without legal personality, or natural persons. Data not yet available on actual beneficiaries.	DNSH, to the extent it applies EIA/SEA, to the extent relevant.
LIFE +	LIFE+ mobilises industry for a clean and circular economy; no specific data available.	Article 11 of the main legal act defines the actions eligible for financing. No explicit reference is made to the industry.	Funding is targeted at legal entities established either in an MS or an overseas country or in a third country associated with LIFE, including legal entities established under Union or international law.	The LIFE Programme directly supports the six environmental objectives set by the EU taxonomy regulation, thus DNSH (Do no significant harm) principle applies.
InvestEU	Main policy areas (i.e. "windows") of InvestEU regulation refer to the industry, particularly • Sustainable Infrastructure, €9.9 bn • SMEs, €6.9 bn • R&I and Digitalization, €2.8 bn.	Actions include: • Energy sector development • Sustainable transportation development • Environment and Resources • Digital solution developments • RDI • SMEs • Sustainable agriculture.	Included but not limited to SMEs, Tourism industry, Technology, Manufacturing, Defence industry. Financing and investment operations under the InvestEU are publicly available. The InvestEU portal provides data on all investment opportunities.	The application of the 'Do No Significant Harm' (DNSH) principle could be regarded as such. Operations under the *sustainable infrastructure window* are subject to climate, environmental and social sustainability proofing to minimise negative impacts and maximise benefits for the climate, environment and social dimension (see Article 8 of the Regulation.) This is described in the Technical

working draft

Table A1-29: EU expenditure contributing to industry policy area				
				guidance on sustainability proofing for the InvestEU Fund.
Recovery and Resilience Facility	'Pollution prevention and control (such as air, water, noise pollution)' actions make up 2% of NRRPs.[678]	Although no expenditure data is available, there is a specific intervention field devoted to 'Air quality and noise reduction measures' (code 048).[679]	Beneficiary data is not available for RRF (only top 100 will be published for each MS as per the requirements of REPowerEU)	DNSH, to the extent it applies EIA/SEA, to the extent relevant.

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678 See RRF scoreboard data

679 See Annex VI of the RRF Regulation (available here in a separate document)

A2.4.3 *Environmental noise*

Description of environmental pressure

The main sources of noise pollution are roads, railways and airports, and industry. Road traffic noise is the dominant source of environmental noise, resulting in ~113 million people affected by long-term daily average noise levels of at least 55 dB(A) and 79 million people affected by night-time noise levels of at least 50 dB(A).

At least 20 % of the EU's population are estimated to be living in areas where noise levels are harmful to health. In Europe, long-term exposure is estimated to contribute to 48 000 new cases of heart disease per year and to 12 000 premature deaths (EEA, 2020).

Policy overview

For noise pollution, abatement measures are driven by the Environmental Noise Directive (END) (2002/49/EC)[680] (and to a lesser extent by non-binding commitments established in the 7th EAP to align with WHO recommended levels)[681]. Abatement measures are adopted via action plans targeting noise from roads, railways, airports and industry. The main abatement measures mitigate pollution at source (e.g. improving road and rail surfaces, air traffic management, reducing speed limits, retrofitting, managing traffic flows). Abatement measures can also involve land use and urban planning, but these are less commonly used (e.g. protecting sensitive receivers using street design and providing quiet zones). Other examples include noise barriers or the provision of home insulation (considered the least cost-effective measure). There is some evidence of integrated planning to implement noise abatement measures together with mobility plans and land use planning, but this is not common practice. (UAB, 2020)[682]

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Table A1-30: END (2002/49/EC) policy overview	
Policy objective	To define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. Environmental noise is not directly identified in any of the UN SDG.
Approach to implementation	EU Member States are required to adopt noise maps and action plans and revise them on a periodic basis (Article 7 and 8). Strategic noise mapping should be conducted in certain agglomerations and major roads, railways and airports. Action plans should address priorities in those areas of interest and should be drawn up by the competent authorities in consultation with the public. Noise mapping is the presentation of data to determine exposure to noise, indicating breaches of any relevant national limit value in force, the area exposed above certain thresholds for major sources, the number of people affected in a certain area, or the number of dwellings exposed to certain values of a noise indicator in a certain area. END defines certain noise indicators to be used by Member States for the preparation and the revision of strategic noise mapping. The design, adoption and implementation of noise-reduction measures is left to the discretion of the Member State authorities. At national level, Member States should ensure that noise action plans systematically include:

680 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32002L0049

681 https://www.who.int/europe/publications/i/item/9789289053563

682 UAB (2020) Noise Action Plans: Impact of END on managing exposure to noise in Europe. Update of Noise Action Plans 2019. https://www.eionet.europa.eu/etcs/etc-atni/products/etc-atni-reports/etc-atni-report-07-2020-noise-action-plans-impact-of-end-on-managing-exposure-to-noise-in-europe-update-of-noise-action-plans-2019/@@download/file/ETCATNI_7-2020_KD_1152_NoiseActionPlans_FINAL.pdf

Table A1-30: END (2002/49/EC) policy overview	
	• the introduction of quiet surfaces whenever a busy road is repaved, as set out in the Green Public Procurement guidelines; • lower road speed limits, when this also improves safety; • well-maintained railway tracks and installation of low-emission tracks near households; • appropriate noise abatement objectives in line with the "Balanced Approach" Regulation (EU) 598/2014, together with effective measures to achieve them; • Relevant authorities should make full use of the potential of the Green City Accord to achieve better compliance with pollution-prevention laws, including the Environmental Noise Directive[683]
Monitoring and reporting	To monitor exposure to noise, Member States are required to determine maps. They are required to report every 5 years on maps and action plans to the Commission. (Article 7 and 8).
Approach to enforcement	The Commission may initiate infringement proceedings against Member States for implementation (relating to noise maps, action plans and public consultations). There are no provisions relating to penalties.

Implementing the PPP

Abatement measures are driven by the Environmental Noise Directive (END) (2002/49/EC)[684] (and to a lesser extent by non-binding commitments established in the 7th EAP to align with WHO recommended levels)[685]. Abatement measures are adopted via action plans targeting noise from roads, railways, airports and industry.

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The PPP is an implicit underlying principle for the END, but is not referred to by the provisions or the recitals. Although there is no legal requirement for the polluter to pay for noise pollution, the polluter is ultimately responsible for implementing the abatement measures adopted by Member State competent authorities to meet the requirements of the Directives.

The policy relies on command and control mechanisms. The END does not prescribe targets for noise pollution reduction and the degree at which noise pollution is tackled is decided by the Member State. The varied approach between Member States makes it difficult to determine exactly how close Europe has moved toward meeting the WHO NNG for Europe (a level of 40 dB) in the future, as reporting of this information remains voluntary for countries.[686] In 2023, there were 10 active infringement proceedings[687] where the Commission had issued a reasoned opinion to the Member State where noise maps and action plans were found to not meet the requirements of the Directive as well as cases where the Member State has failed to transpose the requirements of the Directive. The Member States in question are Poland, Spain, Greece, Cyprus, Portugal, Germany and Latvia. [688].

683 Zero pollution: New EU report calls for stronger action to reduce harmful noise pollution (europa.eu)

684 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32002L0049

685 https://www.who.int/europe/publications/i/item/9789289053563

686 Noise — European Environment Agency (europa.eu)

687 https://ec.europa.eu/atwork/applying-eu-law/infringements-proceedings/infringement_decisions/screen/home?lang_code=en

688 Ricardo et al. (2021) Strengthening of air quality monitoring, modelling and plans under the Ambient Air Quality Directives. https://environment.ec.europa.eu/system/files/2022-07/20210831SR9%20Phase%201%20ReportTechAnnex%20to%20disseminate_1230754304.pdf; Communication from the Commission: Guidance for the development of NAPCP under Directive (EU) 2016/2284 of the European Parliament and of the Council on the reduction of national emissions of certain atmospheric pollutants. https://eur-lex.europa.eu/legal

No guidance was identified in the review of evidence, despite the Directive proclaiming that the Commission may provide guidance for the implementation of noise maps, noise mapping and mapping softwares[689].

In terms of noise pollution, plans for control often entail long-term strategy or a cooperation with mobility planning and sustainability considerations, where noise is combined with urban planning or climate actions for example, building insulation for noise and thermic reasons.[690] The most effective actions to reduce exposure target the polluter by reducing noise at source, e.g. by managing the numbers of road vehicles, or their noise emissions by e.g. introducing quieter road tyres.[691] In urban areas, more than 50% of measures to reduce and manage noise focus on mitigating noise at source. Measures at source are extensively used to reduce and manage noise in areas outside cities that are affected by major railways (52%), major airports (70%) and major roads (39%). Managing and reducing noise through land use and urban planning represents a very small percentage of the measures chosen to address noise[692].

According to Article 7 and Article 8 of the END, MSs are required to prepare maps and action plans for agglomerations, roads, railways, and airports in the scope of the Directive. Under the END, Competent Authorities must be designated to develop and, where relevant, approve strategic noise maps and Noise Action Plans. The Directive intentionally allows space for different ambition levels and does not imply that noise reduction should be achieved to the same extent in all Member States (there is no common noise reduction target set in the Directive). This means that the END does not provide a requirement for Member State authorities to establish ambitions for noise reduction, and in cases where action plans including measures for noise management have been adopted and implemented, the Member State actions beyond the END requirements have varied greatly in content and degree. The responsibility for implementation of the PPP lies therefore with the MSs and the Competent Authorities they designate responsibility to.

EU funding support

Tracking EU expenditure contributing to the improvement of noise quality was not possible.

A2.4.4 Chemical risk management

Description of environmental pressure

Chemicals are essential for wellbeing, high living standards and comfort for modern society. However, many chemicals have hazardous properties which can harm the environment and human health. They are used in many sectors, including health, energy, mobility and housing. The main sources of chemicals pollution derive therefore not just from upstream chemical manufacturing but various downstream activities involving manufacturing, use and disposal of chemical substances, mixtures and articles. Chemical pollution is therefore characterised by diffuse sources of emissions/exposure with all environmental compartments potentially affected, including via releases of persistent, mobile and toxic substances. The approach to regulation to date has therefore focussed on specific substances (increasingly targeting groups of substances), articles and mixtures and addressing these risks in different settings.

While not all hazardous chemicals raise the same concerns, certain chemicals cause cancers, affect the immune, respiratory, endocrine, reproductive and cardiovascular systems, weaken human resilience and capacity to respond to vaccines and increase vulnerability to

689 Annex IV Environmental Noise Directive eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0049

690 Assessment of potential health benefits of noise abatement measures in the EU - Publications Office of the EU (europa.eu)

691 Noise — European Environment Agency (europa.eu)

692 Page 7 Environmental noise in Europe — 2020 — European Environment Agency (europa.eu)

diseases[693]. Global chemicals production is expected to double by 2030, resulting in an even more widespread use of chemicals including in consumer products[694]. EEA (2020) notes the projected increase in chemical production alongside continued use of persistent and hazardous substances suggests the human health and environmental burden from chemical pollution is unlikely to decrease, in the absence of further action.

Exposure to/ release of hazardous chemicals can also have short, medium and long-term and large-scale environmental impacts on the terrestrial and marine environment. They can contribute to the reduction of ecosystem resilience, lead to declines/health in animal populations as well as impacting human health and wellbeing, not least through the possible presence of contaminations in the food chain. Certain specific pollutants such as per- and polyfluoroalkyl substances (PFAS) for example, require special attention considering the number of cases of contamination of soil and water – including drinking water – in the EU and globally so too endocrine-disrupting chemicals more generally, due to their links with diseases acting via the hormonal system and chemical mixtures reflecting combined exposure of multiple chemicals from different sources and over time[695].

Policy overview

The Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation (EC) 1907/2006 (REACH) is a comprehensive system to address risks from the use of substances. It mandates the generation of registration data on hazards and risks, imposes additional costs for those wishing to manufacture, use and sell substances of very high concern (SVHC) and can restrict specific substances.

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Table A1-31: REACH Regulation (EC) No 1907/2006 policy overview

Policy objective	To achieve a high level of protection of human health and the environment, including the promotion of alternative methods for assessment of hazards of substances, as well as the free circulation of substances on the internal market while enhancing competitiveness and innovation. Links to the EGD ambition for zero pollution for a toxic free environment. Relevant UN SDG is SDG 12 - Responsible consumption and production.
Approach to implementation	REACH requires substances used and placed on the market to be registered, based on tonnage bands. Companies must collect information on the properties and use of substances they manufacture or import above one tonne per year and are required to assess the hazards and potential risks presented by the substance and how such risks are to be controlled. It is the responsibility of individual businesses to ensure that the information contained in registration dossiers is correct and that any changes are reported to demonstrate that their use does not adversely affect human health or the environment. Registered substances then circulate freely on the internal market.

693 Circabc (europa.eu)

694 Chemicals strategy (europa.eu)

695 European Commission (2020) "Chemicals Strategy for Sustainability – Towards a toxic-Free Environment" Circabc (europa.eu)

Table A1-31: REACH Regulation (EC) No 1907/2006 policy overview	
	- The process of **registering** substances requires the collection and presentation of information (including all relevant/available physicochemical, toxicological and ecotoxicological information and Chemical Safety Reports[696]), possible testing requirements and the payment of a registration fee, for which registrants are responsible, including associated costs. Safety Data Sheets must also be produced for onward transmission down the supply chain. These costs must be borne by the manufacturer, importer or downstream user. - **Authorisation** for the placing substances of very high concern on the market and use should be granted by the Commission only if the associated risks are controlled or the use can be justified for socio-economic reasons and no technically and economically feasible alternatives are available. Companies using substances subject to authorisation must ensure that exposure is minimised as far as is technically and practically possible in the event that it is not possible to establish a safe level of exposure. Manufacturers and users of substances for specific uses incur the costs for the preparation of the application for authorisation. - **Restrictions** initiated under REACH may place a total or partial ban (or other risk management conditions) on manufacturing, placing on the market and use of substances presenting risks that need to be addressed. Actors will need to substitute alternative substances in such cases, for which they incur substitution costs and/or loss of market.
Monitoring and reporting	Once a substance is registered under REACH, registrants are obliged to update information in the event that new information comes to light/anything changes. Member States report to the Commission every 5 years on operations in their respective territories including sections on evaluation and enforcement. Every three years ECHA is required to report to the Commission on the status of implementation and use of non-animal test methods and testing strategies used to generate information on intrinsic properties and for risk assessment to meet the requirements of this Regulation.
Approach to enforcement	Member State Competent Authorities, ECHA and the Commission all play a role in enforcement. Member States are required to set up a system of official controls as appropriate and a framework for penalties in the case of non-compliance that are effective, proportionate and dissuasive. Member States have the legal powers to enforce against duty holders. ECHA enforces dossier evaluation and hosts information (e. g. registration dossiers), which in case of non-compliance, needs enforcement action by Member States' enforcement authorities. The Commission's enforcement role is to check the proper application of REACH, making sure Member States and ECHA apply and enforce REACH.

Alongside REACH, chemical risk management is regulated by the Seveso Directive 2012/18/EU[697] which establishes requirements for the prevention and remediation of major accidents involving dangerous substances. Key features are presented below.

Table A1-32: Seveso 2012/18/EU policy overview	
Policy objective	Aims to prevent major accidents which involve dangerous substances, and limit their impact on human health and the environment
Approach to implementation	The Seveso Directive requires operators to take a number of actions to prevent pollution from major accidents, including:

696 Chemical Safety Reports set out the conditions and risk management measures that describe how a substance is manufactured or used during its life cycle and how manufacturers and importers control, or recommend downstream users to control, exposures of humans and the environment.

697 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0018

Table A1-32: Seveso 2012/18/EU policy overview	
	• Article 7 – Notify MS CA with information on the dangerous substances on site • Article 8 – Create and keep up to date a major accident prevention policy (MAPP) • Article 12 – Create and keep up to date and emergency plan • Article 16 - In the case of a major accident, operators are required to inform the CA, providing them with all relevant information on the accident, informing them of emergency measures taken, and plans for medium-/long-term actions to mitigate effects of the accident as well as preventing reoccurrence.
Monitoring and reporting	There are three main components to monitoring and reporting under Seveso: • Implementation reporting (Article 21(2)) on national implementation of the Directive, including for example frequency of testing of the external emergency plans and inspections so as to assess the compliance of Member States with the requirements of the Directive. • Reporting on establishments (eSPIRS) (Article 21(3)) to gather statistical information on establishments covered by the Directive, including on whether establishments are upper or lower tier and activity details. • Reporting on accidents (eMARS) (Article 18) to exchange information and lessons learnt from accidents at establishments falling under the scope of the Directive.[698]
Approach to enforcement	Article 20 of the Seveso Directive requires Member State competent authorities to organise a system of inspections to ensure that appropriate action is being taken by operators. Article 28 details that Member States should determine penalties which should be applicable to infringements.

Implementing the PPP

Current EU approach for REACH

The PPP is an implicit underlying principle for REACH, but it is not referred to by the provisions or the recitals of the Regulation. However, it is based on the principle that *"it is for manufacturers, importers and downstream users to ensure that they manufacture, place on the market or use such substances that do not adversely affect human health or the environment."* (Article 1). It places various obligations on manufacturers, importers and downstream users of chemical substances and mixtures who are responsible for covering the associated costs for registration, evaluation and authorisation processes. Chapter 3 sets out the obligation and information requirements for registering substances, with Article 22 setting out additional obligations for registrants (e.g., it is their responsibility to submit to ECHA each year, to update ECHA in any change of status of the company or composition of the substance). Article 38 sets out obligations for downstream users. ECHA has produced a significant body of guidance materials[699] for the implementation of REACH, focussing on compliance with the regulatory requirements and compliance. Key elements of the regulation include:

- **Registration:** REACH contains a 'general obligation to register substances on their own or in preparations' that also applies to monomers and polymers that meet certain conditions. Registration submissions are accompanied by a fee that must be paid by the manufacturer/supplier/downstream user. Registration dossiers must include, *inter alia*, technical data relating to the classification and labelling of the substance, manufacturing information and guidance on safe use of the substance. The cost of gathering

698 https://circabc.europa.eu/sd/a/7cd85a67-b77e-4a43-bfa8-7d60ad4b4e0e/FINAL%20Report%20i3-Review%20Seveso-III%20Monitoring%20System.pdf

699 https://echa.europa.eu/support/guidance

and assimilating this data must be borne by the registrant. REACH contains a 'no data, no market' provision, whereby substances that have not been registered should not be placed on the market. It is the responsibility of the registrant to ensure they comply with the legislation.[700]

- **Authorisation:** The authorisation process sets out that substances listed in Annex XIV cannot be placed on the market or used after a sunset date without authorisation being granted for use. Annex XIV is the REACH Authorisation List, and the substances are selected from the REACH Substances of Very High Concern (SVHC) list. Applications for authorisation must include a chemical safety report detailing the risks to human health and/or the environment as well as assessing the availability of alternatives and understanding the technical and economic feasibility of substitution. A socio-economic assessment may be submitted with an application for authorisation to evaluate the risk of continued use against a number of factors. The analysis may detail the expected impacts on industry (e.g., commercial consequences), consumers (e.g., increased prices) and the feasibility of transitioning to alternative substances. A study by the European Commission has shown that the authorisation process reduces the overall volume of SVHC substances placed on the market and enhances the substitution of SVHCs in products and articles. It additionally further incentivises substitution as manufacturers wishing to continue using a substance must reapply for authorisation. All of these mechanisms apply the PPP, ensuring manufacturers are responsible for complying with REACH and the relevant associated costs. Conversely, authorisations to use SVHC substances are granted where their benefit to society can be demonstrated, and thus it effectively permits environmental pollution. However, the above benefits still show an overall net positive impact on human health and the environment.[704] It is again the registrant's responsibility to gather this data and cover the associated costs, as well as paying the accompanying fee for applications for authorisation.[700]
- **Restrictions:** Annex XVII sets out substances that are restricted for use in the EU where the manufacture and use of a substance creates 'an unacceptable risk to human health or the environment'. Some substances may be completely restricted (e.g., asbestos) whereas other restrictions set maximum concentration/weight limits for the use in products/articles. The Commission are responsible for adding substances to Annex XVII, however, it is the responsibility of manufacturers, importers and downstream users to ensure that their products are compliant and that newly restricted substances are replaced with safer alternatives in products/articles.[700]

Whilst REACH stipulates it is the responsibility of industry to cover the costs of complying with REACH, it is feasible that some of these costs will be passed onto consumers via downstream price increases. Large costs are also incurred by the European Commission, ECHA and individual Member States, though costs to ECHA/Commission are partially offset by the fees paid by industry. A 2018 evaluation of REACH identified that between 2007-2016, ECHA collected €581 million in fees with a €225 million EU subsidy (ECHA budget for the same period was €757 million). It identified costs for generating data for dossiers (€200 million), applications for authorisation (estimated €120,3000 per use, per applicant) and restrictions (substitution costs estimated at €290 million per year).[701]

REACH regulation is targeted to preventing future pollution and does not address remedial or liability costs regarding historic pollution.

