OECD Environment Working Papers No. 232

# Environmental domain tagging in the OECD PINE database

**Bopha Chhun,**

**Deepika Sehdev,**

**Amy Cano Prentice,**

**Miguel Cárdenas Rodríguez,**

**Ivan Haščič**

https://dx.doi.org/10.1787/be984b0a-en

OECD

Organisation for Economic Co-operation and Development

ENV/WKP(2024)2

Unclassified

English - Or. English

15 March 2024

ENVIRONMENT DIRECTORATE

# Environmental domain tagging in the OECD PINE database

## Environment Working Paper No. 232

By Bopha Chhun (1), Deepika Sehdev (1), Amy Cano Prentice (1), Miguel Cárdenas Rodríguez (1), Ivan Haščič (1)

(1) OECD Environment Directorate



Authorised for publication by Mathilde Mesnard, Deputy Director, Environment Directorate.

Keywords: environmental policy, environmental protection, natural resource management, market-based instruments, taxes, fees, tradable permits, deposit-refund schemes, subsidies, voluntary approaches

JEL codes: H25, H27, H71, H72, P48, Q1, Q2, Q3, Q4, Q5, R48

Bopha Chhun (bopha.chhun@oecd.org)

JT03539529

**OECD ENVIRONMENT WORKING PAPERS**

Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the author(s). Working Papers describe preliminary results or research in progress by the author(s) and are published to stimulate discussion on a broad range of issues on which the OECD works.

This series is designed to make available to a wider readership selected studies on environmental issues prepared for use within the OECD. Authorship is usually collective, but principal author(s) are named. The papers are generally available only in their original language – English or French – with a summary in the other language. Comments on Working Papers are welcomed, and may be sent to:

OECD Environment Directorate
2 rue André-Pascal, 75775 Paris Cedex 16, France
or by email: *env.contact@oecd.org*

---

OECD Environment Working Papers are published on
www.oecd.org/environment/workingpapers.htm

---

# Abstract

This paper presents tagging methodologies for 22 environmental domains in the OECD Policy INstruments for the Environment (PINE) database, including seven domains on environmental protection (air pollution, water pollution, soil pollution, solid waste, ozone layer, noise and radiation), six domains on natural resource management (fisheries, forests, freshwater, renewable energy, fossil fuels and minerals) and nine cross-cutting domains (climate change mitigation, climate change adaptation, land degradation, biodiversity, ocean, chemicals management, energy efficiency, circular economy and mercury). The environmental domains in the PINE database support tracking progress towards domestic and international environmental objectives. Tagging environmental domains allows harmonised comparisons across countries, years and policy instrument types.

*Keywords*: environmental policy, environmental protection, natural resource management, market-based instruments, taxes, fees, tradable permits, deposit-refund schemes, subsidies, voluntary approaches

*JEL Classification*: H25, H27, H71, H72, P48, Q1, Q2, Q3, Q4, Q5, R48

# Résumé

Ce document présente des méthodologies d'étiquetage pour 22 domaines environnementaux, dont sept ont trait à la protection de l'environnement (pollution de l'air, pollution de l'eau, pollution des sols, déchets solides, couche d'ozone, bruit et rayonnements), six à la gestion des ressources naturelles (ressources halieutiques, forêts, eau douce, énergies renouvelables, combustibles fossiles et ressources minérales) et neuf à des problématiques transversales (atténuation du changement climatique, adaptation au changement climatique, dégradation des terres, biodiversité, océan, gestion des produits chimiques, efficacité énergétique, économie circulaire et mercure). Les domaines environnementaux de la base de données de l'OCDE sur les instruments d'action dans le domaine de l'environnement aident à suivre les progrès vers la réalisation des objectifs environnementaux nationaux et internationaux. L'étiquetage des domaines environnementaux permet des comparaisons harmonisées entre les pays, les années et les types de leviers d'action.

*Mots-clés* : politique environnementale, protection de l'environnement, gestion des ressources naturelles, instruments fondés sur le marché, taxes, redevances, permis négociables, systèmes de dépôt-remboursement, subventions, approches volontaires

*Classification JEL* : H25, H27, H71, H72, P48, Q1, Q2, Q3, Q4, Q5, R48.

# Acknowledgements

This paper was reviewed by the Working Party on Environmental Information (WPEI). It also benefitted from comments by other OECD bodies, including the Working Party on Biodiversity, Water and Ecosystems (on biodiversity and ocean domains) and the Working Party on Risk Management (on chemicals management domain).

The paper was drafted by Bopha Chhun, Deepika Sehdev, Amy Cano Prentice, Miguel Cárdenas Rodríguez and Ivan Haščič, under the supervision of Nathalie Girouard, Head of Environmental Performance and Information Division of the OECD Environment Directorate. Lydia Servant, Gabriella Scaduto-Mendola and Natasha Cline-Thomas prepared the paper for publication.