Potential Reforms for REACH

700 Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). Available at: EUR-Lex - 32006R1907 - EN - EUR-Lex (europa.eu).

701 European Commission, 2018, Commission General Report on the operation of REACH and review of certain elements. Available at: resource.html (europa.eu)

The European Commission are exploring several reforms to REACH legislation that, if adopted, would change the extent to which the PPP is applied. Potential changes – which are expected to be published in a European Commission proposal at some point in 2023 include:

- Application of an **'essential use concept'**, where certain substances would only be permitted for use in products and articles if they are deemed essential to health, safety and where there are no viable alternatives. An essential use concept would seek to accelerate phase-out of harmful substances, and it may be the responsibility of individual companies/manufacturers to ensure their products are compliant, to absorb associated costs and to facilitate substitution to less harmful substances.[702]
- Extension of the **Generic Risk Management Approach (GRA)** approach to restricting use of substances based on their hazard. This currently applies to carcinogenic, mutagenic and toxic for reproduction (CMR) substances. The European Commission are considering extending the GRA to additional hazard classes[703]. As above, it would be the responsibility of businesses to absorb the costs associated with complying with these reforms.[704]
- Options for **reforming authorisation and restriction processes** are also being considered which may alter the way the regulation applies the PPP.
- Additional proposals set out in the EU Chemical Strategy for Sustainability include the introduction of mixture assessment factors into REACH and how to take account of the combination effects of concurrent exposure to multiple substances.

Additional chemical risk management policies

In addition to REACH, there are a number of policies that manage chemical pollution (Table), which can be grouped into three categories:

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- First, the CLP Regulation, which classifies hazards, mandates how these hazards are to be communicated and triggers downstream regulatory controls.
- Second, Regulations and Directives which seek to address risk from specific substances and/or uses. These include the Mercury Regulation, Cosmetics Regulation and the Toy Safety Directive.
- Third, Regulations and Directives which seek to address risk in specific settings and/or from specific chemical hazards. These include the Persistent Organic Pollutants(POPs) Directive[705], Chemical Agents at Work Directive, the Carcinogens and Mutagens Directive, Biocidal Product Regulation, Pesticides Directive, Fertiliser Regulation, the Plant Protection Products Directive, Regulation concerning the export and import of hazardous chemicals and Seveso.
- Fourth, emission limit values for manufacturing of chemicals under the IED.

Each results in direct and indirect costs to chemical producers and users. These are incurred via generating registration dossiers and associated testing costs, for the preparation of application for authorisation and in administrative fees to regulators for example. Costs are also incurred via the need for specific reformulations of product(s) as well as profit losses where products or portfolios can no longer be placed on the EU market. Consumers face more

702 European Commission, 2023, Supporting the Commission in developing as essential use concept. Available at: Supporting the Commission in developing an essential use concept - Publications Office of the EU (europa.eu)

703 These are: endocrine disrupting chemicals (EDCs), persistent, bioaccumulative and toxic substances (PBT), very persistent and very bioaccumulateive substances (vPvB), specific target organ toxicity single/repeated exposure (STOT RE/SE), category 1 respiratory sensitisers, substances affecting the immune or neurological systems, persistent, mobile and toxic substances (PMT) and very persistent, very mobile substances (vPvM).

704 European Commission, 2023, Study to support the IA for potential amendments of the REACH regulation. Unpublished.

705 The POPs Directive is the EU mechanism to regulate the production and use of substances listed under the Stockholm Convention.

limited costs, via some increased prices and/or losses in functionality. The approach to implementing the PPP for these selected policies is presented below.

Alongside these additional policies, chemical risk management is regulated by the Seveso Directive 2012/18/EU[706] which establishes requirements for the prevention and remediation of major accidents involving dangerous substances. The PPP is not explicitly referred to in the Seveso Directive; however, the provisions of the Directive place the onus of implementation on the operator. The operator is required to take all reasonable action to prevent and mitigate emergencies which could lead to incidences of major pollution, which will likely require investment in the form of time to develop the preventative measures, as well as actually implementing the measures themselves. The operator is also responsible for monitoring and reporting under the Directive. Accordingly, the extent to which the operator complies with the Directive will be key to understanding how the PPP has been applied[707].

Table A1-33: Approaches to implementing the PPP in other chemical risk management policies

Policy	Approach to implementing the PPP
Biocidal Product Regulation (EU) No 528/2012	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention, listing substances that should not be approved for use (and placing on the market) except in specific situations. When reviewing authorisation requests, products are compared to existing biocidal products, non-chemical means of control and other prevention methods to understand the risks/benefits. Substances are restricted where alternatives are deemed available, unless the alternatives are not sufficiently effective, economically viable or otherwise impractical. No planned revision to the legislation.
Carcinogens and Mutagens Directive 2004/37/EC	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention. The CMD aims to protect workers against risks to their health and safety from exposure to carcinogens or mutagens in the workplace by setting occupational exposure limits (OELs). Companies (workplaces) are responsible for protecting employees and bearing the cost of complying with OELs. Planned revision to the legislation[708].
Chemical Agents Directive 98/24/EC	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention. The CAD sets out minimum requirements for the protection of workers from risks to their health and safety arising from the effects of chemical agents that are present in the workplace. Companies (workplace) are responsible for bearing the cost of complying with the requirements of the legislation. The CAD also covers evaluation of emissions and process wastes to understand and regulate human and environmental exposure. Planned revision to the legislation[709].
Classification, Labelling and Packaging Regulation (EC) No 1272/2008	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention. The CLP regulation ascribes responsibility to manufacturers for identifying hazards of substances and mixtures and for deciding on their classification. The regulation seeks to ensure a high level of protection of human health and the environment by harmonising the provisions and criteria for the classification and labelling of substances, mixtures and articles.

706 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0018

707 Page 38 - https://circabc.europa.eu/sd/a/0d6291ce-542f-4a42-acd8-35cd8a0cf8be/KH-09-22-005-EN-N.pdf

708 https://www.consilium.europa.eu/en/press/press-releases/2021/12/16/eu-to-improve-protection-of-workers-from-dangerous-chemical-substances/

709 https://www.europarl.europa.eu/doceo/document/E-9-2022-003483_EN.html

Table A1-33: Approaches to implementing the PPP in other chemical risk management policies	
Policy	**Approach to implementing the PPP**
Cosmetics Regulation (EC) No 1223/2009	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention. The regulation seeks to provide a high level of protection of human health from cosmetic products. Manufacturers are responsible for ensuring the safety of their products and the regulation sets out lists of restricted substances. Planned revision to the legislation[710].
Fertiliser Regulation (EU) 2019/1009	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention. The fertiliser regulation lays down common rules on safety, quality and labelling requirements for fertilising products and introduces limits for toxic contaminants. This prevents pollution by guaranteeing a high level of soil protection and reduces health and environmental risks. Manufacturers and operators are responsible for ensuring compliance with the legislation, and substances that do not comply with the legislation should not be made available on the market. No planned revision to the legislation.
Mercury Regulation (EC) 2017/852	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention. This Regulation establishes measures and conditions concerning the use, storage of and trade in mercury, mercury compounds and mixtures of mercury, and the manufacture, use of and trade in mercury-added products, and the management of mercury waste, to ensure a high level of protection of human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. Industry must bear the costs of phase outs and substitutions, though it is feasible some of these costs may be passed to consumers. This prevents mercury pollution and associated human health/environmental risks from exposure. Planned revision to the Regulation[711].
Persistent Organic Pollutants Regulation (EU) 2019/1021	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention as well as costs of environmental damage to carry out remedial action as appropriate. The POPs regulations implement the Stockholm Convention with the overarching aim of protecting humans and the environment from the adverse effects of chemicals with POPs characteristics. It sets out lists of substances subject to restrictions (for their manufacture and use), release reduction provisions and waste management provisions. The relevant manufacturers are responsible for preventing releases to the environment. The Stockholm Convention lists substances in three Annexes, that EU legislation is aligned with: • Annex A – Elimination • Annex B – Restriction • Annex C – Unintentional Production. Planned revision to the Regulation[712].
Pesticides Directive 2009/128/EC	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention as well as costs of environmental damage to carry out remedial action as appropriate. The Directive sets out measures to reduce the risks and impacts of pesticide use on human health and the environment. The measures include setting quantitative objectives and targets, promoting research programmes, to provide safety information (especially with online sales), amongst other things. It prohibits aerial spraying, highlights the importance of caution near aquatic environments and promotes integrated pest management approaches. Enterprises are

710 https://single-market-economy.ec.europa.eu/news/commission-seeks-views-eu-rules-cosmetic-products-2022-03-28_en

711 https://environment.ec.europa.eu/topics/chemicals/mercury_en#ref-2023-revision

712 https://ec.europa.eu/newsroom/env/items/731716/en#:~:text=On%2028%20October%202021%2C%20the%20European%20Commission%20made,managed%20and%20recycled%20in%20an%20environmentally%20sound%20manner.

Table A1-33: Approaches to implementing the PPP in other chemical risk management policies	
Policy	**Approach to implementing the PPP**
	responsible for complying with these measures. General restrictions are recommended (but not stipulated) at the MS-level, including applying pesticides along railway lines, permeable surfaces, close to groundwater, near areas used by the general public, protected areas or areas recently treated accessible to agricultural workers. Planned revision to the legislation.[713]
Plant Protection Products Regulation (EC) No 1107/2009	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention as well as costs of environmental damage to carry out remedial action as appropriate. The regulation stipulates rules for the approval of active plant protection substances to ensure high levels of protection for humans and the environment. It seeks to harmonise the rules on the placing on the market of plant protection products. It is underpinned by the precautionary approach. Producers of the active substances are responsible for submitting application dossiers. To be authorised, a plant protection product must satisfy a number of requirements, including not having any (direct or indirect) harmful effects on human or animal health and not having any unacceptable impact on the environment, particularly with regards to non-target species and biodiversity. No planned revision to the legislation.
Reg 649/2012 concerning the export and import of hazardous chemicals	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention. This regulation sets out procedures for the export and import of hazardous substances that are banned or restricted in the EU. Its overarching aim is to protect human health and the environment and prevent the harmful effects through exposure to chemicals. It promotes that producers and users of chemicals have a shared responsibility to protect human health and the environment. No planned revision to the legislation.
Toy Safety Directive 2009/48/EC	There is no reference to the PPP in the legislation. However, the legislation implements the PPP to address costs of pollution prevention. Established to harmonise safety levels of toys throughout EU MS. Sets out essential safety requirements regarding physical/mechanical/chemical/electrical properties, flammability, hygiene and radioactivity. It sets out that toys should be designed in such a way that there are no risks of adverse effects on human health. No planned revision to the legislation.

Table note: Related policies also include IED and MCPD which have been grouped with air quality policies.

National approaches

REACH Regulation must be applied uniformly across the EU. Member States participate in REACH through Member State Committees (MSC). The MSC participates in a number of tasks:[714]

- Dossier evaluation – seek unanimous agreement on draft decisions.
- Substance evaluation – seek unanimous agreement on substance evaluation draft decisions.
- Authorisation – seek agreement on SHVC candidate list substances.
- Provide opinion on authorization and restriction decisions

Decisions are made by the European Commission (who have overall decision-making powers), with input from the MSC, and applied across the internal market, where all MS must comply.

713 https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2022)730353

714 European Chemicals Agency, Member State Committee. Member State Committee - ECHA (europa.eu)

EU funding support

Table A1-34 assesses the relevant EU funds in the context of the PPP and chemicals legislation. Several funding streams relate, directly or indirectly, to the use and regulation of chemicals throughout the EU, including research and development initiatives, sustainable production practices and innovative agricultural practices.

Table A1-34: EU expenditure contributing to chemicals policy area

EU fund	EU subsidies	Actions subsidised by EU funds	Beneficiaries	Proofing mechanism
Horizon Europe	Chemicals are not directly included in the main Regulation. However, the Council Decision refers to chemicals within the scopes of Cluster "Health" and Cluster 'Food, Bioeconomy, Natural Resources, Agriculture and Environment' that receive funding of EUR 6 893 000 000 and EUR 8 952 000 000 respectively.	Technologies and methodologies that assess the consequences of chemicals on health, eco-innovations that can serve as prevention and a remedy for environmental pollution arising from respective chemicals.	Any legal entity (natural person or legal person)	Applicants shall refer to the DNSH (Do no significant harm) principle for the proposed research methodology and impact to assure that they do not "make a significant harm to any of the six environmental objectives" set by the EU taxonomy regulation (Horizon Europe Proposal Evaluation, 2023).
CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development)	The reduction of chemical dependency is among the channels that will provide sustainable development and natural resource management practices (Regulation (EU) 2021/2115). No specific data available.	EU specific objective 'To foster sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency' and (see Annex I of CAP Strategic Plan regulation). See also relevant result indicators: R.13. Result indicator refers to "Reducing	Main beneficiaries are EU farmers. List available here	DNSH principle applies. Cross-compliance requirements: - SMR 7[715] concerning the placing of plant protection products on the market - SMR 8 on the sustainable use of pesticides and their storage/disposal

715 See Annex III of CAP Strategic Plan Regulation

Table A1-34: EU expenditure contributing to chemicals policy area				
EU fund	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
		Emissions in the livestock sector", which finances actions aimed at reducing ammonia emissions, indication the importance of this dimension. The approved CAP 2023-2027 Strategic Plans finance actions such as "adoption of enhanced integrated pest management principles, including biological control methods, technologies for precision farming and better application of plant protection products".		
Cohesion policy funds	No specific data available	No specific intervention field linked to chemicals	Public or private bodies, entities with or without legal personality, or natural persons. Data not yet available on actual beneficiaries.	DNSH, though no explicit reference to chemicals is included. The Pollution Prevention and Control category does to some extent take into account chemicals. EIA/SEA, to the extent relevant.
LIFE	LIFE finances the sustainable production and use of chemicals, including it in "Circular Economy and Quality of Life" subprogramme with a EUR 1.345 billion funding.	As an indication, one of the indicators for "Key Monitoring Indicators "for the 2021-2027 MFF is the *Reduction in the production and use of dangerous chemicals* which targets a reduction of 543,121 kilogram per year by 2030.	Funding is targeted at legal entities established either in an MS or an overseas country or in a third country associated with LIFE, including legal entities established under Union or international law.	The LIFE Programme directly supports the six environmental objectives set by the EU taxonomy regulation, thus DNSH (Do no significant harm) principle applies.

Table A1-34: EU expenditure contributing to chemicals policy area				
EU fund	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
InvestEU	Several fundings targeting chemicals have been recorded. There is no direct reference to chemicals in the basic legal act, yet it could fall within one of the policy windows, most likely within "Sustainable Infrastructure" (€9.9 billion) and "RI and digitalization"(€6.6 billion).	Funding associated with chemical recycling plants, manufacturing activates and RDI activities that replace the use of agrichemicals.	Any natural or legal persons (based in an EU or any third eligible country) can benefit from the Project. This includes private entities, public sector entities, mixed entities, Non-profit organizations.	The application of the 'Do No Significant Harm' (DNSH) principle could be regarded as such. Operations under the *sustainable infrastructure window* are subject to climate, environmental and social sustainability proofing to minimise negative impacts and maximise benefits for the climate, environment and social dimension (see Article 8 of the Regulation.) This is described in the Technical guidance on sustainability proofing for the InvestEU Fund.
Recovery and Resilience Facility	No specific expenditure category is associated with chemicals	No intervention field is associated with chemicals	Public administration, public sector and private sector entities. Beneficiary data is not available for RRF (only top 100 will be published for each MS as per the requirements of REPowerEU).	DNSH, though no explicit reference to chemicals is included. The Pollution Prevention and Control category does to some extent take into account chemicals. EIA/SEA, to the extent relevant.

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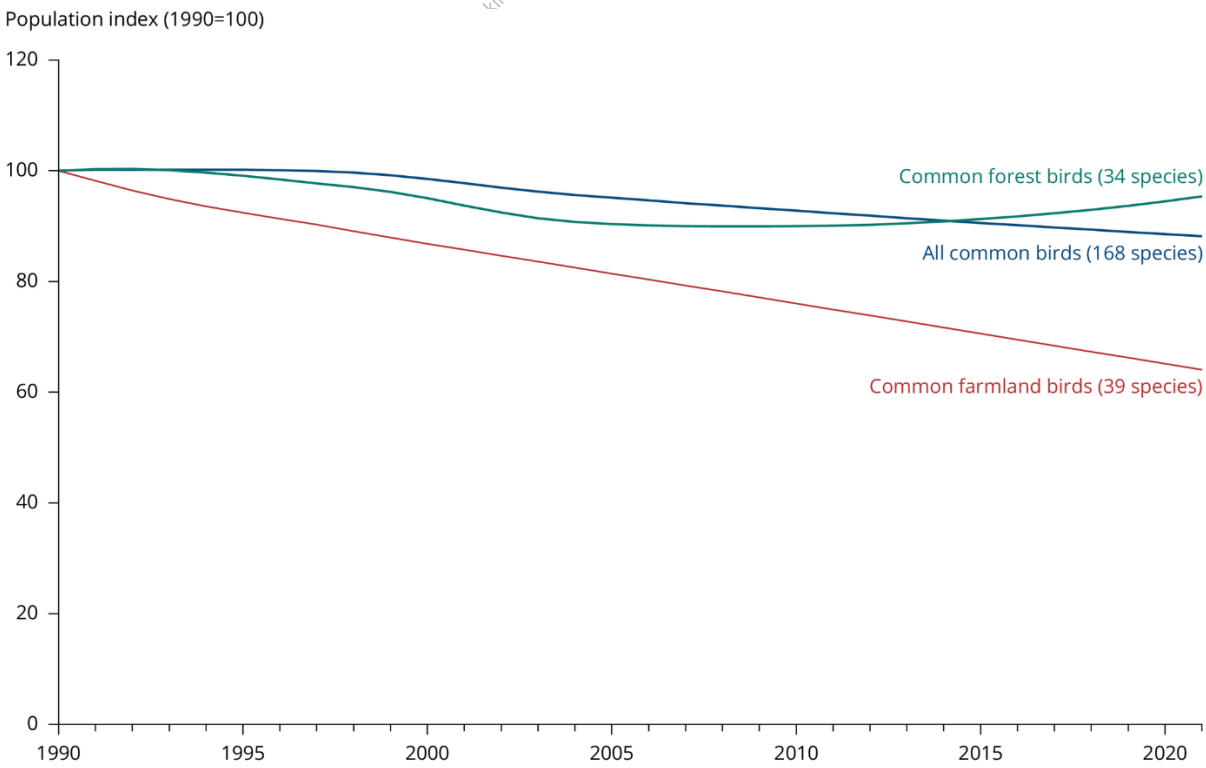
A2.5 Biodiversity and natural capital

A2.5.1 Description of *environmental pressure*

For nature and biodiversity, recent assessments of species and habitats protected under the Habitats Directive concluded that 60% of species had unfavourable conservation status and 77% of habitats (EEA SOER). However, according to the EEA these assessments are not entirely reliable due to certain limitations of applied methodology and of data used in terms of its poor quality or gaps in data completeness. Nevertheless, the most significant environmental pressures include land-use change (and its role in habitat loss, fragmentation, and degradation), natural resource extraction, pollution, climate change and the introduction of invasive alien species.