The authors would like to thank experts in the OECD Secretariat for providing valuable comments on a previous version of the paper, including Aimée Aguilar Jaber, Nils Axel Braathen, Peter Börkey, Andrew Brown, Bob Diderich, Maarten Dubois, Catherine Gamper, Katia Karousakis, Elisa Lanzi, Frithjof Laubinger, Eeva Leinala, Florian Mante, Roger Martini, Maeve Masterson, Mark Mateo, Mauro Migotto, Daniel Nachtigall, Alicia Nitsch, Edward Perry, Mikaela Rambali, Will Symes and Shunta Yamaguchi.

# Table of contents

## Tables

## Figures

# Executive summary

Identifying and understanding the environmental policy choices by countries is essential to track efforts towards meeting domestic and global environmental objectives. As economic instruments for environmental protection and natural resource management have become more prominent and more complex over time[1], the measurement and data collection on environmental policies require clear definitions as well as efficient and replicable methodologies.

In an effort to respond to evolving policy priorities, this document presents a methodology to tag policy instruments in the OECD PINE database into a set of 22 environmental domains, including seven domains on environmental protection (air pollution, water pollution, soil pollution, solid waste, ozone layer, noise and radiation), six domains on natural resource management (fisheries, forests, freshwater, renewable energy, fossil fuels and minerals) and nine cross-cutting domains (climate change mitigation, climate change adaptation, land degradation, biodiversity, ocean, chemicals management, energy efficiency, circular economy and mercury).

Environmental domains represent the focal issues (environmental externalities or natural resources) covered by a policy instrument. Defining how a policy relates to an environmental domain is challenging because definitions may need to evolve over time to adequately reflect the underlying activities and products affected by the policy change. The tagging methodology developed here is transparent and flexible enough to allow reflecting such evolutions over time as it permits to easily review and update the methodology, re-tag policy instruments, and generate new historic data series.

Policy instruments can have both direct and indirect effects on environmental domains; however, only the domain(s) on which the instrument has a direct effect are tagged in the PINE database. Acknowledging that virtually every other domain could be indirectly related through potential impacts in the long-run, the tagging into domains is most valuable if used only in a narrow sense, i.e. direct short-run impacts. Note that a single instrument can be tagged in multiple domains; for example, a landfill tax would have both solid waste and circular economy domains are tagged.

The methodology for tagging environmental domains is in line with previous OECD efforts to identify environment-related instruments in government statistics. First, the definition of each domain is based on international classifications and a review of literature and experience from similar tagging or classification initiatives. Second, the scope of each domain is outlined with a set of inclusion and exclusion criteria. The criteria are developed by specifying the types of activities deemed to have a direct effect on the domain, and describing how these activities may relate to the policy instruments in scope of the database. The objective of the criteria is to specify clear, detailed and transparent rules to determine if an activity has a direct impact on a domain, and provide real-world examples of policy instruments which target the activity. Third, a keyword search is conducted through multiple characteristics of the policy instruments in the PINE database. The objective is to identify the instruments that are potentially relevant to the definition and scope of the domain. Finally, the subset of candidate instruments identified through the keyword search are subjected to an individual review to verify the compliance with the definition and scope of each domain.

[1] For example, Nachtigall, D.,et al. (2022) develop a measurement framework and a harmonised database for tracking climate change mitigation policies, built in part from information on market-based instruments from the PINE database. It finds that countries have strengthened their climate action between 2000 and 2020 in terms of the number and types of policies adopted, as well as their stringency.

The implementation of the tagging methodology on the June 2023 version of the PINE database shows that policy instruments on cross-cutting environmental domains are the most common, followed by environmental protection and natural resource management. Climate change mitigation and circular economy account for the bulk of the instruments in PINE. This is due to the extensive nature of the causes and consequences of these environmental issues and the multiple policy options used to tackle them. Further, the number of countries implementing environmental protection policies has substantially increased. Across the PINE database, most countries have Air pollution-relevant policy instruments in place, followed by Solid waste-relevant instruments, and pollution-relevant instruments. Finally, there has been a significant rise in the adoption of natural resource management policy instruments which target the environmental domains of fossil fuels and renewable energy.

The environmental domain tagging is directly relevant for multiple Sustainable Development Goals of the 2030 United Nations Agenda for Sustainable Development, as well as numerous multilateral environmental agreements, such as the 2015 Sendai Framework for Disaster Risk Reduction or the 2015 Paris Agreement on Climate Change. This paper presents an overview of the main linkages of the environmental domains in the PINE database with the international policy agenda.