In this context, the EEA monitor the Common Bird Index in Europe as one of their headline indicators, as birds are sensitive to environmental pressures and their population numbers can reflect changes in ecosystems and wider biodiversity. Long-term population trends of all common birds in the 26 EU Member States with monitoring schemes show significant population declines. The common bird, forest bird and farmland bird indexes decreased by 12%, 5% and 36% respectively between 1990 and 2020. However, over the appraisal period the common forest bird index has increased, whilst the common bird and common farmland bird indexes decreased steadily. Agricultural intensification is the main pressure for most bird population declines, and in particular pesticide and fertiliser use.

Figure 6-8 Common bird index in the EU, 1990-2021



Source: EEA (2022)
https://www.eea.europa.eu/ims/common-bird-index-in-europe

Soils in Europe suffer from sealing, erosion, compaction, pollution, salinisation and carbon loss. The most significant pressures on land and soil derive from anthropogenic land use practices and land cover changes and from the consequences of Climate Change (such as shifting in spring phenology, droughts, fires, storms and floods). Unsustainable land use

practices relating to the type and intensity of land management can have detrimental implications for soil quality and land productivity. Such pressures are exacerbated by perceived socio-economic needs such as settlement, transport, clean water, food and fibre production, and tourism.

The greatest driving force behind these pressures on Biodiversity and Nature, and Land and Soil derive from practices related to land management, including land use and land-use change. The agricultural and forestry sector combined account for 80% of land area in the EU, making them key players in the pressures placed on nature, particularly in the context of soil and biodiversity (EC – Agriculture and Forestry). To a lesser extent, pressures driving land use change are also incurred through urbanisation.

A2.5.2 Policy overview

There are a number of overarching frameworks driving abatement measures that facilitate in protecting, preserving and restoring biodiversity, and enhancing natural capital (PO5 of the 8th EAP). Key policies include[716]:

- **Habitats Directive (92/43/EEC)[717]** - Adopted in 1992, promotes the maintenance of biodiversity, taking account of economic, social, cultural, and regional requirements. Within this Directive, MSs are required to report of the conservation status of habitats and species, the compensation measures taken for projects having a negative impact on Natura 2000 sites or on derogations they may have applied to the strict protection measures.
- **Birds Directive (2009/147/EC)[718]** – aims to protect the 500 wild bird species naturally occurring in the EU.
- **Regulation on Invasive Species** – sets regulations on the prevention and management of the introduction and spread of invasive alien species.

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Underpinning the key policies, there are several strategies driving forward the ambition to protect natural resources, including:

- **EU biodiversity strategy for 2030[719] -** A core element of the European Green Deal, to honour the commitments made in the Kunming-Montreal Global Biodiversity Framework and ensure that Europe's biodiversity is put on the path to recovery by 2030. This will involve introducing the Nature Restoration law which sets an overarching restoration objective at EU level that binds together existing restoration targets for specific habitats and species.
- **EU soil strategy**[720] which seeks to ensure the protection, sustainable use and restoration of soil, guaranteeing that European soil ecosystems are in good soil health by 2050. A new Soil Health Law has recently been announced to be implemented in 2023 to make concrete steps towards protecting and restoring soils, ensuring they are used sustainably.
- **EU Forest Strategy for 2030** focussing on protecting, restoring, and enriching European forests. The Forest Strategy places particular importance on forest soil recognising its importance in terms of strong interdependence between trees and the soil on

716 Land use planning with respect to urbanisation is a national area of competence (implemented at local or regional level). These policies are not in direct scope of this EU Fitness Check.

717 COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

718 DIRECTIVE 2009/147/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 November 2009 on the conservation of wild birds

719 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Biodiversity Strategy for 2030

720 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Soil Strategy for 2030

which they grow. It emphasises the need to protect soil properties and soil ecosystem services as the foundation of healthy and productive forests. Within the context of the strategy, it is mentioned as an example that the protection of soil, for example by limiting the use of unsuitable machinery which damages soil quality, is essential due to the strong interdependence between soil and forest quality. According to the strategy the Commission took the responsibility to support the evidence-based design and implementation of forest restoration strategies including through the planned research and innovation mission on soil health for forest soils.

The Habitats Directive and the Birds Directive (knowns as the "Natures Directive") make up the core policy measures surrounding the protection of European biodiversity. The Habitats Directive, however, specifically states that the PPP has limited application for nature conservation and highlights the financial burdens placed on some MSs over others due to the uneven distribution of protected habitats and species. Key features of the Directives are presented below.

Table A1-35: Natures Directives policy overview

Policy objective	The Habitats Directive aims to "..contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States to which the Treaty applies."[721] It is directly aligned with the objectives of the Birds Directive which aims to: "protect, manage and regulate all bird species naturally living in the wild within the European territory of the Member States, including the eggs of these birds, their nests and their habitats; and to regulate the exploitation of these species."[722] Both Directives contribute to the European Green Deal macro-objective of preserving and restoring ecosystems and biodiversity. Relevant UN SDG is SDG15 – Life on Land.
Approach to implementation	Appropriate assessment procedure is the main policy mechanism used to safeguard protected areas under both the Habitats and Birds Directives. It applies to all plans or projects likely to have a significant effect on protected areas under the Directives. It requires the following steps: • Step 1: screening – this initial step is to determine whether a plan or project has to undergo an appropriate assessment or not. If it is likely to have a significant negative effect on a Natura 2000 site, or the likelihood of significant impacts cannot be excluded then an appropriate assessment is required. • Step 2: appropriate assessment – once it has been decided that an appropriate assessment is required, a detailed analysis must be undertaken of the potential impacts of the plan or project, alone or in combination with other plans or projects, on the integrity of Natura 2000 site(s) in view of its conservation objectives. • Step 3: decision making - If the appropriate assessment concludes that there is an adverse effect on integrity of the site, it will be necessary to examine whether preventive or mitigation measures can be introduced to remove these effects. • Step 4: derogations - Article 6.4 of the Habitats Directive provides for certain derogations to this general rule. Thus, if it is concluded that the plan or project will have an adverse significant effect on a Natura 2000 site, it can still be approved under exceptional circumstances if there are no alternatives, if the plan or project is considered necessary for imperative reasons of overriding public interest and if the necessary compensatory measures are being taken to protect the coherence of the Natura 2000 network. In such cases also the

721 Article 2(1) of the Habitats Directive

722 https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=LEGISSUM:l28046 Summary

Table A1-35: Natures Directives policy overview	
	European Commission has to be informed and, if priority species or habitat types are affected on the site, a Commission opinion is required.
Monitoring and reporting	Both directives require Member States to report regularly on progress made in implementing the directives and on the main results of research and surveillance carried out. Member State Competent Authorities are responsible for this (Article 12 of the Birds Directive and Article 17 of the Habitats Directive). Reporting covers the conservation measures as well as evaluation of the impact of those measures on the conservation status of the natural habitat types of Annex I and the species in Annex II.
Approach to enforcement	There are no provisions on enforcement in Habitats and Birds directive besides requirements for Member States to take requisite measures to establish a system of strict protection for listed animal and plant species by implementing specific prohibitions. Compliance with appropriate assessment procedure (Article 6(3) of the Habitats Directive) is normally ensured through administrative permitting procedures and is enforced via activities of state inspectorates for nature on MS level and through judicial system. Relatively high number of infringements in relation to the Habitats and Birds directives dealt with by the Commission demonstrate strong enforcement action which has been central to progress in implementation of the Directives[723]. Besides case law which mostly dates form the 1990s and which has clarified uncertainties regarding the implications of certain legislative provisions, most complaints and infringements handled by the Commission have related to undue delays in implementation such as in transposition and in the establishment of NATURA 2000 sites[724]. "Problems with enforcement have been highlighted in relation to hunting, insufficient regard to the impacts of intensive agriculture and forestry on protected species and habitats, the implementation of compensation measures for impacted sites and the impacts of pollution incidents. Even when enforcement activities are carried out, the penalties are often considered inadequate to deter further offences.[725]"

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The Invasive Alien Species Regulation[726] provides a coherent framework for addressing invasive alien species at EU level and increased awareness of the problem. Key features are presented below.

Table A1-36: Invasive Alien Species (Regulation (EU) 1143/2014) policy overview	
Policy objectives	• To prevent, minimise and mitigate the adverse impact on biodiversity of the introduction and spread within the Union, both intentional and unintentional, of invasive alien species. • To prevent, minimise and mitigate the adverse impacts posed by these species on native biodiversity and ecosystem services. To limit social and economic damage resulting from their introduction and spread.

723 COMMISSION STAFF WORKING DOCUMENT FITNESS CHECK of the EU Nature Legislation (Birds and Habitats Directives), 2016, EC, p 41

724 COMMISSION STAFF WORKING DOCUMENT FITNESS CHECK of the EU Nature Legislation (Birds and Habitats Directives), 2016, EC, p 41

725 COMMISSION STAFF WORKING DOCUMENT FITNESS CHECK of the EU Nature Legislation (Birds and Habitats Directives), 2016, EC, p 41

726 Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species

Table A1-36: Invasive Alien Species (Regulation (EU) 1143/2014) policy overview	
	• Contributes to the European Green Deal macro-objective of preserving and restoring ecosystems and biodiversity. • Relevant UN SDG is SDG15 – Life on Land.
Approach to implementation	The IAS Regulation imposes restrictions on keeping, importing, selling, breeding, growing and releasing into the environment species included in the list of invasive alien species of Union concern (Article 7). Additional preventative measures include system of permits for research on or ex-situ conservation of the species included in the list of invasive alien species of Union concern (Article 8), as well as authorisations for other exceptional activities (Article 9). Additionally, Member States are required to take preventative actions on pathways of unintentional introduction, take measures for the early detection and rapid eradication of these species and manage species that are already widely spread in their territory. In its Article 21 the IAS Regulation contains provision which in accordance with the PPP and without prejudice to Environmental Liability Directive, stipulates that Member States shall aim to recover the costs of the measures needed to prevent, minimise or mitigate the adverse impact of invasive alien species, including environmental and resources costs as well as the restoration cost.
Monitoring and reporting	• The IAS Regulation Article 14 requires Member States to undertake research, monitoring and surveillance of invasive alien species by establishing "a surveillance system f invasive of invasive alien species of Union concern, or include it in their existing system, which collects and records data on the occurrence in the environment of invasive alien species by survey, monitoring or other procedures to prevent the spread of invasive alien species into or within the Union. • Member States are required by Article 24 of the IAS Regulation to report to the Commission every six years on their surveillance system, distribution of invasive alien species, action plans, number of permits, costs of action, enforcement through inspections etc.
Approach to enforcement	• Member States are required by Article 8(8) of the IAS Regulation to "ensure that inspections are carried out by their competent authorities to ensure that the establishments comply with the conditions set out in those permits issued." • A permit system is required to allow establishments to carry out research on or ex-situ conservation of invasive alien species of Union concern, and to allow scientific production and medicinal use when use of products derived from invasive alien species is unavoidable to advance human health (Article 8(1)).

A2.5.3 Implementing the PPP

EU approach

Although there are no legal references to the PPP within the provisions of the Nature Directives, there are policy provisions to implement it:

- **Habitats Directive**: The PPP is referred to in the recitals of the legislation to state the challenges of applying the PPP in the case of nature conservation: "*Whereas it is recognized that the adoption of measures intended to promote the conservation of priority natural habitats and priority species of Community interest is a common responsibility of all Member States; whereas this may, however, impose an excessive financial burden on certain Member States given, on the one hand, the uneven distribution of such habitats and species throughout the Community and, on the other hand, the fact that the "polluter pays" principle can have only limited application in the special case of*

nature conservation;"[727] This is translated into the provisions of the Directive (Article 8(2)) which refers to the identification of EU funding to support with implementation. Thus, a challenge occurs where the costs of restoration of sites are not paid by a polluter and public funds are used for restoration of habitats which could be degraded because of pollution.

- **Birds Directive**: There is no direct reference to PPP in the legislation. The PPP is implemented in the legislation via the appropriate assessment procedure. Member States are responsible for implementing measures to avoid pollution or deterioration of habitats or any disturbances affecting the birds.

The main cost incurred as a result affects stakeholders wanting to carry out a plan or a project within the designated NATURA 2000 network (who bear the cost of complying by carrying out an appropriate assessment procedure to provide a detailed analysis of the potential impacts of the plan or project). Appropriate assessment procedure is the main policy mechanism used to safeguard protected areas under both the Habitats and Birds Directives. It applies to all plans or projects likely to have a significant effect on protected areas under the Directives. It requires the following steps:

- Step 1: screening – this initial step is to determine whether a plan or project has to undergo an appropriate assessment or not. If it is likely to have a significant negative effect on a Natura 2000 site, or the likelihood of significant impacts cannot be excluded then an appropriate assessment is required.
- Step 2: appropriate assessment – once it has been decided that an appropriate assessment is required, a detailed analysis must be undertaken of the potential impacts of the plan or project, alone or in combination with other plans or projects, on the integrity of Natura 2000 site(s) in view of its conservation objectives.
- Step 3: decision making - If the appropriate assessment concludes that there is an adverse effect on integrity of the site, it will be necessary to examine whether preventive or mitigation measures can be introduced to remove these effects.
- Step 4: derogations - Article 6.4 of the Habitats Directive provides for certain derogations to this general rule. Thus, if it is concluded that the plan or project will have an adverse significant effect on a Natura 2000 site, it can still be approved under exceptional circumstances if there are no alternatives, if the plan or project is considered necessary for imperative reasons of overriding public interest and if the necessary compensatory measures are being taken to protect the coherence of the Natura 2000 network. In such cases also the European Commission has to be informed and, if priority species or habitat types are affected on the site, a Commission opinion is required.

The PPP is applied explicitly under the **Invasive Alien Species Regulation.** Polluters are responsible for implementing restrictions on keeping, importing, selling, breeding, growing and releasing species into the environment. Without prejudice to the Environmental Liability Directive, the Regulation requires that Member States aim "*to recover the costs of the measures needed to prevent, minimise or mitigate the adverse impact of invasive alien species, including environmental and resources costs as well as the restoration cost*."[728]

Underpinning these primary policies in scope of this fitness check are the strategies for soil, biodiversity and forestry. An outline of the way in which the PPP is taken into account is below.

727 Habitats Directive, recitals

728 Article 21 of The Invasive Alien Species Regulation (Regulation (EU) 1143/2014)

Table A1-37: Approaches to implementing the PPP in nature strategies	
Policy	**Approach to implementing the PPP**
EU Soil Strategy	The strategy deals with prevention of pollution with reference to existing policies (Sewage Sludge Directive, REACH, EU fertilising products regulation) and includes 4 steps for pollution prevention. The PPP is not referred to. Additionally, the strategy includes steps for restoring degraded soils and remediating contaminated sites. In this context it is suggested to: "By 2022, revise the Industrial Emissions Directive and by 2023 evaluate the Environmental Liability Directive, including with regard to the definition of land damage and the role of financial security." In 2022, the Commission adopted a proposal[729] to revise the Industrial Emissions Directive while the evaluation procedure of the Environmental Liability Directive is still ongoing[730]. The proposal to revise the Industrial Emissions Directive does not contain the definition of land damage and the related role of financial security as suggested in the EU Soil Strategy.
EU Biodiversity Strategy for 2030	The strategy refers to the Polluter pays principle by stating: "The Commission will further promote tax systems and pricing that reflect environmental costs, including biodiversity loss. This should encourage changes in national fiscal systems to shift the tax burden from labour to pollution, under-priced resources, and other environmental externalities. The 'user pays' and 'polluter pays' principles have to be applied to prevent and correct environmental degradation.[731]" (Section 3.3.2 of the strategy on investments, pricing and taxation) Regarding the Birds and Habitats Directives, the strategy refers to the need for improved enforcement: "enforcement will focus on completing the Natura 2000 network, the effective management of all sites, species-protection provisions, and species and habitats that show declining trends. The Commission will also ensure that environment-related legislation with an impact on biodiversity is better implemented, enforced and – where necessary – reviewed and revised." (Section 3.2. of the EU biodiversity strategy on stepping up implementation and enforcement of EU environmental legislation).
EU Forestry Strategy for 2030	The Strategy emphasises the need for stepping up implementation and enforcement of existing EU acquis: "The implementation and enforcement of the EU acquis of relevance for forests and forest management issues needs to be stepped up. The Habitats and Birds Directives provide for the conservation of a good range of forest habitats and of forests-related animal and plant species. The Environmental Liability Directive requires the prevention and remediation of environmental damage involving forest habitats." There is no direct reference made to the implementation of the PPP.

National approaches

The use of a regulation to implement the requirements pertaining to invasive alien species limits Member State flexibility for implementation. However, the Nature Directives provide flexibility to Member States and their implementation of the provisions. This has a direct bearing on the way the PPP is implemented and biodiversity damage is managed.[732]

729 Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) and Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

730 https://environment.ec.europa.eu/law-and-governance/compliance-assurance/environmental-liability/implementation-commission_en, accessed on 5 June 2023

731 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Biodiversity Strategy for 2030

732 FITNESS CHECK of the EU Nature Legislation (Birds and Habitats Directives), Brussels, 16.12.2016 SWD(2016) 472 final, p 68

With respect to appropriate assessment procedure which is the main policy mechanism used to safeguard protected areas under both the Habitats and Birds Directives, and applies to all plans or projects likely to have a significant effect on protected areas under the Directives, there have been variations in implementation between Member States.

Nationally, there has been uncertainty about the scope of a 'project' within the meaning of the Article 6(3) of the Habitats Directive e.g. whether licences to harvest cockles was a 'project' within the meaning of the Article 6(3). In the Waddenzee case[733] on whether a plan or project is 'likely to have a significant effect', the CJEU gave a precautionary ruling, interpreting this as meaning that any significant effect would have to be ruled out on the basis of objective information showing that there must be 'no reasonable scientific doubt' remaining about the absence of such effects. CJEU gave a very wide interpretation of what constitutes a project within the meaning of Article 6(3) which entails the need to carry out appropriate assessment procedure by holding that: *"An activity such as mechanical cockle fishing which has been carried on for many years but for which a licence is granted annually for a limited period, with each licence entailing a new assessment both of the possibility of carrying on that activity and of the site where it may be carried on, falls within the concept of 'plan' or 'project' within the meaning of Article 6(3) of Council Directive 92/43 on the conservation of natural habitats and of wild fauna and flora*."[734]

Additionally, regarding the lack of uniformity in implementation of appropriate assessment procedures between Member States, a study[735] on evaluation and improvement of appropriate assessment and connected permitting procedures for plans and projects potentially affecting NATURA 2000 sites demonstrated widely differing administrative set-ups within Member States for handling the appropriate assessment permit procedures (Art 6.3 of the Habitats Directive)[736].

Working draft

733 Case C-127/02 Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij

734 Case C-127/02 Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij In the same case, it was also noted: "The first sentence of Article 6(3) of Directive 92/43 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that any plan or project not directly connected with or necessary to the management of the protected site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information and, in particular, in the light of the characteristics and environmental conditions of that site, that it will have a significant effect on that site, either individually or in combination with other plans or projects. Such an assessment of the implications implies that, prior to the approval of the plan or project, all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site's conservation objectives must be identified in the light of the best scientific knowledge in the field.

The competent national authorities, taking account of the appropriate assessment of the implications of the plan or project on the site concerned in the light of the site's conservation objectives, are to authorise that plan or project only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects".

735 STUDY ON EVALUATING AND IMPROVING THE ARTICLE 6.3 PERMIT PROCEDURE FOR NATURA 2000 SITES, p 85 FINAL-AA_final_analysis_REV NOV 2013 clean (europa.eu)

736 STUDY ON EVALUATING AND IMPROVING THE ARTICLE 6.3 PERMIT PROCEDURE FOR NATURA 2000 SITES, p 85 FINAL-AA_final_analysis_REV NOV 2013 clean (europa.eu) this stated "..it is important to recall that the way in which the Article 6.3 permitting procedure is implemented varies greatly from one country to another, and even from one region to another within the same country. This can be heavily influenced by: The basic constitutional structure of the countries concerned (whether it is a devolved or centralised government structure); The distribution of administrative responsibilities and competences amongst the different authorities (e.g. whether shared among different sectors or only in the hands of environment authorities; whether the permit procedure is integrated into other consent procedures or treated as a stand-alone procedure); Traditions as regards administrative practices and cultures (e.g. in terms of cooperation and dialogue between different administrative bodies, the role of spatial planning for development and land use policies); The level of detail of the transposing legislation as well as margin of discretion left to the authorities when implementing the legislative provisions. These wide ranging factors make it very difficult to obtain a full overview of how the Article 6.3 procedure is being implemented in the Member States. It also cautions against making generalized comments about AA implementation across the EU. But from the initial analysis undertaken it is clear that the differences in application of Article 6.3 across the countries and regions can have a major influence on how the Article 6.3 permit procedure is implemented in practice and this in turn can impact on the nature and extent of possible problems that arise during this implementation."

A2.5.4 EU funding support

Table A1-38 provides an overview of six EU funds which include support for nature protection, biodiversity, soil and land policy area or some of its components. It includes specific segments and portions of the funds designated for this policy area, the actions these funds subsidise, as well as relevant beneficiaries and proofing mechanisms.

Table A1-38: EU expenditure contributing to nature, biodiversity, soil and land policy area

EU funds	EU subsidies	Actions subsidised by EU funds	Beneficiaries	Proofing mechanism
Horizon Europe	The cluster "Food, Bioeconomy, Natural Resources, Agriculture and Environment" within Pillar II Global challenges and European industrial competitiveness, will receive EUR 8 952 000 000 financing.	Environmental protection, sustainable use and management for land, water and biodiversity, transition towards sustainable bioeconomy.	Any legal entity (natural person or legal person)	Applicants shall refer to the DNSH (Do no significant harm) principle for the proposed research methodology and impact to assure that they do not "make a significant harm to any of the six environmental objectives" set by the EU taxonomy regulation (Horizon Europe Proposal Evaluation, 2023).
CAP (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development)	Halting and reserving biodiversity loss is among the specific objectives of the CAP. Biodiversity expenditures are channelled through both EAGF and EAFRD, 13% and 26% of the envelope respectively.	EU specific objectives include 'To foster sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency' and 'To contribute to halting and reversing biodiversity loss, enhance ecosystem	Main beneficiaries are EU farmers. List available here	DNSH principle applies. Cross-compliance requirements: • GAEC 5[737] aimed at 'Minimum land management reflecting site specific conditions to limit erosion' • GAEC 6 aimed at 'Protection of soils in periods that are most sensitive'

737 See Annex III of CAP Strategic Plan Regulation

Table A1-38: EU expenditure contributing to nature, biodiversity, soil and land policy area				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
		services and preserve habitats and landscapes' (see Annex I of CAP Strategic Plan regulation). Several result and output indicators refer to ecological management of farmland, agroecology, Nature 200 site preservation activities, etc. suggesting the relevance of these dimensions.		• GAEC 7 aimed at 'Preserving the soil potential' SMR 3 on the conservation of wild birds • SMR 4 on the conservation of natural habitats and of wild flora and fauna GAEC 8 aimed at 'Maintenance of non-productive features and area to improve on-farm biodiversity' GAEC 9 aimed at 'Protection of habitats and species'.
Cohesion policy funds	7.35bn expenditure is planned under 'Nature protection and biodiversity'.[738]	Several relevant intervention fields: Protection, restoration and sustainable use of Natura 2000 sites (078), Nature and biodiversity protection, natural heritage and resources, green and blue infrastructure (079)	Public or private bodies, entities with or without legal personality, or natural persons. Data not yet available on actual beneficiaries.	• Thematic enabling condition 2.7. Prioritised action framework for the necessary conservation measures involving Union co-financing DNSH, objective 6: 'The Protection and Restoration of Biodiversity and Ecosystems'. • EIA/SEA, to the extent relevant.
LIFE	A subprogramme of LIFE is "Nature and Biodiversity", Receiving EUR 2.143 billion	Projects that are funded must fall within at least one of two intervention areas739:	Funding is targeted at legal entities established either in an MS or an overseas country or in	The LIFE Programme directly supports the six environmental objectives set by the EU

738 According to the data compiled for the cohesion open data platform

739 https://www.rvo.nl/sites/default/files/2023-01/LIFE%20Priority%20topics.pdf

Table A1-38: EU expenditure contributing to nature, biodiversity, soil and land policy area				
EU funds	**EU subsidies**	**Actions subsidised by EU funds**	**Beneficiaries**	**Proofing mechanism**
	in funding. This contribution covers 46% of the envelope.	1. Space and Nature (e.g., area-based activities aimed at conservation and restoration of habitats or species. 2. Safeguarding our species (other than area-based interventions).	a third country associated with LIFE, including legal entities established under Union or international law.	taxonomy regulation, thus DNSH (Do no significant harm) principle applies.
InvestEU	The Commission's sustainability guidance, consistent with DNSH principle, includes consolidated impact of projects targeting land and biodiversity with an aim of Protection and restoration of biodiversity and ecosystems. No specific data available.	1) Green and blue infrastructure projects, 2) nature and biodiversity protection	Any natural or legal persons (based in an EU or any third eligible country) can benefit from the Project. This includes private entities, public sector entities, mixed entities, Non-profit organizations.	The application of the 'Do No Significant Harm' (DNSH) principle could be regarded as such.
Recovery and Resilience Facility	'The protection and restoration of biodiversity and ecosystems' actions make up 3% of NRRPs.[740]	There are two specific intervention fields associated with this area: 1) Protection, restoration and sustainable use of Natura 2000 sites (code 049) [741] 2) Nature and biodiversity protection, natural heritage and resources, green and blue infrastructure (code 050).	Public administration, public sector and private sector entities. Beneficiary data is not available for RRF (only top 100 will be published for each MS as per the requirements of REPowerEU)	• DNSH, objective 6: 'The Protection and Restoration of Biodiversity and Ecosystems'. • EIA/SEA, to the extent relevant.

740 See RRF scoreboard data

741 See Annex VI of the RRF Regulation (available here in a separate document)

A2.*6* Reducing environmental and climate pressures

Reducing environmental and climate pressures related to production and consumption (PO6 of the 8th EAP) is regarded as a cross-cutting theme that underpins the other five priority objectives of the 8th EAP. To facilitate with meeting this priority objective we have identified horizontal policies that also underpin the other five priority objectives of the 8th EAP.

A2.*6*.1 Environmental Liability

Policy overview

The Environmental Liability Directive covers pollution caused to protected species and habitats (Directive on conservation of wild birds, Natural Habitats Directive) land, water (EU Water FD, Marine Environment Strategy Directive) and industry (Industrial Emissions Directive). It also includes the discharge of pollutants into the air, inland surface water and groundwater and any deliberate release of genetically modified organisms (GMOs) into the environment. The directive is based on the PPP and entered into force in 2004. It sets out a list of occupational activities that, should they cause damage or threat of damage to the environment, the operator (polluter) is responsible for taking any preventive or remedial measures, including covering the cost, to restore the environment to its original condition. Annex III of the directive sets out the occupational activities in scope, which are:

- The operation of installations subject to permit
- Waste management operations
- All discharges to inland surface water that require prior authorisation
- All discharges to groundwater that require prior authorisation
- The discharge or injection of pollutants into surface water or ground water that require a permit, authorisation or registration in advance
- Manufacture, use, storage, processing, filling, or release into the environment of dangerous substances, plant protection products or biocidal products
- Transport of dangerous or polluting goods
- The release into air of polluting substances
- Use, release into the environment or transport of genetically modified micro-organisms
- Transboundary shipments of prohibited wastes[742]

Table A1-39: Environmental Liability Directive policy overview

Policy objective	To establish a common framework for the prevention and remedy of environmental damage at a reasonable cost to society.
Approach to implementation	It requires any stakeholder who damages, or threatens to damage, environmental media (including protected species and habitats, as per the definitions and activities set out in the legislative text) to notify the designated competent authority as soon as possible. In instances where environmental damage has not yet occurred, the competent authority may set out necessary preventive measures. These may include: • "require the operator to provide information on any imminent threat of environmental damage or in suspected cases of such an imminent threat; • require the operator to take the necessary preventive measures; • give instructions to the operator to be followed on the necessary preventive measures to be taken; or

742 EUR-Lex - 32004L0035, European Commission, 2004, Annex III, Activities referred to in Article 3. Available at: EUR-Lex - 02004L0035-20190626 - EN - EUR-Lex (europa.eu)

Table A1-39: Environmental Liability Directive policy overview	
	• itself take the necessary preventive measures."[743] In instances where environmental damage has occurred, the competent authority may set out necessary remedial measures. These may include: • "require the operator to provide supplementary information on any damage that has occurred; • take, require the operator to take or give instructions to the operator concerning, all practicable steps to immediately control, contain, remove or otherwise manage the relevant contaminants and/or any other damage factors in order to limit or to prevent further environmental damage and adverse effect on human health, or further impairment of services; • require the operator to take the necessary remedial measures; • give instructions to the operator to be followed on the necessary remedial measures to be taken; or • itself take the necessary remedial measures."[744]
Monitoring and reporting	Member States shall report the results of the monitoring programme to demonstrate compliance with the Directive every 5 years. At the time of entry into force MS were required to report on the period 30 April 2007 – 30 April 2013[745], "a list of instances of environmental damage and instances of liability under this Directive, with the following information and data for each instance: 1. Type of environmental damage, date of occurrence and/or discovery of the damage and date on which proceedings were initiated under this Directive. 2. Activity classification code of the liable legal person(s)(1). 3. Whether there has been resort to judicial review proceedings either by liable parties or qualified entities. (The type of claimants and the outcome of proceedings shall be specified.) 4. Outcome of the remediation process. 5. Date of closure of proceedings."[746] ***Note, the Environmental Liability Directive is currently undergoing an evaluation by the European Commission and is expected to be published in 2023. Once finalised the results will be incorporated.***
Approach to enforcement	The competent authority is responsible for enforcing the Directive including identifying the responsible operator. They can request the operator to take relevant preventive or remedial actions as set out in the legislative text. Such actions include, but are not limited to, providing information on any damage or the threat of damage, require the operator to take preventive/remedial measures, and instructing the operator on the most appropriate course of action. Where the operator fails to comply, the competent authority is entitled to initiate cost recovery proceedings against the operator within 5 years from the date any preventive/remediation measures have been completed.

Implementing the PPP

The Environmental Liability Directive establishes a legal link between activities that damage the environment and those they are committed by. It sets out the respective activities in scope and, where relevant, appropriate/suggested sanctions. The Environmental Liability Directive

743 EUR-Lex - 32004L0035, European Commission, 2004, Article 5, Preventive Action. Available at: EUR-Lex - 02004L0035-20190626 - EN - EUR-Lex (europa.eu)

744 EUR-Lex - 32004L0035, European Commission, 2004, Article 6, Remedial Action. Available at: EUR-Lex - 02004L0035-20190626 - EN - EUR-Lex (europa.eu)

745 An updated evaluation to the Environmental Liability Directive is expected to be published in 2023.

746 EUR-Lex - 32004L0035, European Commission, 2004. Available at: EUR-Lex - 02004L0035-20190626 - EN - EUR-Lex (europa.eu)

is based on the principles of the Polluter Pays Principle by setting out that Member States can request that a liable polluter must restore the affected area to original condition.

The Environmental Liability Directive (ELD) covers pollution caused to protected species and habitats (Directive on conservation of wild birds, Natural Habitats Directive), land, water (EU Water FD, Marine Environment Strategy Directive) and industry (Industrial Emissions Directive). It also includes the discharge of pollutants into the air (as this can affect ground and water conditions), inland surface water and groundwater and any deliberate release of GMOs into the environment. The main polluting pressure covered in the Directive relates to environmental damage, referring to any damage made to protected species and natural habitats, water and soil. Article 2(2) of the Directive provides that 'damage' means 'measurable adverse change in a natural resource or measurable impairment of a natural resource service which may occur directly or indirectly.' [747]

The Environmental Liability Directive is based on the PPP; an operator causing environmental damage or creating an imminent threat of such damage should, in principle, bear the cost of the necessary preventive or remedial measures. In cases where a competent authority acts, itself or through a third party, in the place of an operator, that authority should ensure that the cost incurred by it is recovered from the operator. The legislative text defines an 'operator' as "any natural or legal, private or public person who operates or controls the occupational activity (set out above), including the holder of a permit or authorisation of an activity and anyone who holds economic power over the technical functioning of an activity". The scope of the Directive is therefore broad, and applies to any and all operators conducting activities that cause or may cause damage to water, land and protected species and habitats. Operators should ultimately bear the cost of assessing environmental damage and, as the case may be, assessing an imminent threat of such damage occurring.

The Environmental Liability Directive establishes a legal framework of liability to prevent and remedy environmental damage. The directive applies to pollution caused to protected species and habitats, land, water and through releases to air *via* specific activities set out in Annex III to the legislation. The directive does not specify minimum threshold levels, but instead ascribes liability to 'significant damage' where 'damage' is defined as 'a measurable adverse change in a natural resource or measurable impairment of a natural resource service which may occur directly or indirectly'.[748] The Directive sets out that liable operators will bear the costs for any preventive and remedial actions necessary. Competent authorities are responsible for overseeing enforcement of the Directive and they are permitted to recover any costs they incur *via* security over property or 'other appropriate guarantees from the operator who has caused the damage'. Member States can transpose the Directive into national legislation and specify threshold levels.

Member States submitted National Reports in 2013. These are the most recent examples of MS reports available on the Commission website and this section will be updated once the 2023 evaluation is complete. Select examples of action taken under the Directive are included below:

- In Cyprus (2009), installation of drainage pipes discharged into the sea causing damage to protected species/habitats and potential coastal water damage. The operator implemented necessary remediation measures and removed the pipeline. Installation of drainage pipes is not listed as an activity in Annex III of the legislation but fell in

747 Environmental Liability (europa.eu)

748 EUR-Lex - 32004L0035, European Commission, 2004, Article 2, Definitions. Available at: EUR-Lex - 02004L0035-20190626 - EN - EUR-Lex (europa.eu)

scope of the ELD through 'damage to protected areas by occupational activities other than those listed in Annex III'. The associated costs were not reported.[749]

- In Estonia (2010), a fuel truck drove into a ditch on a slippery road and spilled 6000-8000 litres of specially marked diesel. The fuel leached into the surrounding snow and soil. Remedial measures were undertaken by the operator with an associated cost of €20,985.87, plus the fuel spilled. These included:[750]
    - Excavation and treatment of polluted soil
    - Collecting soil and water samples
    - Pumping out and treatment of polluted water, and wider excavation of the pit to remove as much polluted soil as possible
    - Filling in the pit with new soil at the earliest opportunity
    - Monitoring the following spring thaw to check quality of the ditch water.
- A number of MS reported instances where damage had been identified but competent authorities were not able to recover the costs of remedial action. Examples include in Belgium where water pollution resulted in the deaths of a large number of protected species of fish but a liable operator was not identified. In Bulgaria imminent threat of damage was attributable to a chemical company that was not liable to pay due to insolvency.[751,752]

The 2016 evaluation of the ELD highlighted that a lack of understanding of the term 'environmental damage' was hampering its implementation. The Commission produced guidelines to foster a common understanding of this term, setting out the scope of the Directive (types of pollution), principles the Directive draws upon (PPP, precautionary approach, preventive action should be taken and damage should be rectified at source) and how occupational activities address adverse effects on the environment.[753] The guidance also sets out those who are liable for pollution (operators), and in what context they are liable (activities).[754] Similarly, several Member States have produced guidance documents to support with implementation of the Directive and the PPP by extension (Denmark, Finland, France, Ireland, The Netherlands, Portugal, and Spain).[755]

Transposition of the ELD into national legislation is particularly important. It can either mirror the ELD in creating equivalent Environmental Liability Acts, or components of the ELD can be incorporated into other Frameworks, e.g., the incorporation of PPP and liability into a Water Directive. Transposition of the ELD has a direct impact on the implementation of PPP as its scope defines the areas where polluters are liable to undertake preventive or remedial action to the damage, or threat of damage, they have caused.[756]

A number of external factors were investigated by the ELD implementation study. The study concluded that the following factors had the greatest influence on implementation of the ELD:

749 Cyprus Environmental Liability Directive National Report, 2013. Available at: Circabc (europa.eu)

750 Estonia Environmental Liability Directive National Report, 2013. Available at: Circabc (europa.eu)

751 Belgium Environmental Liability Directive National Report, 2013. Available at: Circabc (europa.eu)

752 Bulgaria Environmental Liability Directive National Report, 2013. Available at: Circabc (europa.eu)

753 European Commission, 2021, Guidelines providing a common understanding of the term 'environmental damage' as defined in Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage. Available at: eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021XC0407(01)

754 European Commission, 2021, Guidelines providing a common understanding of the term 'environmental damage' as defined in Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021XC0407(01)

755 European Commission, How EU Member States implement the ELD. Available at: Implementation Member States (europa.eu)

756 European Commission, 2016, REFIT Evaluation of the Environmental Liability Directive, Section 5.1 'Transposition of the ELD', p. 18. Available at: untitled (europa.eu)

- Conditions for ELD application – including transposition, compliance and willingness to enforce the ELD by Member States. The 2010 ELD report found limited implementation of the ELD. This resulted in 'a patchwork of liability systems across the EU', for example when determining the 'significance threshold' and minimum standards.[757]
- Expertise and knowledge – it was found that relevant stakeholders (competent authorities, operators) were either lacking in awareness about the ELD or that expertise and knowledge was inconsistent across different MS. The level of awareness was also generally lower for SMEs.
- Legislative environment – it was found that competent authorities in MS with well-developed environmental legislation favoured enforcing existing legislation instead of the ELD.

A2.6.2 Environmental Crime

Environmental pressure

Environmental crime contributes to greater risk of disease and environmental disaster, irreversible climate change, the contamination of the food chain, reduced life expectancy and the death of human beings (EURPOL).