Looking forward, harmonised, and comparable data on policy instruments by environmental domain will enrich the messages regarding policy options to address environmental externalities. The OECD PINE database and indicators derived using this tagging methodology could support the evidence-based policy analysis in OECD country studies such as Environmental Performance Reviews and Economic Surveys, and serve as a reference data source for conducting quantitative research on environmental policy design and effectiveness.

# 1. Introduction

The OECD Policy INstruments for the Environment (PINE) database is a comprehensive and structured repository of detailed information on over 4000 policy instruments in 125 countries (http://oe.cd/pine). The database is part of OECD's foundational work on environmental information. Its structured data allow harmonised comparisons across countries, policy instrument types, and over time, and contribute to the construction of comparable environmental policy indicators (e.g. Environmentally Related Tax Revenue, the Climate Actions and Policies Measurement Framework, the Environmental Policy Stringency Index). The database also supports the evidence-based policy analysis in OECD country studies such as Environmental Performance Reviews and Economic Surveys, and it is also a reference data source for conducting quantitative research on environmental policy design and effectiveness.

Identifying and understanding the environmental policy choices by countries is essential to track efforts towards meeting domestic and global environmental objectives. As economic instruments for environmental protection and natural resource management have become more prominent and more complex over time[2], the measurement and data collection on environmental policies require clear definitions as well as efficient and replicable methodologies. In an effort to respond to evolving policy priorities, this document presents a methodology to tag policy instruments in the OECD PINE database into a set of 22 domains, including seven domains on environmental protection, six domains on natural resource management, and nine domains which cut across both environmental protection and natural resource management.

Environmental domains represent the focal issues (environmental externalities or natural resources) covered by a policy instrument. Defining how a policy relates to an environmental domain is challenging because definitions may need to evolve over time to adequately reflect the underlying activities and products affected by the policy change. For example, nowadays a tax on electricity consumption is considered as relevant for tackling climate change, since electricity is generally produced from fossil fuels; however, this perspective might evolve as countries progress in the transition to low-carbon energy sources for electricity production. The tagging methodology developed here is transparent and flexible enough to allow reflecting such evolutions over time as it permits to easily review and update the methodology, re-tag policy instruments, and generate new historic data series.

Policy instruments can have both direct and indirect effects on environmental domains; however, only the domain(s) on which the instrument has a direct effect are tagged in the PINE database. For example, landfill taxes have a direct effect on solid waste and circular economy, although they may also have an indirect effect on climate change through the reduction of methane emissions. In this case, only the solid waste and circular economy domains are tagged. Acknowledging that virtually every other domain could be indirectly related through potential impacts in the long-run, the tagging into domains is most valuable if used only in a narrow sense, i.e. direct short-run impacts. Note that a single instrument can be tagged in multiple domains; in the above example, both solid waste and circular economy domains are tagged.

Importantly, it is the (dis-)incentivised activity or product which allow to assess whether a policy instrument has a direct impact on an environmental domain; in contrast, characteristics such as the name, the stated purpose, motivation, or intent of a policy instrument are irrelevant in this respect. On the one hand, there can be some policy instruments introduced with a stated environmental motivation and sometimes officially

[2] For example, Nachtigall, D.,et al. (2022) develops a measurement framework and a harmonised database for tracking climate change mitigation policies, built in part from information on market-based instruments from the PINE database. It finds that countries have strengthened their climate action between 2000 and 2020 in terms of the number and types of policies adopted, as well as their stringency.

labelled “green”, but which, ultimately, are general instruments that do not differentiate by any environmental characteristic. On the other hand, there are instruments introduced for pure fiscal purposes (e.g. some transport taxes) where the stated motivation is not environmental and they nevertheless disincentivise environmentally harmful production or consumption. For example, in the case of taxes it is the tax base (e.g. purchase of fuel) that will determine the relevant domain, irrespective of whether the tax was initially introduced to generate revenue or for another reason, and irrespective of the official name given to the policy instrument.

The OECD PINE database allows to identify and track the policies implemented to achieve domestic and international environmental objectives. In particular, the environmental domain tagging is directly relevant for multiple Sustainable Development Goals of the 2030 United Nations Agenda for Sustainable Development, as well as numerous multilateral environmental agreements, such as the 2015 Sendai Framework for Disaster Risk Reduction or the 2015 Paris Agreement on Climate Change. Table 1 presents an overview of the main linkages of the environmental domains in the PINE database with the international policy agenda.

The remainder of this paper develops a methodology to identify and tag policy instruments in the PINE database across a set of 22 domains. Finally, a mapping of the domains to the (proposed) international Classification of Environmental Functions is presented in Annex A, and the extended lists of environmentally harmful and less environmentally harmful bases are presented in Annex B.