Policy overview

The Environmental Crime Directive (ECD) relates to biodiversity, waste, chemicals, water, and air quality/climate change. Conduct must be considered unlawful for the Directive to be applied, and the text sets out what constitutes a criminal offence, through either committing or non-compliance with the following::[758]

- Discharge of a quantity of materials/ionising radiation into air, soil or water which causes or is likely to cause death, serious injury or substantial damage to air/soil/water/animals/plants
- Placing on the market of a product which is likely to cause death/damage/serious injury to the media listed above
- Manufacture, placing on the market, use of substances subject to regulation in the EU
- Execution of projects that are likely to cause substantial damage to the environment
- Collection, transport, recovery and shipment of waste subject to regulation in the EU
- Recycling of ships in scope of EU regulations
- Installation, operation or dismantling of an installation in which dangerous activities are carried out or dangerous substances are used
- Manufacture, production, processing, etc, of radioactive material subject to regulation in the EU
- Abstraction of water that is likely to cause ecological damage
- Killing, destruction, possession, sale or trade of wild flora/fauna
- Placing or making available on the market illegally harvested timber
- Activities that cause deterioration of a habitat within a protected site
- Introduction or spread of invasive alien species
- Production, use, import, export of ozone depleting substances
- Production, use, import, export of fluorinated greenhouse gases

757 European Commission, 2016, REFIT Evaluation of the Environmental Liability Directive, Annex II 'ELD Studies' , p. 65. Available at: untitled (europa.eu)

758 EUR-Lex – 32008L0099, European Commission, 2008, Article 3 – Offences. Available at: EUR-Lex - 32008L0099 - EN - EUR-Lex (europa.eu)

Table A1-40: Environmental Crime Directive policy overview	
Policy objective	Overall: to ensure a better protection of the environment by means of criminal law and by improving detection, investigation, prosecution and sanctioning of environmental crime. 1. Improve the effectiveness of detection, investigation, prosecution and sanctioning of environmental crime by updating the scope of the Directive and refine the legal technique used for the scope definition 2. Improve the effectiveness of detection, investigation, prosecutions and sanctioning of environmental crime by clarifying or eliminating the undefined terms used in the current description of the environmental criminal offences. 3. Ensure effective, dissuasive and proportionate sanction types and levels for environmental crime. 4. Foster cross-border investigation and prosecution. 5. Improve informed decision-making on environmental crime through improved collection and dissemination of information and statistical data on the scale of environmental crime and the efforts to combat it. 6.Improve the overall operational effectiveness of national enforcement chains to foster detection, investigation, prosecution and sanctioning of environmental crimes.
Approach to implementation	Articles 3 and 4 of the Environmental Crime Directive (2008) set out activities (including aiding and abetting of those activities) that constitute criminal offences when they are committed intentionally or with serious negligence. The Directive sets out the action MS must take to ensure that the offences described in Articles 3 and 4 are punishable by "effective, proportionate and dissuasive criminal penalties".[759]
Monitoring and reporting	The initial Directive did not stipulate reporting obligations other than to report to the Commission on the implementation of the Directive. Under the 2021 changes, Member States were required to report to the Commission every two years detailing a summary about implementation of and actions taken in accordance with Articles 15, 16, 17, 19, and 20[760]. At the time of this interim report a date has not yet been set for the reporting period to commence.
Approach to enforcement	ECD is invoked for criminal acts and thus polluters have not met the requirements of legislation. The 2021 update sets maximum penalty terms for particular crimes and allows MS to set additional sanctions including fines, an obligation to restore the natural environment and bans on re-entering the space.

Implementing the PPP

The Environmental Crime Directive establishes a legal link between activities that damage the environment and those they are committed by. It sets out the respective activities in scope and, where relevant, appropriate/suggested sanctions. The PPP is incorporated into the Environmental Crime Directive by setting out that Member States can request that a liable polluter must restore the affected area to original condition.

The Environmental Crime Directive (ECD) relates to biodiversity, waste, chemicals, water, and air quality/climate change. Conduct must be considered unlawful for the Directive to be applied, and the text sets out what constitutes a criminal offence.

759 EUR-Lex - 32008L0099, European Commission, 2004, Article 3 'Offences', Article 4 'Inciting, Aiding and Abetting'. Available at: EUR-Lex - 32008L0099 - EN - EUR-Lex (europa.eu)

760 Article 15 – prevention. MS shall take actions to reduce overall environmental criminal offences, raise public awareness and reduce the risk of the population becoming a victim of environmental crime. Article 16 – resources. MS shall ensure that the authorities have sufficient financial, technical and technological resources necessary to detect, investigate, prosecute or adjudicate environmental offences. Article 17 – training. MS shall request those involved in training relevant staff to provide specialised training. Article 19 – coordination and cooperation between competent authorities within a MS. MS shall establish appropriate mechanisms involved in the prevention of and fight against environmental criminal offences. Article 20 – National strategy. MS shall establish, publish and implement a national strategy on combating environmental criminal offences

The ECD provides a mechanism to correct market failures by specifying when polluters are liable to prevent/remedy environmental damage and/or when their activities are considered a criminal offence. The directive ascribes legal ownership and redress to instances of environmental pollution, specifies where instances of environmental pollution are punishable by criminal sanctions, and aims to have a deterrent effect to those who may undertake polluting activities. The ECD is EU-wide and implemented into MS national law through one of four approaches:[761]

- Transposition into criminal code (BG, CZ, EE, ES, FI, HR, HU, LT, LV, PL, PT, SI, SK)
- Transposition into environmental legislation (BE, DK, FR, IE, LU, SE)
- Combined approach of criminal code and environmental legislation (AT, DE, IT, NL, RO, UK)
- Specific Acts (CY, EL, MT)

Member States took different approaches to transposing the term 'unlawful', either through criminal code or environmental law. The former should capture any amendments to Annexes in environmental legislation, whilst the latter may lead to inconsistencies in the implementation of the ECD due to the complexity of legal frameworks. Different approaches were also taken in relation to undefined terms:

- 'Significant damage' – some MS consider the value of the damage caused, e.g., Czech Republic sets significant damage at €20,000 whilst Austrian law considers the ecological impact of the damage caused.
- 'Non-negligible quantity' – this relates to waste shipments under Article 3c of the legislation and most MS chose not to link criminal liability to the quantity of illegally shipped waste. Some MS provided guidelines on the interpretation of this term.
- 'Negligible quantity/impact' – the ECD specifies that damage to protected flora and fauna should be criminalised except for where a negligible quantity of damage has had a negligible impact on the species. Some MS (BE, DK, EL, FR, HR, IE, IT, LU, LV, NL, SI) defined criminal liability without the exception of 'negligible quantity'. Some MS provide definitions of negligible by linking to the species or the financial value of the damage.

Select examples of case studies demonstrating action taken under the ECD include:[762]

- Wildlife organised crime – glass eels trafficking in France. Glass eels are critically endangered and subject to a European safeguarding plan. A 2014/15 investigation into fishing activities identified that 600-800 kg of glass eels had been sold illegally and charges were brought against nine persons, including sea/river fishermen and poachers. Those responsible were given custodial sentences of up to two years and fines between €5,000-20,000.
- Liability of legal persons – Dieselgate in Germany. In 2015, it was found that the Volkswagen group had cheated emissions tests by fitting illegal software that lowered the emissions of nitrogen oxides to meet regulatory limits. In Germany, Volkswagen was sanctioned for a breach of duties and fined €1 billion.
- Cross border and organised crime – illegal waste trade to Romania. In 2011, organised crime groups were suspected of laundering money through a Romanian landfill site

761 European Commission, 2020, Evaluation of the Environmental Crime Directive, Section 5 'Implementation/State of Play', p. 25. Available at: evaluation_-_swd2020259_-_part_1_0.pdf (europa.eu)

762 European Commission, 2020, Annexes to the Evaluation of the Environmental Crime Directive, Annex 3 'Case Studies', p. 101. Available at: environmental_crime_evaluation_report_annexes.pdf (europa.eu)

linked to illegal waste transfers from Italy. An Italian court issued four custodial sentences between 3.5-5 years to group members and landfill site managers/owners.

A proposed amendment (2021) to the ECD includes an update to Article 5 specifying that sanctions for environmental crime may include 'an obligation to reinstate the environment within a given time period'. This explicitly implements the PPP and seeks to address shortcomings of the original legislation, which did not specify recommended sanctions for environmental crimes.

Several external factors were identified for the ECD. Firstly, high public awareness of environmental issues generally leads to increased efforts to reduce/report environmental offences. Conversely, high volumes of international trade may lead to increased cross-border crime, facilitated by the ability to order online from across the globe and to do so with anonymity. The 2008 Directive did not set minimum sanction levels for penalties, instead referring to "effective, dissuasive and proportionate criminal penalties" that should be set at the MS-level. Differences in implementation and sanction levels therefore exist across EU Member States and hamper the creation of a level playing field. Jurisdictions with lenient environmental crime legislation may unintentionally create 'safe havens' for environmental crimes, further reducing the level playing field across the EU. Factors such as corruption within a MS and the political support and public awareness of environmental crimes can influence how successfully environmental crimes are combatted.[763]

A2.6.3 Built Environment

Environmental pressure

The built environment exerts pressure on a wide range of environmental agents including human health, biodiversity, land, soil, water, air, and climate, via buildings owners, developers (which may include government or other public bodies), suppliers, contractors and not least occupants. Major building and development projects include nuclear power stations, long-distance railways, motorways, express roads, waste disposal installations for hazardous waste, dams of a certain capacity, urban or industrial development projects, roads, tourism developments, and canalization and flood relief works. Plans and programs that facilitate their implementation include those related to land use, transport, energy, waste and agriculture. [764] Responsibility for how these environmental pressures are managed lies primarily with the construction sector[765]. Market failures occur when development has unintended consequences on the environment, including GHG emissions, damage to habitats and biodiversity and water pollution. These costs will produce reductions in welfare which are not accounted for in the cost of the development.[766]

Policy overview

This section focusses on the built environment. The Environmental Impact Assessment Directive (EIA) and Strategic Environmental Assessment (SEA) Directive seek to tackle the environmental impact of plans and projects.

763 European Commission, 2020, Evaluation of the Environmental Crime Directive, Section 2.3 'The Intervention Logic', p. 12. Available at: evaluation_-_swd2020259_-_part_1_0.pdf (europa.eu)

764 European Commission (n.d.). Environmental Impact Assessment. https://environment.ec.europa.eu/law-and-governance/environmental-assessments/environmental-impact-assessment_en

765 https://single-market-economy.ec.europa.eu/sectors/construction/observatory_en

766 Gangolells et al. (2009). A methodology for predicting the severity of environmental impacts related to the construction process of residential buildings. https://www.sciencedirect.com/science/article/abs/pii/S036013230800098X

Table A1-41: Policy overview		
	SEA	**EIA**
Policy objective	Aims to provide a high level of protection to the environment and contribute to integrating environmental considerations into the preparation, adoption and implementation of plans and programmes to promote sustainable development.	To ensure that environmental considerations are integrated into the design and decision-making process for certain public and private projects that are likely to have significant effects on the environment. Seeks to ensure environmental protection and transparency of the decision-making process.
Approach to implementation	The SEA Directive requires an environmental assessment to be carried out according to the Directive's provisions for plans and programmes identified as likely to have significant effects of the environment .This is carried out by the Competent Authority.	The EIA Directive sets processes for the assessment of environmental effects of public and private projects by virtue of their size, scale (these are defined in the Directive) that are likely to have significant effects on the environment. This process implements the PPP as the developer incurs the cost of the EIA preparation. The recitals (Paragraph 1B) of the 2011 version of the Directive refers to the PPP directly.
Monitoring and reporting	*Requirements are specified in in Article 10*[767] 1. Member States shall monitor the significant environmental effects of the implementation of plans and programmes in order, inter alia, to identify at an early stage unforeseen adverse effects, and to be able to undertake appropriate remedial action. 2. In order to comply with paragraph 1, existing monitoring arrangements may be used if appropriate, with a view to avoiding duplication of monitoring.	The competent authorities in each member state are responsible for overseeing the EIA process, ensuring that the necessary assessments are carried out and that the requirements of the directive are met. If a Member State fails to properly implement or enforce the EIA directive, the European Commission may take legal action against that Member State. This can include the imposition of financial penalties or other measures to ensure compliance with the directive. The Directive contains obligations for each MS to report and share data on experience gained with the Directive (Article 12). The Directive also contains obligations that the Member States to ensure mitigation and compensation measures are implemented in individual consents, that appropriate procedures are in place to identify unforeseen significant adverse effects, in order to be able to undertake appropriate remedial action.[768]
Approach to enforcement	Member States are required to transpose the directive into their national legislation and to designate a competent authority responsible for	As left, Member States are required to transpose the directive into national legislation and to designate a competent authority responsible for overseeing its

767 Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0042&from=EN

768 Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0052&from=EN (35)

Table A1-41: Policy overview		
	overseeing its implementation. The competent authority is responsible for ensuring that plans and programmes subject to the directive are subject to a full and transparent SEA process. In practice, the enforcement of the SEA Directive varies among EU member states, and the specific enforcement measures used by each country will depend on their national legal framework and administrative practices. Some member states have established dedicated SEA units or integrated SEA processes into their existing environmental impact assessment systems to ensure effective enforcement. Other member states have relied on existing administrative procedures to implement the directive. The European Commission monitors the implementation of the SEA Directive in Member States and may take enforcement action against countries that fail to comply with their obligations under the directive. If a member state fails to implement the directive, the European Commission may initiate legal proceedings against the country, which could result in financial penalties or other sanctions.	implementation. Were the developer is the Competent Authority itself, separation of functions are required. Article 10(a) requires Member States to lay down rules on penalties applicable to infringements of the national provisions adopted pursuant to this Directive. The penalties shall be effective, proportionate and dissuasive. Article 12(2) requires Member States to provide various data on the application of the Directive (number of projects to which it applies, duration of EIA process and estates on the direct costs of such assessments, These have been published by the European Commission.

Implementing the PPP

The SEA Directive requires an environmental assessment to be carried out according to the Directive's provisions for plans and programmes identified as likely to have significant effects of the environment. This is carried out by the Competent Authority. The SEA Directive establishes the process of determining whether *plans and programmes* are likely to have significant environmental effects and thus require an SEA ('screening'). Thereafter,

- Member States have to take into account significance criteria, set out in Annex II to the SEA Directive. Most Member States apply a case-by-case screening approach. This stage ensures that the required plans and programmes undertake the SEA process and therefore consider and mitigate against potential environmental impacts.
- The scope and level of detail of the information to be covered in the environmental report is referred to as 'scoping'. Member States have wide discretion in organising the scoping phase of an SEA, limited by the sole obligation to consult the authorities with specific environmental responsibilities. While not required by the Directive, there is usually a formal or informal scoping document. This may take the shape of a guideline of what will be included in the final environmental report, a prescriptive list, or a record of discussions on the subject.
- The environmental report is defined in Article 2(c) of the SEA Directive as 'the part of the plan or programme documentation containing the information required in Article 5

and Annex I'. As such, it is the cornerstone of the SEA process, bringing together the identification, description and evaluation of the likely significant environmental effects and the reasonable alternatives. It also forms the basis for monitoring the significant effects.
- The SEA also requires monitoring and enforcement of the mitigation measures and the environmental authorities and the public (and, where appropriate, affected Member States) must be informed and consulted.

The SEA Directive incurs costs to plan makers (i.e. public authorities at various levels in MSs) in the consideration, assessment and mitigation of development plans or programmes. The Directive requires that adverse environmental effects are identified, mitigated and alternatives are assessed. In this way, the PPP is applied in indirect terms whereby the provisions seek to ensure that development plans do not enable proposals for development – or programmes – that plainly run counter to sustainability objectives.

The EIA Directive sets processes for the assessment of environmental effects of public and private projects by virtue of their size, scale (these are defined in the Directive) that are likely to have significant effects on the environment. The EIA Directive aims to ensure adverse environmental impacts are mitigated and/or prevented at the level of *individual development projects* (e.g. airports, energy and transport infrastructure). The purpose of the Directive is achieving a high level of human health and environmental protection via minimum standards for the EIA process and the technical assessment. The purpose of the assessment itself is to ensure that inter alia, the likely significant environmental effects have been identified, that relevant stakeholders (which include private citizens (groups), Government Agencies, regulators and utilities) have been consulted and that the adverse effects are mitigated if not removed via changes in the scheme design. The costs of doing so are largely incurred by the developer (often undertaken by private technical consultants). The costs of the EIA can be substantial (several million Euro, but in 2010 amounted to less than €50,000 on average).[769] The 2011 Directive was amended in 2014 to clarify the process and extend some of the topics considered (specifically effects of the proposed development on human health and climate change). Key steps are:

- The 'Screening stage' ascertains whether the Project's effects on the environment are expected to be significant, i.e. the Project is 'Screened' to determine whether an EIA is necessary. The Member State's Competent Authority make that determination through either a (i) case-by-case examination or (ii) set thresholds or criteria.
- The 'Scoping stage' involves assessment and determination, or 'scoping', of the amount of information and analysis that authorities will need. This process ensures that the right level of environmental impacts are considered to ensure the required level of environmental protection. This is based on information submitted by the developer at their cost, but has resource implications for the Competent Authority (and any statutory consultees)
- An environmental impact assessment report is required which identifies and assesses the potential environmental impacts of the project. If the project is likely to have significant adverse effects on the environment, the developer must propose measures to mitigate those impacts or alternative designs to avoid that damage.

All three steps above are based on information and analysis submitted by the developer, at their cost. As such the EIA Directive implements the PPP. It does, however, have resource implications for the Competent Authority (and any statutory consultees). In the assessment of that information and the decision whether to grant development consent. This administrative

769 GHK (2010). Collection of information and data to support the Impact Assessment study of the review of the EIA Directive. Available at: https://ec.europa.eu/environment/eia/pdf/collection_data.pdf

charge is mitigated by the payment of an application fee. The developer may also pay some form of compensation to mitigate adverse effects (such as financial contributions to social infrastructure) and they may also pay a fee to the authority, which is effectively a transfer cost, depending on the MS.

National approaches to EIA

All member States have transposed the EIA Directive but there are differences in national practice. Member States had until May 2017 to transpose the revised 2014 Directive and all had made amendments. Justice and Environment (2016) prepared a collection of "examples of good legislative practices" of MS in EIA procedures. Four examples provided are from Slovakia, Czech Republic, Austria and Slovenia below to show how varied approaches to national implementation affect the way in which the PPP is applied in practice.[770]

Table A1-42: Best practices in national EIA

Slovakia: Determination of the scope of the assessment	• In Slovakia, all affected entities – affected state administration bodies, affected public and affected municipalities – may comment on the scope of the assessment. Whilst this may increase administrative burden, each affected entity can influence the focus of the EIA, which are binding for the assessors. • Examples have shown that the time schedules for various specific assessment and phasing of different stages has been defined in the scope. E.g. for a project belonging to the network Natura 2000, it is possible to define in the scope of the assessment that a primary assessment as per Article 6 of the Habitats Directive has to be carried out before other stages of the assessment. This has the potential to improve design at an early stage and reduce iteration (and hence costs and delays). • The determination of the scope of the assessment is often preceded by an oral hearing with all relevant stakeholders which provides a space to discuss and clarify certain issues. This is likely to be more efficient than several organisations communicating.
Slovenia: Two-steps procedure of preparation of environmental report	The Slovenian Environmental Protection Act (2004) established a two-step procedure for preparing an environmental report: (1) the environmental report, (2) the revision of the environmental report by an environmental expert. The 2008 revisions to the Environmental Protection Act abolished the revision step and established a more detailed system of accreditation for the expert, preparing the original environmental impact reports. This saved costs, time and aided improvement in standards in the original assessment.
Czech Republic: Quality and objectiveness of EIA reports	The updated Directive 2014/52/EU states that "sufficient expertise", in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality. Act No. 100/2001 Coll. on the Environmental Impact Assessment (national legislation) requires expert reviewers to assess the documentation, with the costs covered by the developer. Note J&E also identified some significant drawbacks with the adopted approach and potential amendments have been considered which lay down the quality requirements for EIA in more detail.
Austria: Challenging decisions from Screening procedure by the public	Screening procedures play a large role in Austria's EIA. In 2016, for every full EIA, there were about 4 screenings (about 100 per year). The regular use of screening procedures helps to ensure that projects that require an EIA do undergo one, especially in cases where it is unclear whether the required threshold is met. The role of the Environmental Law office "Umweltanwaltschaft"; in a quasi-independent role, alongside a wider public consultation exercise is seen as positive.

770 Justice and Environment (2016). Collection of Examples of Good Practice in EIA Procedures. Available at: http://www.justiceandenvironment.org/fileadmin/user_upload/Publications/2016/EIA_good_practices_collection.pdf

A2.7 *EU funding*

EU funding programmes reviewed include:

- Horizon Europe
- Common Agricultural Policy (CAP)
- Cohesion Policy 2021 – 2027
- LIFE+
- InvestEU
- Recovery and Resilience Facility (RRF)

The review provides:

- An overview of each budget programme to understand its relevance and significance to environmental objectives. This demonstrates EU expenditure (including planned expenditure) under specific programmes earmarked for the different policy areas and related tracking mechanisms. It highlights the significance of these EU funds to the respective policy areas (and the extent to which the PPP is potentially relevant). The focus is on instruments under the 2021-2027 MFF. Predecessor programmes are referenced only to the extent they provide additional information or expenditure data linked to specific policy areas. They will be included in the evaluation analysis to understand how the policies have evolved towards the current state of play; and
- An assessment of the state of implementation of the PPP in terms of proofing mechanisms – a structured process to minimise harmful impacts of EU spending. For most programmes as a minimum this includes the application of the 'Do No Significant Harm' principle[771].