## Table 1. Environmental domains and the international environmental policy agenda

| | *Domains in the PINE database* | *Sustainable Development Goals* | *Multilateral Environmental Agreements* |
|---|---|---|---|
| **Environmental protection** | Air pollution | SDG 11 on air quality in cities<br>SDG 3 on good health and well-being | 1979 Geneva Convention on Long-Range Transboundary Air Pollution (LRTAP) |
| | Water pollution | SDG 6 on monitoring water and sanitation related issues<br>SDG 14 on the oceans | 1992 The Convention on the Protection and Use of Transboundary Watercourses and International Lakes |
| | Soil pollution | SDG 2 on food security<br>SDG 13 on climate resilience<br>SDG 15 on terrestrial ecosystems | 1994 Convention to Combat Desertification (UNCCD) |
| | Solid waste | SDG 12 sustainable production and consumption | 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal |
| | Ozone layer | SDG 3 on good health and well-being<br>SDG 12 sustainable prod. And cons.<br>SDG 13 climate action | 1987 Montreal Protocol on Substances that Deplete the Ozone Layer |
| | Noise | SDG 11 on sustainable cities and communities | 1983 Convention on Migratory Species |
| | Radiation | SDG 3 on good health and well-being<br>SDG 14 on the ocean<br>SDG 15 on life on land<br>SDG 17 on partnership for goals | Scientific Committee, United Nations Scientific Committee on the Effects of Atomic Radiation |
| **Natural resource management** | Fisheries | SDG 14 on the ocean | 1982 United Nations Convention on the Law of the Sea (UNCLOS)<br>1992 Convention on Biological Diversity<br>1995 United Nations Fish Stock Agreement |
| | Forests | SDG 15 on sustainable forest management | 1992 Convention on Biological Diversity (CBD)<br>1994 Convention to Combat Desertification (UNCCD) |
| | Freshwater | SDG 6 on water quality and availability | 1992 Convention on the Protection and Use of Transboundary Watercourses |
| | Renewable energy | SDG 7 on affordable clean energy | 2015 Paris Agreement |
| | Fossil fuels | SDG 12 sustainable production and consumption | 2015 Paris Agreement |
| | Minerals | SDG 12 sustainable production and consumption | 2019 Mineral Resource Governance |
| **Cross-cutting domains** | Climate change mitigation | SDG 13 on climate action | 1992 Framework Convention on Climate Change (UNFCCC)<br>2015 Paris Agreement |
| | Climate change adaptation | SDG 13 on climate action | 2015 Paris Agreement<br>2015 Sendai Framework for Disaster Risk Reduction |
| | Land degradation | SDG 15 on life on land | 1994 Convention to Combat Desertification (UNCCD) |
| | Biodiversity | SDG 14 and 15 on marine and terrestrial biodiversity | 1992 Convention on Biological Diversity (CBD) |
| | Ocean | SDG 14 on the ocean | 1992 Convention on Biological Diversity (CBD)<br>1994 United Nations Convention on the Law of the Sea |
| | Chemicals management | SDG 12 sustainable production and consumption<br>SDG 3 on health and well-being | 1989 Basel Convention on Hazardous Wastes<br>1998 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade<br>2001 Stockholm Convention on POPs<br>2006 Strategic Approach to International Chemicals Management (SAICM)<br>2013 Minimata Convention on Mercury |
| | Energy efficiency | SDG 7 on affordable clean energy | 2015 Paris Agreement |
| | Circular economy | SDG 8 on decent work and economic growth<br>SDG 12 on sustainable production and consumption<br>SDG 13 on climate action | 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal |
| | Mercury | SDG 2 to improve nutrition and sustainable agriculture<br>SDG 3 to promote healthy lives and well-being<br>SDG 14 on the ocean | 2013 UN Minamata Convention on Mercury |

# 2. Tagging methodology

## General approach

The methodology for tagging environmental domains is in line with previous OECD efforts to identify environment-related instruments in government statistics (OECD, 2020a[1]) (OECD, 2022b[2])]. The methodology can be described as follows:

First, the **definition** of each domain is characterised based on (i) international classifications such as the System of Environmental Economic Accounting – Central Framework (SEEA-CF) (SEEA, 2014[3]), the Classification of Environmental Protection Activities and Expenditure (CEPA), the Classification of Resource Management Activities (CReMA) (Eurostat, 2020[4]); and (ii) a review of literature and experience from similar tagging or classification initiatives, incl. (OECD, 2010[5]); (EEA, 2019b[6]); (Eurostat, 2013[7]) and (2009[8]); (RECARE, 2018[9]); (UNEP, 2015[10]); (Eurostat, Forthcoming-a[11]).

The definitions of environmental domains in the PINE database are broadly aligned with similar international classification systems[3]. Nevertheless, the type and objectives of domain tagging in the PINE database are fundamentally different. First, PINE database tags policy instruments by the environmental externalities that the instrument addresses (e.g. air *pollution*, water *pollution*), while other international classification systems often classify environmental functions within an economy (e.g. air *emissions*, *wastewater* management). In fact, there is a direct correspondence between PINE domains and other classification systems where the notions come closest (e.g. noise, radiation). Second, PINE domains respond to demands to track progress towards domestic and international environmental policy objectives and this is reflected, in particular, in the cross-cutting domains (e.g. climate change mitigation, circular economy). Finally, the domains in the PINE database are not mutually exclusive (i.e. they are a tag), while classification systems such as CEPA or CReMA are intended as mutually exclusive.

Second, the **scope** of each domain is outlined with a set of inclusion and exclusion criteria. The criteria are developed by specifying the types of activities deemed to have a direct effect on the domain, and describing how these activities may relate to the policy instruments in scope of the database. The objective of the criteria is to specify clear, detailed and transparent rules to determine if an activity has a direct impact on a domain, and provide real-world examples of policy instruments which target the activity.

Third, a **keyword search** is conducted through multiple characteristics of the policy instruments in the PINE database. The objective is to identify the instruments that are potentially relevant to the definition and scope of the domain. The list of keywords are developed by drawing on the resources used to characterise definitions and the inclusion criteria, complemented with expert consultations. The keyword list is further refined, based on multiple search iterations through the database, to maximise the screening of relevant instruments (i.e. true positives), and minimise the number of relevant instruments left unselected (i.e. false negatives) or irrelevant instruments selected (i.e. false positives). The search is conducted through multiple attributes such as names, descriptions, definitions and the provisions of the instrument, including all its exemptions and sub-schemes (e.g. tax-bases). Note that generic keywords such as “environment”, “sustainability” or “ecological” are not needed because the PINE database includes, by definition, only environment-related policy instruments.

Finally, the subset of candidate instruments identified through the keyword search are subjected to an **individual review** to verify the compliance with the definition and scope of each domain. This individual

[3] Annex Table A.1 presents a mapping of the scope of PINE domains to the proposed Classification of Environmental Functions (CEF).

review serves to cross-check the application of the inclusion and exclusion criteria and review borderline cases. The application of this tagging methodology to each environmental domain is detailed below.

***Caveats***

Note that the policy scope of the OECD PINE database determines the sample of instruments analysed and tagged, and it influences the scope of individual domains. First, PINE currently collects information on five types of market-based (or "economic") policy instruments. These are taxes and fees, subsidies and payments, tradable permits and offsets, deposit-refund schemes, and voluntary approaches (OECD, 2016a[12]). As such, non-market-based instruments such as technology standards, performance standards, or information-based measures, which are relevant for some domains, are currently not in scope of the database and are not reflected in the examples or instrument characteristics provided below.

Further, the thematic scope of the PINE database is limited to those instruments which provide disincentives for environmentally harmful activities or incentives for less environmentally harmful activities[4]. For example, taxes on fossil fuel-based production and consumption are included in PINE, while subsidies for these activities are out of the scope of the database[5]. This has implications for the tagging methodologies. It also frames the natural resource management domains which cover both (i) sustainable management of natural resources such as 'natural' forests or wild fisheries, but also (ii) environmental externalities potentially arising from the production of related 'cultivated' biological assets (e.g. timber from planted forests, fish production from aquaculture) insofar the policy instrument incentivises less environmentally harmful production modes.

[4] A list of tax bases, subsidy bases and other policy instrument bases is available in Annex B.

[5] Such instruments are covered by other OECD work, incl. the OECD Fossil Fuel Support Inventory or OECD work on biodiversity harmful subsidies.

## 2.1 Environmental protection

### *2.1.1 Air pollution*

Air pollution is, in the words of the World Health Organization (WHO), "the world's largest single environmental health risk", as it is a major risk factor in several diseases leading to disabilities and deaths, claiming an estimated annual toll of 7.6% of all deaths in 2016 (WHO, 2018b[13]). Efforts to combat air pollution respond to several SDGs (notably, SDG 3 on health and well-being and SDG 11.6 on air quality in cities), as well as the goals set out in the 1979 Geneva Convention on Long-range Transboundary Air Pollution and its subsequent Protocols.