Table A1-43: Horizon Europe[772] overview	
Objectives	The successor of Horizon 2020, Horizon Europe is an R&I (Research and Innovation) programme for the 2021-2027 MFF. The general objective of the Programme is to deliver scientific, technological, economic and societal impact from the Union's investments in R&I (Art 3 of the Regulation). The regulation aims to enable robust green transportation, resource and water efficient economy, biodiversity, and food security. The environmental impact of various economic activates shall be addressed by technological improvement and transformation. Horizon Europe, with an increased budget of €95.5 billion at current prices, pays explicit attention to sustainable development goals by emphasizing commitment to the principles of *UN SDG*, *Paris Agreement* and *2030 Agenda*. The incorporation of *Missions* - R&I activities that are time-bound and have a measurable goal - identifies a *new cluster* within *Pillar II* (*Global challenges and European industrial competitiveness*), namely the *'Food, bioeconomy, natural resources, agriculture and environment* cluster;
Pollution targeted	Horizon Europe calls for pollution prevention and control, consistent with the European Green Deal objectives. Some targeted pollution reflected in the legislation include soil, air, marine and coastal/environment/water, chemicals, sustainable development, climate change, waste and recycling (see Annex I of the Regulation)

771 See here Further description on how this is done in practice can be found in SWD (2022) 225 final, for InvestEU here or for the RRF, here.

772 Regulation (EU) 2021/695 establishing Horizon Europe — the framework programme for research and innovation, laying down its rules for participation and dissemination

Table A1-43: Horizon Europe[772] overview	
Economic sector(s) targeted by the instrument	The Pillar II 'Global Challenges and European Industrial Competitiveness' defines the scope of targeted sectors by identifying the following clusters. • Human health services (Section Q based on NACE classification) • Culture, Creativity, and Inclusive Society (section R based on NACE classification); • Civil Security for Society (section O based on NACE classification); • Digital, Industry and Space (section b, C, D, E, G based on NACE classification; • Climate, Energy and Mobility (section H and D based on NACE classification); • Food, Bioeconomy, Natural Resources, Agriculture and Environment (sections A, B, E, based on NACE classification); Moreover, Pillar I refers to the Excellent Science, including research infrastructures. Pillar III consist of European Innovation Council (EIC), European innovation ecosystems (EIE) and European Institute of Innovation and Technology (EIT).
When did the policy enter into force (start year of current programme)	2021 (called Horizon 2020 for 2014-2020, Research Framework Programmes (FP1-7) for preceding financial perspectives)
What is the geographic scope of the policy?	In addition to the geographic scope of Horizon 2020 targeting EU27, the new framework is more explicit about its international commitments and cooperation and has a stronger focus on involving non-EU countries from anywhere in the world upon meeting certain requirements sets by the legislation.

Table A1-44: Common Agricultural Policy (CAP)[773] overview	
Objectives	The CAP 2023-27 is covered by three regulations with a combined aim to guarantee food security, ensure sustainable agriculture and support farmers in Europe. The revised regulation of CAP has 10 key policy objectives, which are consistent with the sustainability pillars. Three objectives, namely *climate change action, environmental care* and *landscape & biodiversity preservation* are directly linked to the EGD aspirations. Rural development objectives are financed by the EAFRD[774] while EAGF provides income support schemes for farmers and market measures.
Pollution targeted	CAP aims to reduce pollution affecting soil, water, nature/biodiversity, GHG emissions (climate change), chemicals (i.e. fertilisers and plant protection products/pesticides), waste (notably food, but also other types).
Economic sector(s) targeted by the instrument	Agriculture; other sectors concerned by rural development activities, incl. forestry, R&I and ICT.
When did the policy enter into force (start year of	As opposed to the standard MFF cycle, the new CAP entered into force in 2023. Transitional regulation for the years 2021-2022 was in force (Regulation (EU) 2020/2220). CAP has been in place since 1962.

773 Regulation (EU) 2021/2116 on the financing, management and monitoring of the common agricultural policy (CAP Horizontal Regulation)

Regulation (EU) 2021/2115 – rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP strategic plans) and financed by the European Agricultural Guarantee Fund and by the European Agricultural Fund for Rural Development (CAP strategic plans regulation)

Regulation (EU) 2021/2117, amending Regulation (EU) 1308/2013 on the common organisation of the agricultural markets; Regulation (EU) No 1151/2012 on quality schemes for agricultural products; Regulation (EU) No 251/2014 on geographical indications for aromatised wine products; and Regulation (EU) No 228/2013 laying down measures for agriculture in the outermost regions of the EU.

774 See here.

Table A1-44: Common Agricultural Policy (CAP)[773] overview	
current programme)?	
What is the geographic scope of the policy?	EU27

Table A1-45: Cohesion Policy 2021 – 2027 overview	
Objectives	The 2021-27 cohesion policy is delivered through four funds: • The European Regional Development Fund (ERDF), • the Cohesion Fund (CF), • the European Social Fund Plus (ESF+) and • the Just Transition Fund (JTF) REACT-EU, financed under NGEU, also support cohesion policy, though it is technically a continuation of the 2014-2020 programming period, and can be used up to the end of 2023 (in line with the N+3 rule). General rules for the cohesion policy funds (along with a number of others) are laid down by the Common Provisions Regulation (Regulation (EU) 2021/1060). The policies aim to contribute to: 1. a more competitive and smarter Europe 2. a greener, low carbon transitioning towards a net zero carbon economy 3. a more connected Europe by enhancing mobility 4. a more social and inclusive Europe 5. Europe closer to citizens by fostering the sustainable and integrated development of all types of territories Objective 2 is especially linked to the implementation of the EGD. Moreover, the JTF has the objective of supporting regions in addressing the socio-economic and environmental impacts of the transition towards the Union's 2030 targets for energy and climate and to climate neutrality (based on the Paris agreement).
Pollution targeted	Although not specifically the target of cohesion policy, some of the intervention fields[775] specifically refer to pollution. These include water (e.g. wastewater treatment, sewage, drinking water etc.) and waste (e.g. recycling) management, development of green infrastructure, GHG emission reduction (e.g. energy efficiency measures, R&I, etc.) and air quality.
Economic sector(s) targeted by the instrument	While 8th EAP policy areas are not explicitly targeted by cohesion policy funds, virtually all – perhaps save the one on chemicals – can benefit from relevant interventions.
When did the policy enter into force (start year of current programme)	2021
What is the geographic scope of the policy?	EU27

Table A1-46: LIFE+[776] overview	
Objectives	The general objective of the LIFE Programme shall be to contribute to the shift towards a sustainable, circular, energy-efficient, renewable energy-based, climate-neutral and - resilient economy (Article 3 of the Regulation). The

775 See Annex I of the 2021-27 CPR

776 Regulation (EU) 2021/783 establishing a programme for the environment and climate action (LIFE)

Table A1-46: LIFE+[776] overview	
	Regulation specifies that it aims to protect, restore and improve the quality of the environment, including the air, water and soil, and to halt and reverse biodiversity loss and to tackle the degradation of ecosystems, including by supporting the implementation and management of the Natura 2000 network, thereby contributing to sustainable development.
Pollution targeted	Pollution ambitions are included in different subprogrammes, especially within the Circular Economy and Quality of Life, whereby air and noise, chemicals, marine and coastal water, soil, waste are prioritised.
Economic sector(s) targeted by the instrument	LIFE provides funding for priority areas[777] listed under 'pollution targeted' rather than specific economic sectors.
When did the policy enter into force (start year of current programme)?	2021
What is the geographic scope of the policy?	EU27 + co-financing opportunities to certain non-EU countries specified by the regulation.

Table A1-47: InvestEU[778] overview	
Objectives	InvestEU provides financing and investment operations that support a range of EU objectives (see Art 3 of the Regulation). Importantly, Article 3 states that it contributes to '[..] the sustainability of the Union economy and its environmental and climate dimension contributing to the achievement of the SDGs and the objectives of the Paris Agreement [..]'. (Art 3(b)). Moreover, it also refers to sustainable and inclusive recovery from Covid-19.
Pollution targeted	InvestEU finances projects targeting pollution prevention and control, including air and noise, water, industrial, soil pollution (see Annex II of the regulation). No direct reference is made to chemicals in the regulation.
Economic sector(s) targeted by the instrument	The Project supports Sustainable investment in all economic sectors in a circular economy, such as energy (NACE C, D, E), transport (NACE H), innovative technologies (NACE C, J) and more. The InvestEU Programme directs funds towards sustainable finance systems consistent with the European Green Deal Investment Plan. At least 30% of InvestEU Programme funds is intended to support the EU's climate ambitions and 60% of funds under the 1st policy area (1st "window") of Sustainable Infrastructure should have a contribution to the EU's objectives with respect to climate and environment.
When did the policy enter into force? (start year of current programme)	2021
What is the geographic scope of the policy?	EU 27

777 See here

778 Regulation (EU) 2021/523 establishing the InvestEU Programme

Table A1-48: Recovery and Resilience Facility (RRF)[779] overview	
Objectives	The overarching general objective of the RRF is to promote the Union's economic, social and territorial cohesion. Contribution to the implementation of the EGD, facilitating the green transition and mainstreaming environmental sustainability are explicitly referenced by several Recital paragraphs and Article 4 on the General and Specific Objectives of the RRF.
Pollution targeted	Specific pollution types are not targeted through the objectives of the Facility. Nonetheless, carbon/GHG emissions, water, household, commercial and industrial waste, air and noise pollution are noted in the intervention fields listed in Annex VI of the Regulation.
Economic sector(s) targeted by the instrument	While these policy areas are not explicitly targeted by the Facility, virtually all – perhaps save the one on chemicals – of the 8thEAP policy areas receive support through the RRF.
When did the policy enter into force?	2021
What is the geographic scope of the policy?	EU27

A2.8 State Aid Rules

To avoid market distortion, there is a general prohibition of State Aid in the EU. Exemptions are permitted where intervention is needed for a well-functioning and equitable economy. The granting of aid requires prior notification to the Commission by the Member State concerned, unless the aid is covered by a block exemption regulation, most importantly the General Block Exemption Regulation (GBER), falls below the de minimis threshold or forms part of an aid scheme already approved by the Commission.

Table A1-49: State Aid Rules relevant to the PPP[780]	
Policy objectives	The main articles in the *TFEU* covering State aid are *Articles 107, 108 and 109*. However, the environmental practices and the commitment to the PPP are highlighted in Title X of the TFEU, starting with Article 191 which refers to the *Environment.* Furthermore, throughout the course of continuous amendments of the General Block Exemptions Regulation, the importance of exceptions referring to environmental protection and climate change has increased substantially. Other substantial State Aid rules are laid down in horizontal or sectoral rules. The 2023 amendment of GBER is aimed at facilitating the *twin transition* goals anchored by the *European Green Deal*. Articles 45 (Investment aid for remediation of contaminated sites) and 47 (*Investment aid for resource efficiency and for supporting the transition towards a circular economy)* lay down rules with direct PPP relevance. In fact, Article 45(3) makes direct reference to the PPP[781].

779 Regulation (EU) 2021/241 establishing the Recovery and Resilience Facility

780 Treaty on the Functioning of the European Union, Articles 107-109

[781] See Commission Regulation (EU) 2023/1315 https://competition-policy.ec.europa.eu/state-aid/legislation/regulations_en

Table A1-49: State Aid Rules relevant to the PPP[780]	
	Importantly, the Guidelines on State aid for climate, environmental protection and energy 2022. spell out how compatibility with state aid rules is assessed for environmental protection, including climate protection, and energy aid measures. Sections 3.2.1 (on the general compatibility assessment under Article 107(3), point (c), of the Treaty), 4.4.4 (on aid for resource efficiency and for supporting the transition towards a circular economy), 4.6.3 (on aid for the remediation of environmental damage, the rehabilitation of natural habitats and ecosystems, the protection or restoration of biodiversity and the implementation of nature-based solutions for climate change adaptation and mitigation) directly refer to the application of the PPP, and 4.12.2 (on aid for exceptional costs in relation to the closure of uncompetitive coal, peat and oil shale activities).
Pollution targeted	The TFEU and the respective legislations refer to the pollution targets in general terms within the scope of the PPP. For example, 2022 guidelines on State aid for climate, environmental protection and energy target among others (i) reduction and removal of greenhouse gas emissions through support for renewable energy and energy efficiency, (ii) reduction of pollution other than from greenhouse gases (iii) resource efficiency and the transition towards a circular economy ; (iv) the remediation of environmental damage, the rehabilitation of natural habitats and ecosystems, the protection or restoration of biodiversity and the implementation of nature-based solutions for climate change adaptation and mitigation; and (v) exceptional costs (including exceptional environmental costs) resulting from the closure of uncompetitive coal, peat and oil shale activities. The GBER contains a definition of the PPP and sets out instances where it is directly applied. For instance, Article 47 (4) states that 'the aid shall not relieve undertakings that generate waste from any costs or obligations relating to the treatment of waste for which they are liable under Union or national law'. Articles 45(5) and 56e(8)(a)(iii) spell out liability for environmental damage in accordance with the PPP.
Economic sector(s) regulated by the policy	The State aid rules including a reference to the PPP apply to a wide range of economic sectors.
When did the policy enter into force?	State aid policy was among the very first competencies of the EU that prevent competitive distortions in the internal market. The General Block Exemption Regulation (Regulation (EU) No 651/2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty) was amended in 2023 by Commission Regulation (EU) 2023/1315 of 23 June 2023**.** That regulation exempts from the notification obligation certain categories of aid that can be deemed compatible with the internal market. The Climate, Environmental Protection and Energy aid Guidelines were adopted in January 2022 to replace the previously applicable 2014 Environmental Protection and Energy aid Guidelines.
What is the geographic scope of the policy?	Regulations apply consistently to all MSs as the Competition Policy and State aid are key competences of the EU.

APPENDIX 3 STAKEHOLDERS CONSULTATION – SYNOPSIS REPORT

In accordance with the Better Regulation Guidelines, the synopsis report provides an outline of the consultation strategy, consultation activities undertaken, methods and tools used for collecting and analysing the data, stakeholder groups that participated in consultation activities, and the findings of consultation activities.

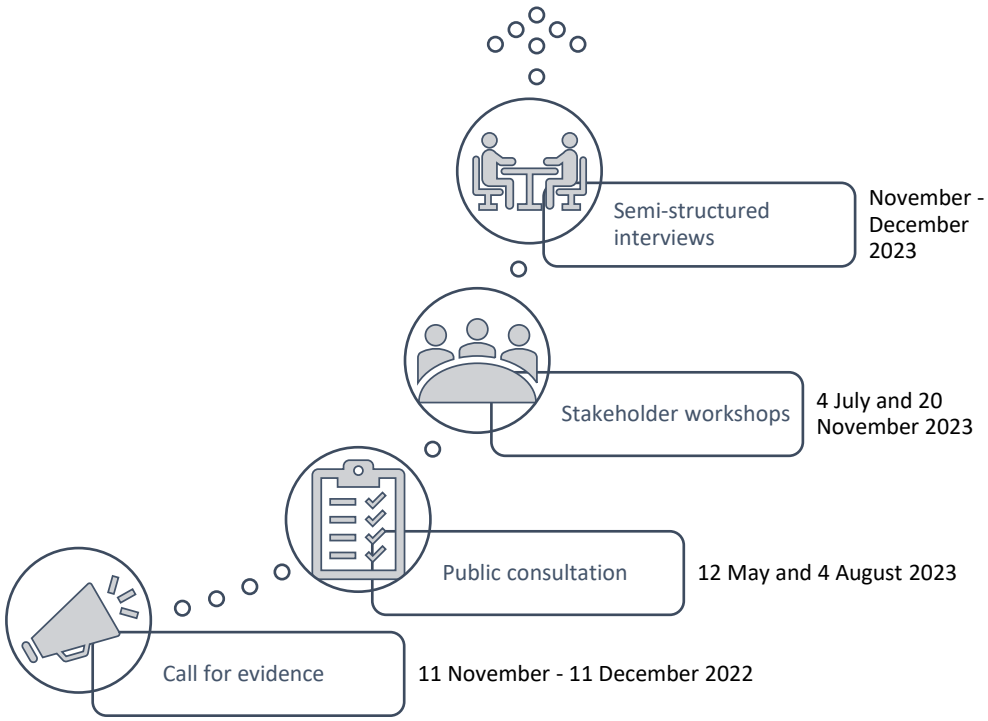
This document should be regarded solely as an overview of contributions received during the stakeholder consultation activities of the 'polluter pays' principle fitness check. It cannot, in any circumstances be regarded as the official position of the Commission or its services. Responses to the consultation activities cannot be considered as a representative sample of the views of the EU population.

Consultation strategy

The fitness check considers how well the PPP is applied. This includes looking at a wide range of activities and policies that relate to the environment in terms of their primary objectives (such as climate change, water policy, air policy, waste policy or environmental liability requirements), and sectoral policies in other areas that mainstream and integrate environmental considerations, such as activities in and policies for industry and the circular economy, agriculture, fisheries, energy and transport, to name just a few.

The main **objective** of the stakeholder consultation is to collect information, data, evidence and opinions on the implementation of the 'polluter pays principle' in the EU *acquis*. It included the call for evidence, online public consultation, two online stakeholder workshops and semi-structured interviews.

Figure 6-9: Overview of consultation activities



The following **major stakeholder groups** were identified to support the recruitment of respondents to the public consultation, online workshops and semi-structured interviews:

- **Stakeholders engaged in occupational activities that can produce environmental damage** cover business entities and business associations representing their interests that carry out activities defined in Annex III of the ELD and Annex I of the IED. These stakeholders obtain obligations under the relevant environmental legislation to comply with the PPP principle in terms of prevention and remedy of environmental damage.
- **Public authorities** that are responsible for the implementation and enforcement of the 'polluter pays principle' under the different pieces of environmental legislation.
- **Financial security and risk management organisations** that work in the field of risk management related to environmental damage or provide financial security instruments enabling the operators that can produce environmental damage to use financial guarantees to cover their responsibilities.
- **Environmental non-governmental organisations** active in the fields of water, land, air, and habitat protection.
- **International organisations** engaged in developing and implementing international documents and agreements related to liability for environmental damage.
- **EU institutions and agencies** that play an important role in the PPP implementation and enforcement.
- **Research and academia** that conducted studies concerning economic, legal and environmental aspects of the PPP.
- **Citizens –** members of the public (both EU and non-EU citizens) who are interested in the issue of the implementation of the PPP in Europe.

The strategy for compiling the **database of stakeholders** followed the advice of the Better Regulation Guidelines, Tool #52, which recommends considering several criteria for selecting relevant stakeholders: level of interest, nature of impact (direct, indirect, potential), influence and expertise related to the PPP. It should be noted that stakeholders who experience direct impact have more expertise and interest in influencing the PPP's future development than those who are affected indirectly or only under certain conditions.

The stakeholder database covered most comprehensively those **target groups who were directly affected by the PPP** because they have the highest interest in the PPP and have high levels of expertise on the subject.

Methods and tools used for collecting and analysing the data

A **call for evidence** aimed to collect the stakeholder feedback to the call for evidence document published on the Have Your Say portal. Stakeholders provided their opinion between 11 November and 11 December 2022 by uploading the text and/or files to the portal. A qualitative thematic analysis was conducted on the collected stakeholder feedback.

The **public consultation** 'Polluter Pays Principle – fitness check of its application to the environment' aimed at collecting public views and evidence about the implementation of the PPP in the EU for the fitness check, specifically looking at its effectiveness, efficiency, coherence, relevance, and the EU added value of its application. The public consultation was accessible through the EU Survey between 12 May and 4 August 2023.

The questionnaire consisted of 16 questions organised into the following parts:

- An introductory section that collected information about the demographic profile of the respondents,
- Five thematic sections that gathered opinions about the PPP implementation in the EU,

- A final section where the survey participants submitted general comments and uploaded the supplementary documents.