Common air pollution mitigation strategies include reduction of emissions into air (e.g. fuel-efficient technologies, scrubbers for fuel combustion), control and monitoring of emissions, and reduction or limiting of activities causing air pollution (e.g. road transportation, and structural changes in the economy more generally). Keywords used for screening candidates for tagging air pollution-related instruments are presented in Table 2

**Table 2. Keywords to identify a candidate subset of air pollution-related instruments**

| |
|---|
| monitoring equipment, air-handling equipment, dust collectors, separators, precipitator, |
| catalytic, filter, scrubber, cyclone, centrifuge, cooler, condenser, odour control equipment, thermal, |
| air pollution, air quality, airplane, aviation, departure, flight, air ticket, charter, travel, $SO_x$, $SO_2$, $NO_x$, PM*, particulate, VOC, volatile organic compound, traffic, congestion, highway, road use, road tax, passenger, electricity, ammonia, desulph*, flue gas, pollut*, mercury, selenium, arsenic, sulphur, sulfur, stationary, nitrogen, oxide, exhaust, combustion, fuel, diesel, LPG, LNG, natural gas, petrol, kerosen*, motor spirit, mineral oil, coal, smokestack, stack, incinerator, |
| ambient, clean air, electric vehicle, bicycle, public transport, charging infrastructure, walking. |

Note: Certain keywords are excluded from the automated search as they yield many false positives. A wildcard (*) allows any series of characters to follow the keyword.

The candidate instruments identified through the keyword search are then individually reviewed to verify that they meet one of the following criteria. The instruments are **included** as relevant to air pollution if they are directed at:

a) Preventing and controlling the release of air pollutant emissions (e.g. sulphur dioxide, nitrogen oxides, carbon monoxide, ground-level ozone, non-methane volatile organic compounds) and particulate matter from production processes (e.g. fuel combustion for power/electricity generation, industrial boilers and processes, improving air-tightness) and air polluting activities (e.g. minimising traffic congestion, minimising air travelling).

b) Installation and maintenance of equipment/facilities for air pollution control and treatment in mobile and stationary sources, including integrated solutions (e.g. improved combustion), end-of-pipe equipment (e.g. catalytic converters, scrubbers, exhaust gas and air treatment) and product design (e.g. light-weighting, reduced air resistance).

c) Limiting or reducing the use of fossil fuels in mobile or stationary sources, incl. in heating and cooking, or policy differentiation according to the air emissions or energy efficiency of the source (e.g. emission-differentiated instruments on the ownership or registration of motor vehicles, motor fuel (see also 2.2.5 Fossil fuels for additional tags).

d) Other product or process substitution: e.g. less air-polluting fuels (biogas from waste), less air-polluting transport modes (low-emission and electric vehicles, bicycles, walking) (see 2.3.1 Climate change mitigation for additional tags, substitutes of chlorofluorocarbons (CFC).

e) Development of (sub)urban green spaces and public parks (e.g., reduced urban heat causing less ozone pollution).

f) Emissions reductions in general, even if they also include $CO_2$ and GHGs.

g) Research and development, information, training and education activities and measures aimed at reducing or limiting of activities causing air pollution (e.g. assessment, evaluation and planning; management, training, information on air emissions, emission monitoring, services for measurement of exhaust gases (e.g. from vehicles, heating systems, power generation).

The tagging strategy is further refined by **excluding** candidate instruments if they target:

a) Activities for the prevention or minimisation of emissions of greenhouse gases which are not directly abating air pollutants (see 2.3.1 Climate change mitigation).

b) Transport equipment and infrastructure, such as emission-undifferentiated instruments levied on the *ownership* of motor vehicles (incl. also maritime transportation and aviation), as opposed to the *use* of motor vehicles. While the use of motor vehicles has a direct effect on air pollution, the effect of vehicle *ownership* is mostly indirect (see 2.3.8 Circular economy).

c) Instruments in the transport sector are also excluded in cases where rates are not differentiated according to the pollutant emissions or energy efficiency of the vehicle.

Finally, resulting from this two-step process Table 2 presents selected examples of policy instruments tagged in the air pollution domain.

### Table 2. Examples of air pollution-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets |
|---|---|---|---|
| $SO_2$ and $NO_X$ pollution tax (Italy) | Air emissions charge (Montenegro) | Environmental Pollution Prevention Fund (Türkiye) | Clean Air Interstate Rule - $SO_2$ and $NO_X$ allowance trading (United States) |
| Tax on emissions from stationary sources (Chile) | Emission landing charges for air planes (Sweden) | Grants for cleaner production technologies (Cyprus) | $NO_X$ emissions trading (Netherlands) |
| Individual consumption tax on passenger vehicles (Korea) | Charge on air pollution (Türkiye) | Jawaharlal Nehru National Solar Mission (India) | Transferable consumption allowances for degreasing solvents (Canada) |
| Excise tax on petroleum products (Seychelles) | Air emission non-compliance fees (Romania) | Loans for pollution control (Japan) | Control of VOC and $NO_X$ emissions (Basel Kanton, Switzerland) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage.