Two online stakeholder workshops aimed to discuss the state of play in the implementation of the PPP, present and validate the findings, evidence collected and emerging conclusions of the supporting study to the fitness check as well as disseminate information about the development of the methodology for the identification and reporting of non-energy environmentally harmful subsidies (EHS). The workshops were organised on 4 July and 20 November 2023 and included presentations of the study progress, preliminary findings and thematic discussions with the participants.

Semi-structured interviews with stakeholders involved in the implementation of the PPP aimed to complement the evidence gathered through literature and legislation review as well as other consultation activities with insights on the following:

- the design of the policies and tools for implementing the PPP at the EU level and in the EU Member States.
- the issues of practical implementation of the PPP with a focus on costs and impacts.

The interviews contained 15 questions that were thematically organised in two templates – one focused on the practical implementation issues and the other – on the design of policies. The semi-structured interviews were carried out in November-December 2023.

Quantitative data collected in consultation activities were analysed by using the descriptive **statistics method**. For the interpretation of qualitative data (e.g., open-ended survey questions, position papers, the feedback of semi-structured interviews and workshop discussions) **thematic analysis** – a qualitative method for identifying major patterns and themes in texts was applied.

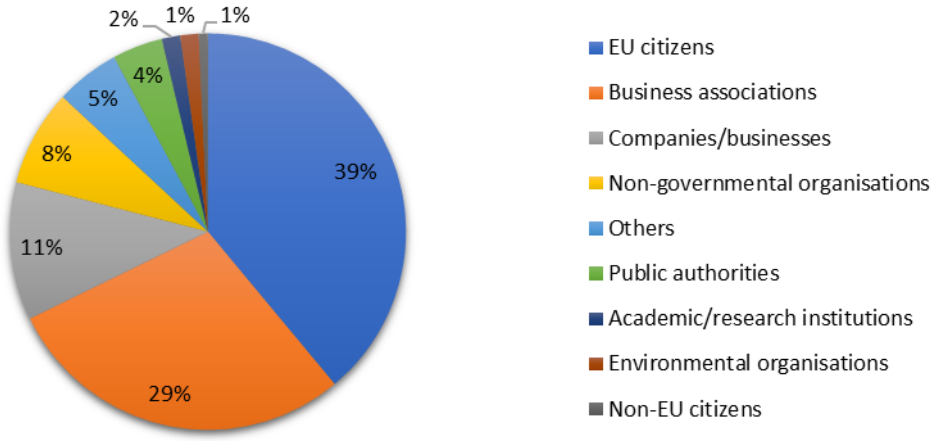
Stakeholder groups that participated in consultation activities

106 stakeholders provided feedback to the **call for evidence**. They represented 19 countries: 17 EU Member States and 2 non-EU countries (Norway and Switzerland). More feedback originated from Belgium (22%, 23), Slovakia (15%, 16), and France (15%, 16). Most stakeholders were EU citizens (40%, 42), business associations (24%, 25) and non-governmental organisations (20%, 21). Fewer responses were received from companies (8, 8%), environmental organisations (4%, 4), public authorities (2%, 2), academic/research organisations (1%, 1) and non-EU citizens (1%, 1). Two stakeholders (2%) categorised themselves as 'other' type of respondents.

268 respondents completed the **online public consultation** questionnaire and, excluding one duplicate answer, 267 responses were considered suitable and included in the analysis. The respondents represented 27 countries: 95% (253) were from EU Member States, while 5% (14) were from non-EU countries. Six EU countries represented over two-thirds of the responses (68%, 181): Germany (16%, 44), Belgium (13%, 36), Portugal (12%, 31), Italy (9%, 25), France (9%, 23) and Spain (8%, 22).

Most respondents submitted their responses as EU citizens (39%, 104), followed by business associations (29%, 77). Fewer responses were received from companies/businesses (11%, 30), NGOs (8%, 21), others (5%, 14), public authorities (4%, 11), academic/research institutions (1%, 4), environmental organisations (1%, 4) and non-EU citizens (1%, 2). Nearly 80% of respondents represented a business entity (i.e., a company or a business association 40%, 107) or an EU citizen (39%, 104). Organisations (60%, 161) of various sizes participated in the survey.

Figure 6-10: Respondents by organisation type, N=267



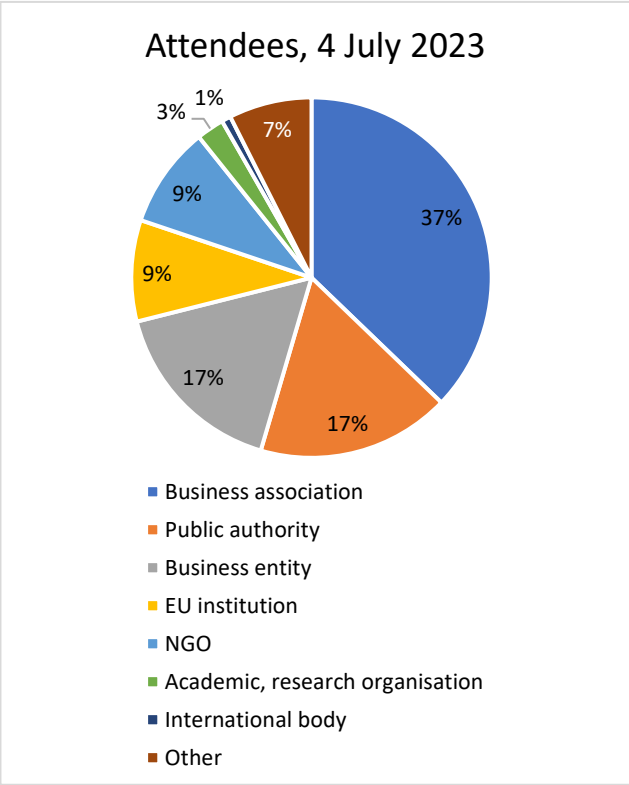
The number of participants representing micro (31%, 50), small (26%, 42) and large (26%, 42) organisations was similar, while fewer medium organisations (17%, 27) took part in the public consultation.

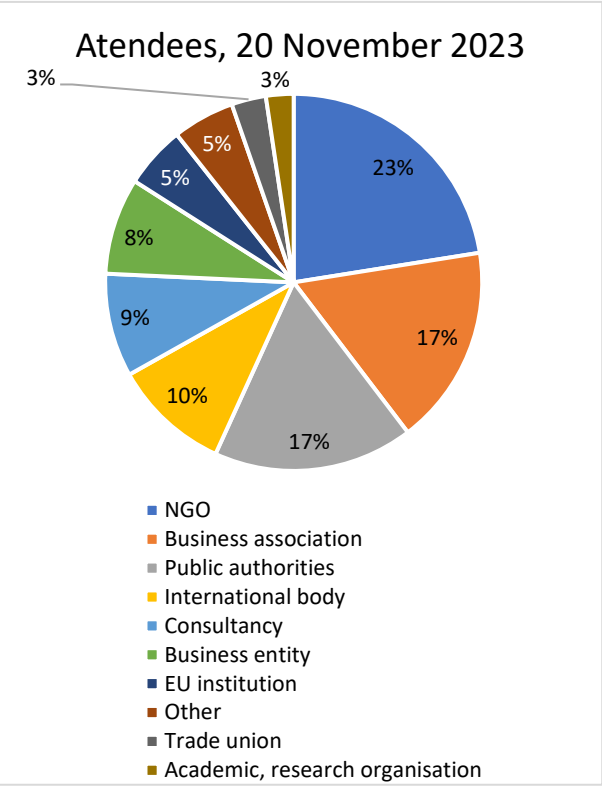
In the online public consultation, a group that comprised ≥ 5% of respondents and shared at least 50% was considered a campaign. Campaigns were reviewed in Excel by assessing responses to the closed and open-ended questions, sorting the responses by the categories of respondents, and identifying potential patterns in the responses. **No campaigns were identified in the online public consultation**.

A total of 194 people registered and 121 participants (62% of registrants) participated in the **first online workshop** held on 4 July 2023. The participants represented 22 countries including 19 EU Member States, and 3 non-EU countries: the UK, Norway and Iraq. Many participants represented Germany (11%, 13), Austria (7%, 8), and France (5%, 6). Attendees were from competent authorities, EU institutions, industry and trade associations, private companies, non-governmental organisations, researchers and members of the study team. Many attendees were from business associations (37%, 44), public authorities (17%, 21) and business companies (17%, 20).

The **second online workshop** held on 20 November 2023 attracted the attention of 253 registrants and 169 participants (67% of registrants). A total of 22 countries were represented during the workshop. This number included 20 EU Member States, and 2 non-EU countries: the UK and Norway. Many respondents were from Germany (9%, 15), the Netherlands (8%, 13), and the UK (6%, 10). Attendees were from competent authorities, EU institutions, international bodies, industry and trade associations, private companies, non-governmental organisations, researchers, consultants, and members of the study team. Three attendees did not provide their affiliation and country of operation and were not included in the detailed workshop attendance statistics. Many respondents were from non-governmental organisations (23%, 38), business associations (17%, 29), and public authorities (17%, 29).

Figure 6-11: Attendees of online workshops by organisation type





Twenty-nine interviews with 39 interviewees (some were held with 2 or three respondents) were carried out in November-December 2023. In addition, one stakeholder was consulted on specific questions related to the collection of evidence without using the semi-structured interview template.

Many interviewees represented organisations of a European focus, i.e., European business associations, non-governmental organisations, research organisations and think tanks. Few organisations were international and sixteen national. Interviewees from the following countries participated in the conversations: France (5), Germany (4), Austria (2), Spain (1), Denmark (1), the Netherlands (1), Lithuania (1), the UK (1).

Organisations that took part in the interviews in many cases were business entities, i.e., business associations or companies (17%, 44 respondents), non-governmental organisations (11%, 28 respondents) and academic, research organisations and think tanks (18%, 7 respondents). Few interviewees represented public authorities, European institutions and platforms and networks.

Twelve interview participants sent links to studies, excerpts or translations of documents relevant to the PPP topics after the interviews. This material was reviewed in the context of evidence collection.

Limitations

Several limitations of stakeholder consultation research should be considered in the interpretation of the findings:

- Consultation activities employed a quantitative public consultation survey based on non-probability sampling and qualitative consultations (i.e., stakeholder workshops and interviews). Therefore, the **findings of these consultation activities reflect only the opinion of their participants and cannot be generalised** to the EU population or specific stakeholder groups.

- **There was uneven participation of various organisations and countries in the consultation activities**. Some types of organisations and countries prevailed in certain consultation events.
- Stakeholders represented **specific (but not all potentially relevant) sectors** where the PPP has been implemented. The PPP is a horizontal element of the EU environmental policies and is relevant to multiple sectoral policy areas. The consultation activities captured the opinions of some of those sectors in more detail than others.
- The respondents could not **comprehensively answer all questions** due to the broadness and complexity of the PPP topics. The consultation activities contained a wide range of questions covering the design of policies and their implementation on different – EU and national levels, as well as required specific knowledge of the costs not borne by the polluter, legal and non-legal instruments, etc. Therefore, the respondents typically could not answer some questions or give a comprehensive response.

Findings of the call for evidence

The **overall impression** of the feedback is that the PPP is seen as in theory a **good principle** to ensure the green and just transition but stakeholders ask for improvement regarding its implementation.

One of the most recurring comments was that the polluter is not paying or is paying less than the costs of his pollution. Some stakeholders also stress that currently, the PPP leads to **environmental unfairness** because rich people or big enterprises can afford to pollute, whereas this is not the purpose of the PPP. This opinion appears to mainly refer to market-based instruments as the same stakeholders ask for a better implementation strategy that would be accompanied by other instruments (such as quotas and limits).

Respondents to the call for evidence often gave sector-specific comments. Some stakeholders find that the PPP is badly applied when it comes to **plastic pollution**, especially microplastics. They find that plastic producers and those who put plastic products on the market currently only pay for the emissions during production while there is insufficient policy to take care of the waste streams in the whole product chain.

A lot of the feedback concerns the **transport sector,** focusing on the internalisation of all key external costs across all transport modes. The lack of internalisation hinders the modal shift and meeting the objectives of the Green Deal. PPP is seen as a key mechanism for managing traffic demand, boosting the transition to cleaner vehicles and placing the right incentives for mobility.

Another topic mentioned several times is the **diffuse pollution of surface water and sediments**. This is a problem for owners and managers (public or private) of reservoirs and canals. They are disturbed by pollutants emitted upstream which are stored in the reservoir/canal sediments. EU policy is perceived as not making the polluter pay for the environmental damage done by **pervasive litter in the marine environment** and the **ongoing entry of plastic waste into the ocean**.

Many stakeholders indicated that the PPP is not well applied in the **agricultural sector** (especially the use of pesticides, GMOs, nitrogen fertilisers, and non-essential use of antibiotics).

Many stakeholders found that carbon pricing is very fragmented. In sectors not covered by the ETS carbon pricing varies widely across the Member States. ETS-free allowances hinder the application of the PPP. In addition, the EU and Member States are paying polluters through

fossil fuel subsidies (FFS). In general, **environmentally harmful subsidies (EHS)** are at odds with PPP.

Stakeholders also commented on the problem of **hidden polluters** for the application of the PPP. Polluters release pollution with no current legislation and where it is difficult and costly to prove the polluter in court or that the polluter has no longer the financial strength to pay.

Findings of the public consultation

The respondents were to **various degrees familiar with the PPP**. 85 per cent of respondents (227) indicated that they were familiar with the PPP. When asked about their level of knowledge, 45% (120) of the respondents were familiar with the PPP implementation in various pieces of the EU legislation, while 21% (57) of the respondents were aware of the PPP implementation in at least one piece of the EU environmental legislation. Finally, 22% (59) of respondents were familiar with the implementation of the PPP in the national legislation.

A substantial number of respondents believed that **ensuring the implementation of the PPP was a major priority** (67%, 180) and **that it was important** (22%, 58). 85% (88) of EU citizens, 84% (21) of NGOs and 48% (51) of business entities believed that ensuring the implementation of the PPP is a major priority. Interestingly, 17% (18) of business entities thought that the implementation of the PPP was important to a limited degree.

According to many respondents, **market-based/economic instruments** (61%, 162 responses) and **command and control measures** (56%, 150) were sufficiently or fully effective for **preventing/reducing** pollution. A small number of respondents indicated that market-based/economic instruments (18%, 48) and command and control measures (15%, 38) were ineffective or insufficiently effective. The analysis of answers by groups of respondents showed that market-based/economic instruments were considered fully effective or effective by 62% (66) of business entities, 60% (63) of EU citizens and 44% (12) of NGOs. Command and control measures were considered fully effective or effective by 62% (67) of business entities, 43% (45) of EU citizens and 60% (16) of NGOs.

Similarly, over half of the respondents considered **market-based/economic instruments** (54%, 144 responses) and **command and control measures** (53%, 140) sufficiently or fully effective for **remedying** the remaining pollution. For a small number of respondents, market-based/economic instruments (19%, 49) and command and control measures (16%, 44) were ineffective or insufficiently effective. The analysis of answers by groups of respondents showed that market-based/economic instruments were considered fully effective or effective by 53% (57) of business entities, 56% (58) of EU citizens and 42% (11) of NGOs. Command and control measures were considered fully effective or effective by 53% (57) of business entities, 46% (48) of EU citizens and 60% (16) of NGOs.

More than half the respondents distinguished **three very important obstacles** to ensuring that polluters pay for the pollution they are responsible for: lack of political willingness to introduce and enforce implementation of the principle (59%, 157), the price of products and services does not fully reflect (internalise) the environmental damage (externalities) of the products and services' lifecycles (55%, 147) and national authorities fail to enforce environmental legislation and to make the polluters pay (51%, 136). The analysis revealed that the option 'lack of political willingness to introduce and enforce implementation of the principle' was considered 'very important' by 35% (37) of business entities, 76% (79) of EU citizens, and 88% (22) of NGOs. The option 'the price of products and services does not fully reflect (internalise) the environmental damage (externalities) of the products' and services' lifecycles' was considered 'very important' by 43% (46) of business entities, 39% (41) EU citizens, and 68% (17) of NGOs. Finally, the option national authorities fail to enforce

environmental legislation and to make the polluters' pay was considered 'very important' by 31% (33) of business entities, 72% (75) of EU citizens, and 52% (13) of NGOs.

Additionally, the respondents were invited to elaborate on other factors that may have hindered the effective implementation of the PPP and prevented it from meeting its objectives. The **lack of a robust definition of a polluter** was highlighted in multiple comments. The respondents highlighted that the existing definitions in various legal acts did not consider all actors responsible for the pollution and the public sector as a polluter was not sufficiently addressed. This issue prevailed in the responses of business associations and individual business companies. Various respondents, including businesses, public authorities, NGOs and EU citizens, mentioned the **'lack of implementation' of the PPP**, i.e., the lack of a joint/unified approach to the PPP implementation on the EU level, the **national PPP implementation issues**, and **implementation gaps in specific policy areas** (e.g., agriculture, textile, waste management, etc.).

What concerns costs, 61% of the respondents (161) believed that the implementation of the **PPP has not led to disproportionate costs of products and services for EU consumers**. Similarly, 56% of the respondents (149) **completely or mostly disagreed that the PPP implementation caused disproportionate costs in the production of products and provision of services by EU companies**. 40% (43) of business entities completely or mostly agreed that the PPP negatively affected the profitability and competitiveness of EU companies. However, 62% (64) of EU citizens and 44% (11) of NGOs completely or mostly disagreed that such a negative impact existed.

However, respondents were more divided on whether the implementation of the PPP caused negative effects on some social groups. A **similar number of respondents indicated that the implementation of the PPP has been to at least a certain extent** (35%, 93 responses as 'Yes' and 'In part') and **has not been** (40%, 107 responses as 'No') **to the detriment of some social groups**.

Over two-thirds of the respondents emphasised the full or sufficient PPP's contribution to the following objectives of the Green Deal: **a zero-pollution ambition for a toxic-free environment** (66%, 175), **mobilising industry for a clean and circular economy** (68%, 182) and **preserving and restoring ecosystems and biodiversity** (62%, 167). The analysis of the answers by respondent groups revealed that 54% (58) of business entities, 75% (78) of EU citizens, and 80% (19) of NGOs thought that the PPP fully or sufficiently contributed to a zero-pollution ambition for a toxic-free environment. 58% (62) of business entities, 82% (85) of EU citizens, and 64% (16) of NGOs felt that the PPP contributed to mobilising industry for a clean and circular economy. 55% (59) of business entities, 72% (75) of EU citizens, and 68% (17) of NGOs believed that the PPP contributed to preserving and restoring ecosystems and biodiversity.

The respondents had diverging opinions about the **adequacy of the EU acquis for tackling new or emerging environmental issues and changes in technology**. Forty-two per cent of respondents (112) believed that the implementation of the PPP in the EU acquis is adequate to tackle new or emerging environmental issues and changes in technology. Twenty-three per cent (62) of respondents thought the implementation of the PPP in the EU acquis was inadequate and 19% (52) were neutral. The analysis of answers by respondent groups has shown that 36% (39) of business entities felt that the implementation of the PPP in the EU acquis was adequate, while 30% (32) believed that it was inadequate to tackle new or emerging environmental issues and changes in technology. 57% (59) of EU citizens considered that the implementation of the PPP in the EU acquis was adequate and 13% (13) believed that it is inadequate. Twenty per cent (5) of NGOs thought that the implementation of the PPP in the EU acquis was adequate, while 32% (8) considered it inadequate.

Opinions of the respondents varied considering the extent to which the EU PPP requirements were implemented on the national level. 78% (207 responses) of respondents indicated that their country has implemented the PPP to a limited (51%, 135) or large extent (27%, 72) compared to 6% (15 responses) who thought that their country has not implemented the PPP in its policies at all. 37% (40) of business entities, 21% (22) of EU citizens and 4% (1) of NGOs answered that EU requirements to a large extent led their MSs to implement the PPP, while 43% (46) business entities, 57% (59) of EU citizens and 56% (14) of NGOs thought that EU requirements had a limited impact.