### *2.1.2 Water pollution*

Poor water quality, results in a reduction of the quantity of usable water to support human well-being and the natural ecosystem (OECD, 2017[14]). Water pollution policy instruments can help protect the degradation of water ecosystems (both inland and marine) and minimise (or significantly reduce) the different streams of pollution into water bodies.

The data collected is directly relevant to SDG 6 in monitoring water and sanitation related issues, including the target 6.3 dedicated to improving water quality by reducing pollution. It also readily contributes to track the progress on other SDG targets, such as 14.1 and 14.2 on sustainably managing and protecting the marine and coastal ecosystems through the prevention and reduction of marine pollution of all kinds, and 15.1 on ensuring the conservation and restoration of terrestrial and inland freshwater ecosystems and their services. Equally important, it is relevant to the 1992 Convention on the Protection and Use of Transboundary Watercourses, which promotes the protection, control, and reduction of transboundary impacts of water pollution on watercourse and international lakes.

Water pollution can arise from several different sources which discharge polluting substances into water bodies (groundwater, surface water, and the ocean). In the PINE database, water pollution instruments incentivise the prevention and reduction of pollutant emissions from entering water bodies; the collection and treatment of wastewater; and the protection of water bodies to avoid water quality deterioration. Table 4 lists the keywords used to screen potential candidates.

**Table 4. Keywords to identify a candidate subset of water pollution-related instruments**

| |
|---|
| buffer, catchment, coastal, quality, vegetative, septic, wastewater, emissions to water, water pollution, water protection, water quality, water treatment, watershed, spill, leak, runoff, |
| agrochemical, agrichemical, animal waste, biosolid, biological oxygen demand, BOD, black spot, brownfields, chemical oxygen demand, COD, contamin*, discharge, drainage, effluent, fertili*, fluid waste, heavy metal, leak, liquid waste, waste water, livestock, marine pollution, manure, nitrate, nitrogen, nutrient, polychlorinated biphenyls, PCB, pesticide, pharmaceutical, phosphorus, sewage, sewer, sludge, slurry, SOx, spill, leak, runoff, open pit, mining, quarr*, extraction, |
| environmentally friendly farming, environmentally friendly product, plant protection product, |
| acidification, eutrophication, sanit*, salin* |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g. abstraction, air pollution, bodies, code.

Instruments are **included** in water pollution tag if they are relevant to:

a) Measures aimed at the reduction of effluent discharges into bodies of water from establishments and households, as a result of production, consumption and accumulation from:
   - conventional water pollutants (e.g. nitrogen and phosphorus compounds, nutrient discharge), which can lead to increased levels of chemical oxygen demand (COD) and biological oxygen demand (BOD).
   - toxic water pollutants: heavy metals (e.g., from open pit mining operations), persistent chemicals (e.g., polychlorinated biphenyls (PCB)), residues of pesticides and pharmaceuticals, other harmful substances (see also 2.1.3 Soil pollution for additional domain tags).

b) Preventing and eliminating pollutant substances from entering bodies of water through physical activities (e.g., installation of catchment for run-offs or leaks, pollution control facilities, vegetative filter techniques, transportation of pollutant products, drainage management, sewerage network operation), or through nature-based solutions (e.g., buffer zones to prevent animal manure from entering water streams).

c) Cleaning up of water bodies and soils by reducing the quantity of pollutants at the polluted location, e.g., cleaning up of surface water or coastal areas following oil or chemical spills (see also 2.1.3 Soil pollution for additional domain tags).

d) Activities aimed at the collection, sanitation and treatment of wastewater, e.g. the physical or biological treatment to eliminate pollution, septic tank maintenance, treatment of sewage sludge for disposal, trade effluent discharge, after-use treatment of cooling water for discharging into the environment (see 2.2.3 Freshwater for intake of water used for industrial processes), and improvements of technical equipment for water treatment.

e) Addressing acidification and salinisation from degrading water supplies and/or water resources, e.g. improve soil water management, changes in irrigation practices, actions to raise or lower groundwater tables (see also 2.1.3 Soil pollution and 2.2.3 Freshwater for additional domain tags).

f) Monitoring the quality and pollution of water bodies and assessing the level of risks to support protection and remediation interventions.

g) Research and development, information, training and education activities and measures on the prevention and reduction of pollutant emissions (e.g., research and development on new prevention or cleaning technologies for soil or water pollution).

Candidate instruments are **excluded** from the tag if they target:

a) Management of industrial and consumer product disposal and of hazardous/toxic waste (see 2.1.4 Solid waste or 2.3.6 Chemicals management).

b) Activities and measures aimed at the abstraction of water (see 2.2.3 Freshwater).

c) Activities and measures aimed to reduce (exclusively) air emissions (see 2.1.1 Air pollution).

Examples of different types of policy instruments tagged in the water pollution domain are shown in Table 5.