At the end of the questionnaire, the respondents were offered an opportunity to submit general comments and suggestions regarding the evaluation of the implementation of PPP in the EU legislation. 111 respondents (42%) submitted text to the suggestions and comments field. Of those 13 respondents directed the study team to their position papers or links to relevant academic studies, and several respondents answered that they don't have any more feedback. Main themes in the respondents' feedback included **appropriately identifying and defining the polluter, competitiveness within the EU and with non-EU countries** (mainly raised by business associations and companies), **mechanisms (e.g., green taxes, etc.) that could have been used for the PPP implementation**, **insufficient implementation of the PPP in specific sectors** (e.g., waste, water supply, textile, aviation, packaging, pharmaceuticals, transport, fishing and energy) or insufficiently addressed **types of pollution** (e.g., air pollution, noise pollution, etc.).

A total of 69 documents were received in the public consultation. **35 of them were position papers**, while the remaining 34 documents were academic articles, reports, research papers, pamphlets, brochures, or position papers not focused on the Polluter Pays Principle. Seven identical position papers were submitted by different organisations. Two position papers were received after the end of public consultation. They were not considered in the analysis but were consulted as part of evidence-collection activities.

Most position papers were submitted by **business associations (16)** and **NGOs and environmental organisations (11)**, while the lesser number of papers were by companies (5), public authorities (1), Chamber of Commerce (1), and non-EU citizens (1).

Most authors of position papers were based in Belgium (10), representing organisations and associations operating at the EU level. The remaining 25 submissions were received primarily from European countries, including Germany (5), France (4), Austria (3), Hungary (3), Italy (2), Sweden (2), the Netherlands (1) and Spain (1), while a small number of position papers were by respondents based in non-European countries, including the USA (2), Australia (1), and South Africa (1).

Position papers focused on the **issues** related to the implementation of the PPP, including specific measures & implementation requirements in certain legal acts, exemptions and derogations, diffuse pollution and legacy pollution, the granularity of the PPP-related definitions and the use of the EU and national funds. Some position papers also discussed **potential solutions** to the identified issues, including operationalisation of the PPP in the relevant legislation, improving/expanding the Extended Producer Responsibility schemes, and working on preventive measures.

Findings of the stakeholder workshops

The main topics in the discussions of both stakeholder workshops focused on the issues/gaps and solutions (instruments/measures) in the PPP implementation. The participants of both stakeholder workshops emphasised the following issues in the PPP implementation:

- **Identifying (and defining) a polluter** in the situations of legacy, chronic and diffuse pollution. According to the participants, in such cases, determining a polluter is not a straightforward and often complex process that requires clear and standardised approaches in key pieces of legislation.

- The participants of both workshops recognised that the **EU funds have been used to finance projects that should be paid for by the polluter**. At the first workshop, the stakeholders highlighted the reasons for such an issue: the limited capacity of the national competent authorities to appropriately implement the PPP, the issues of inappropriate distribution of the EU funds in shared management programmes, explicit mentioning of the PPP in the funding mechanism legislation, etc.

- **Insufficient communication and public awareness raising about the PPP**. The lack of proper communication about the rationale, objectives, and benefits of the principle has been one of the possible reasons for misunderstandings or resistance from various stakeholders.

Some of the PPP implementation issues were discussed during one of the stakeholder workshops (see the summary in Table 6-7).

Table 6-21 Other PPP issues mentioned at the workshops

4 July 2023 workshop	20 November 2023 workshop
The PPP impact on small and medium-sized enterprises (SMEs). The implementation of certain environmental regulations or sustainability practices increased costs for businesses, particularly smaller ones with limited resources or economies of scale.	**Treatment, administrative and monitoring costs have not been borne by the polluter**. From the perspective of some participants, treatment costs under water and waste legislation are often borne by operators and citizens, rather than by the polluters. Some participants provided examples of administrative costs for monitoring not borne by the polluters in ship recycling and shell farming.
Fairness and cost allocation: some stakeholders argued that imposing environmental taxes disproportionately affected certain groups or industries, placing an unfair burden on them.	**The lack of a strategic approach to the PPP**. Some participants noted that a fundamental challenge was the absence of a sense of urgency, with a lack of prioritising the collective well-being of the population and of the businesses that have clean technologies and clean ways of producing. Moreover, there has been often a focus on short-term implications, rather than on the long-term perspective.
Outdated permits granted by national authorities: an obstacle to the application of the PPP stemming from permits granted by national authorities that have been no longer aligned with current environmental standards or regulations.	**Subsidies and free allowances**. Some attendees underlined the issue of **subsidies**, e.g. fossil fuel subsidies, and **free allowances** granted under different pieces of legislation and schemes.
	Lack of application of the principle in specific areas/sectors due to gaps in legislation. Participants provided examples of sectors (drinking water supply, shellfish farming, transport, ship recycling, energy, etc.) where the PPP has not been fully or correctly applied.

While not relevant for a (backward-looking) evaluation, it must be noted that the participants of both workshops highlighted the **legal and non-legal instruments** for effective implementation of the PPP:

- **Environmental (green) taxes** were highlighted by the workshops' participants as effective and important instruments for the PPP implementation. The participants claimed that the introduction of environmental taxes or levies on polluting activities facilitates the internalisation of the costs associated with pollution, making polluters bear the financial burden of their actions. The revenue generated from these taxes

could then be used to fund environmental initiatives, promote sustainable practices, and support the transition to a greener economy.

- The participants believed that the application of **Extended Producer Responsibility (EPR)** schemes and the increase of their coverage (e.g., in terms of sectors and pollutants) could have helped define and assign responsibility to a polluter.

Some of the PPP implementation instruments/measures were discussed during one of the stakeholder workshops (see the summary in Table 6-8).

Table 6-22 Other PPP instruments/measures mentioned at the workshops

4 July 2023 workshop	20 November 2023 workshop
Redistribution of resources among citizens. According to the participants, the redistribution of resources generated through the PPP implementation (taxes and charges) would have been a way to recognise the social dimension of the PPP. This would involve directing a portion of the financial contributions received from polluters towards initiatives aimed at benefiting affected communities or financing environmental protection and restoration projects.	**Emphasis on preventive and control-at-source measures**. Such measures were seen by some participants as the most effective solution from a societal point of view (e.g. taking downstream measures such as additional drinking water treatment requires more resources and is more energy-intensive and costly than applying preventive measures).
EU-wide registry for compensation claims. Establishing an EU-wide registry for stakeholders to submit compensation claims could have improved the implementation of the PPP. This registry would serve as a centralised platform for individuals, communities, or organisations affected by pollution to seek compensation from the responsible parties.	**EU-wide database showcasing which environmental taxation**, pricing mechanisms and other instruments have been implemented or foreseen for the future in each Member State.

Findings of the stakeholder interviews

The respondents approached the **effectiveness** of the PPP from several perspectives. Some of them highlighted the developments and gaps in specific legislation, while others focused on the issues related to the implementation of the PPP.

Few interviewees provided examples where, in their opinion, the **implementation of the PPP has been improved**. These examples covered policies in the areas of cement industry, waste, and single-use plastics. Some interviewees referred **to specific gaps or lack of the application of the PPP** in specific legal acts, such as the Energy Taxation Directive, REACH, the Environmental Liability Directive, and the Water Framework Directive. Many respondents indicated **general issues**, such as identifying and defining the polluters that have affected the effectiveness of various PPP instruments and the focus of the existing PPP measures on supporting the linear business models instead of encouraging businesses to move towards sustainable and circular business models.

Furthermore, the respondents indicated sectors/policy areas where the PPP has not been (sufficiently) applied. Several sectors were mentioned by the interviewees, including **aviation, maritime shipping, drinking water, wastewater management, waste generation, agriculture and aquaculture**.

A lot of interviewees discussed the specific **PPP legal and non-legal instruments** and identified their shortcomings. Many interviewees discussed the Emission Trading System (ETS), Extended Producer Responsibility (EPR) and environmental taxes. Some interviewees

only briefly mentioned Carbon Border Adjustment Mechanism (CBAM), biodiversity offsetting and emission thresholds.

Many respondents described the **Extended Producer Responsibility (EPR)** schemes. The respondents had **mixed opinions about the effectiveness of the EPR schemes**. Some of them considered it an **effective tool** for implementing the PPP, while others had serious **doubts about its effectiveness**. According to the interviewees, the scope of EPR schemes did not cover significant polluters, the EPR fees were not sufficiently harmonised in the EU Member States, and the EPR fees were too low to cover the costs of pollution.

The **attitudes to the ETS among the respondents were mixed** with some of them positively and others – negatively evaluating this instrument. The interviewees highlighted several **constraints** of the ETS: insufficient scope of the ETS with many emitting sectors not covered, availability of free emission allowances that had not incentivised the polluters to move to sustainable business models, and the price of the emissions that had not been sufficiently high to change the polluters' behaviour.

Several respondents discussed **environmental or green taxes** in more detail. The respondents viewed environmental taxes largely positively; however, they also pointed out some of the **shortcomings that reduce their effectiveness**. According to the interviewees, the **charges applied in environmental taxes (or revenues raised from environmental taxes) have been too low** to a) encourage the transition from polluting to sustainable activities and/or b) tackle the issues of environmental pollution. Some respondents believed that **derogations and exemptions weakened the effect of taxes**.

The opinions of the interviewees concerning the **competitiveness within the EU and with non-EU countries** diverged. Although most respondents who commented about competitiveness represented business associations, their opinions varied. Some respondents believed that the existing legal and non-legal instruments ensured a level playing field, while other interviewees indicated that there were issues related to competition between the EU and non-EU economic operators and the competitiveness of sustainable businesses.

The interviewees discussed the **distributional effects of specific legal and non-legal PPP instruments**. The **areas where distributional effects were discussed** included the use of fossil fuels, transport, agriculture, pharmaceuticals, food, energy and water. Several commonly **affected audiences** usually included specific industry sectors or social groups (e.g., low-income populations). The respondents highlighted **that both positive and negative distributional effects were the outcomes of the design of environmental policies or instruments**.

Responses about the **examples of costs (or benefits) caused by economic operators** and have not been borne by them substantially varied in the level of detail. Moreover, quite many respondents were not able to answer this question. Therefore, the limited number of responses mostly covered the **drinking water and waste sector**.

According to the interviewees, the **costs of drinking water treatment have been mostly paid by consumers** but not the economic operators who caused the pollution. Costs of **quaternary treatment** of water for removing chemical pollutants (e.g., active substances in medicines, pesticides, etc.) from water were highlighted by many respondents. In addition, the respondents noted that the use of quaternary treatment caused higher consumption of energy and additional emissions.

The respondents from waste management sectors outlined two problems considering the costs that have not been borne by polluters – the **uncovered costs of particular waste**

management processes and the **low waste management charges to tackle the consequences of pollution**.

The respondents listed several **useful measures** for internalising the externalities. These included measures for **preventing pollution**, such as monitoring and reporting pollution, controlling the pollution at source, putting efforts into **calculating externalities** to ensure that the instrument covers the relevant costs and using **financial security instruments** that enable economic operators to bear the costs of environmental pollution.

Three coherence issues were prominent in the answers of the stakeholders – environmentally harmful subsidies, the use of public funds to tackle environmental pollution that should be paid for by polluters and different levels of ambition to implement the PPP in the EU Member States. The interviewees claimed that some policies in the Member States or at the EU level enabled **environmentally harmful subsidies (EHS)** that conflicted with the PPP and mentioned diverse instances of what they considered such subsidies. For instance, some of them treated subsidies to farmers under agricultural policies (especially, Common Agricultural Policy – CAP) as EHS, while others highlighted EHS in the field of energy and fossil fuels. Some respondents emphasised that the **use of EU funds (e.g., through various funding mechanisms) to cover the costs to be paid by the polluters** contradicted PPP. Finally, a few respondents highlighted that the **national policies substantially varied in the level of ambition** to implement the PPP in the EU Member States.

The respondents discussed **the emerging pollutants and pollution types that generated externalities** and elaborated on the **role of innovation and technologies** in preventing, controlling or remedying environmental pollution. The overwhelming majority of interviewees mentioned **perfluoroalkyl and polyfluoroalkyl substances** (PFAS) as (emerging) manufactured in various sectors that generated costs in preventing, reducing and eliminating environmental pollution. The main reasons for considering these substances were their **volatility, persistence in the environment and negative effects on health and the environment** coupled with their **wide use in a variety of products**. Although the respondents often recognised that the issue of PFAS was not new (to be considered emerging), they believed that the situation with the use and phase-out of PFAS was alarming.

Other topics, that emerged in several interviews included the emerging environmental issues associated with the activities in **IT, mobile communications and electronics**. According to the interviewees, their effects have been underscored. According to a few interviewees, there was **a potential pollution issue (or a threat) of mining critical raw materials in Europe** to reduce the dependency on third countries. Several respondents indicated that **plastics** in general or specific plastic materials have been problematic due to recycling issues.

Several respondents reflected on whether the instruments for implementing the PPP encouraged the use of emerging technologies and innovation for preventing, reducing and remediating environmental pollution. The opinions expressed by the interviewees **substantially varied**. Some respondents considered that **the PPP had a positive effect on the application of new technologies or innovation.** Other interviewees emphasised that the **economic feasibility of sustainable business models** was more important than the application of innovative technologies *per se*. Finally, some respondents draw attention to the **emerging risk of greenwashing** related to specific technologies (e.g., carbon capture).

Asked about the **EU added value** of the PPP, most interviewees evaluated it positively and highlighted the role of the EU in the **coordination of efforts of the Member States**, facilitating the **solution of transboundary issues** and **driving the development of the environmental policies all over the EU**. In addition, some respondents highlighted that the **EU has been extending its influence on environmental policies on a global scale**.

Recurring and diverging opinions in consultation activities

The problematic definition of **'who is the polluter' was prominent in all stakeholder consultation activities** (i.e., call for evidence, public consultation questionnaire, stakeholder workshops and interviews). The stakeholders emphasised that the definition is an important pre-requisite of the PPP implementation effectiveness.

Similarly, **the respondents of all consultation activities highlighted that the PPP has not been sufficiently implemented in some policy areas of sectors**. Typically, the stakeholders mentioned transport (especially, aviation and maritime shipping), waste management, water supply, agriculture, textile, aquaculture, and energy.

Extended Producer Responsibility (EPR) schemes were discussed as an instrument for the PPP implementation by the participants of all consultation activities. In various consultation activities, the stakeholders expressed the opinion that the scope of EPR should be expanded. While in the call for evidence, public consultation, and stakeholder workshops, the approach to EPR was largely positive, in the interviews, the opinions concerning the effectiveness of EPR diverged.

Other important PPP instruments were mentioned by stakeholders in several consultation activities. In the call for evidence and interviews, the stakeholders elaborated on the **Emission Trading Schemes (ETS)**. The respondents highlighted two limitations of ETS – insufficient scope that has not covered certain emitting sectors and free emission allowances that weakened the PPP implementation. At online workshops and in the interviews, the stakeholders discussed **environmental (green) taxes** that were viewed largely positively. The stakeholders saw the taxes as an effective means to make the polluters bear the financial burden of their actions and emphasised that the revenues generated from the taxes could be used to fund environmental initiatives. The interviewees also expressed some criticism of environmental taxes concerning low charges and derogation and exemptions.

APPENDIX 4. LIST OF REFERENCES

References have been compiled into two lists as follows:

- A4.1. General references
- A4.2. Policy references (grouped by policy, references include legislation, policy evaluation and impact assessment)

A4.1. General references

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Drinking Water Directive (EU) 2020/2184	**Legislative Text :** EUR-Lex - 32020L2184 - EN - EUR-Lex (europa.eu) **Impact Assessment References:** European Commission (2017). Impact Assessment Accompying the document Proposal for a Directive of the European Parliament and of the Council on the quality of water intended for human consumption (SWD(2017)449), available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52017SC0449 European Commission (2016). Study supporting the revision of the EU drinking water directive: Final impact assessment report (November 2016). Available at: https://op.europa.eu/en/publication-detail/-/publication/9f2d594a-1832-11e7-808e-01aa75ed71a1 **Evaluation References:** European Commission (2019). Water FD (SWD(2019)439) (Fitness Check, relevant to the Urban Waste Water Treatment Directive, the Drinking Water Directive, Floods Directive, Pesticides Directive, the Nitrates Directive), available at: https://commission.europa.eu/publications/fitness-check-water-framework-directive-and-floods-directive_en European Commission (2016). REFIT EVALUATION of the Drinking Water Directive 98/83/EC (SWD(2016)428), available at: https://circabc.europa.eu/ui/group/1c566741-ee2f-41e7-a915-7bd88bae7c03/library/50e4411d-7198-4ea2-ad93-4ab568c52b37/details?download=true European Commission (2016). Study supporting the revision of the EU Drinking Water Directive. (May 2016) Available at: https://op.europa.eu/en/publication-detail/-/publication/74eb5932-4cbd-11e7-a5ca-01aa75ed71a1/language-en/format-PDF/source-search
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Renewable Energy Directive 2018/2001/EU	**Legislative Text :** EUR-Lex - 32018L2001 - EN - EUR-Lex (europa.eu) **Impact Assessment References:** European Commission (2021). Proposal for a Directive amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 (SWD(2021)620), available at: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=SWD:2021:620:FIN **Implementation Assessment References:** European Commission (2021). Technical support for RES policy development and implementation: delivering on an increased ambition through energy system integration. Available at: https://op.europa.eu/en/publication-detail/-/publication/6fcc38cb-1440-11ec-b4fe-01aa75ed71a1/language-en
Ecodesign Directive 2009/125/EC	**Legislative Text :** EUR-Lex - 32009L0125 - EN - EUR-Lex (europa.eu) **Impact Assessment References:**

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Ecolabel	**Legislative Text:** EU Ecolabel - Home (europa.eu)
Waste and Recycling (including plastics)	
Batteries Directive 2006/66/EC	**Legislative Text :** EUR-Lex - 32006L0066 - EN - EUR-Lex (europa.eu) **Impact Assessment References:** European Commission (2020). Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation (EU) 2019/1020 (SWD/2020/335), available here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD:2020:335:FIN **Evaluation References:** European Commission (2019). Evaluation of the Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (SWD(2019)1300), available at: https://circabc.europa.eu/ui/group/636f928d-2669-41d3-83db-093e90ca93a2/library/801140f7-5bd7-405f-b5fb-1a41571f4783/details?download=true **Implementation Assessment References:** European Commission (2019). Report on the implementation and the impact on the environment and the functioning of the internal market of Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (COM/2019/166), available at: https://eur-lex.europa.eu/legal-content/AUTO/?uri=CELEX:52019DC0166&qid=1676378260496&rid=4

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End of life Vehicles Directive 2000/53/EC	**Legislative Text :** EUR-Lex - 32000L0053 - EN - EUR-Lex (europa.eu) **Impact Assessment References:** European Commission (2020). Inception Impact assessment for a revision of the End of life Vehicles Directive, available here: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12633-End-of-life-vehicles-revision-of-EU-rules_en **Evaluation References:** European Commission (2021). Commission Staff Working Document Evaluation of Directive (EC) 2000/53 of 18 September 2000 on end-of-life vehicles (SWD/2021/0060), available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021SC0060&qid=1676376824206 **Implementation Assessment References:** European Commission (2020). Report on the Implementation of Directive 2000/53/EC on End-of-Life Vehicles for the Period 2014-2017 (COM/2020/33), available at: https://eur-lex.europa.eu/legal-content/AUTO/?uri=CELEX:52020DC0033&qid=1676376824206&rid=5 European Commission (2017). Report on the Implementation of Directive 2000/53/EC on End-of-Life Vehicles for the periods 2008-2011 and 2011-2014 (COM/2017/098), available at: https://eur-lex.europa.eu/legal-content/AUTO/?uri=CELEX:52017DC0098&qid=1676376824206&rid=9 European Commission (2009). Report on the Implementation of Directive 2000/53/EC on End-of-Life Vehicles for the periods 2005-2008 (COM/2009/0635), available at: https://eur-lex.europa.eu/legal-content/AUTO/?uri=CELEX:52009DC0635&qid=1676376824206&rid=15
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