### Table 5. Examples of water pollution-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Deposit-refund schemes | Voluntary approaches |
|---|---|---|---|---|---|
| Water pollution non-compliance fees for total phosphorus discharges without permit (Estonia) | Water protection charge from Sulphates (Montenegro) | Accelerated depreciation for investments in air and water pollution abatement (Finland) | Hunter River Salinity Trading Scheme (Australia) | Deposit-refund system for containers of pesticides for restricted use (United States) | Covenant for the basic metals sector to improve environmental concerns with acidification, toxic substances, eutrophication (Netherlands) |
| Duty on pesticides (Denmark) | Water pollution non-compliance fees for discharges above permitted level (Latvia) | Support for treatment of agricultural waste - improving manure disposal (Canada) | Tradable phosphorous discharge rights - Dillion Reservoir (Colorado, United States) | Deposit-refund system of glass and plastic bottles to reduce waste on public autoroutes, lakes and rivers (Chile) | Certification for environmentally friendly agricultural products (Korea) |
| Water effluent charge on the quantity of wastewater in excess of permissible contents of COD and TSS (Mexico) | Marine discharge permit for land-based sources emitting to the sea (Israel) | Co-financing of soil remediation (Belgium) | Lake Taupo Protection Project to reduce nitrogen (New Zealand) | N/A | The Pesticides Voluntary Initiative (United Kingdom) |

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Deposit-refund schemes | Voluntary approaches |
|---|---|---|---|---|---|
| Charge for total pollution load management (water quality) (Korea) | Mining charge for extraction of clay pit and quarry (Bulgaria) | Marine pollution prevention fund (Israel) | Nutrient emission right for farmers (Belgium) | N/A | Voluntary agreement to promote sustainable environment usage, reduce waste and water pollution (Estonia) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage.

### *2.1.3 Soil pollution*

Soil pollution occurs when anthropogenic activities result in a concentration of chemical substances in the soil that is higher than the concentration in the soil's natural state (e.g., agricultural chemicals, accidental spills, disposal of urban waste, industrial activities) (FAO, 2018[15]). Such contamination can cause adverse effects to the environment, deteriorating soil systems and the provision of goods and services for human life and ecosystems (e.g., food production, clean water) (FAO, 2017[16]).

The soil pollution tag in the PINE database supports SDG 2 concerning food security, SDG 13 on climate resilience and thus soil security, and SDG 15 on the protection, restoration and promotion of sustainable terrestrial ecosystems.

In the PINE database, instruments are tagged for soil pollution if they are aimed at the prevention, reduction, and control of the accumulation of contaminants from entering soil bodies, and the remediation of contaminated soils. Activities related to preserving and enhancing soil biodiversity are out of scope. Keywords used for screening candidate instruments related to soil contamination are presented in Table 6.

**Table 6. Keywords to identify a candidate subset of soil pollution-related instruments**

| |
|---|
| soil, desertification, acidification, salin*, biodegradable, |
| contaminat*, pesticide, ferti*, manure, mulch, herbicide, agrochemical, agrichemical, environmentally friendly product, plant protection product, |
| spill, leak, brownfield, black spot, runoff, remediation, degrasification, open pit, mining, quarr*, extraction. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., conservation, container, greenhouse, watercourse, groundwater.

The candidate instruments screened are individually reviewed to verify their relevance to the soil contamination domain. Instruments are **included** in the tag based on the following criteria:

a) Measures aimed at the prevention or reduction of chemicals or substances from being released to soils (e.g., pesticides, fertilisers, animal manure and other waste from livestock activities).

b) Remediation and cleaning up of soils by reducing the accumulation of contaminants at the polluted location (e.g. soil decontamination/remediation at industrial sites, landfills, and other black spots/ brownfields (see also 2.3.3 Land degradation for additional domain tags), and the cleaning up of chemical or oil spills in coastal areas (see also 2.1.2 Water pollution and 2.3.5 Ocean for additional domain tags).

c) Measures aimed at preventing soil salinisation through, e.g. improved soil water management, changes in irrigation practices, actions to raise or lower groundwater tables (see also 2.1.2 Water pollution and 2.2.3 Freshwater for additional domain tags).

d) Measures aimed at minimising pollution from surface mining and quarrying operations (e.g. open pit mining) (see also 2.1.2 Water pollution, 2.2.5 Fossil fuels and 2.2.6 Minerals for additional domain tags).

e) Research and development, information, training and education activities and measures aimed at the protection and remediation of soils (e.g., technology development for addressing soil pollution; inventories of "black spots", mapping of soil pollution, risk assessments of soil contamination levels).

The tagging is further refined by **excluding** candidate instruments if they target:

a) Activities aimed exclusively at the conservation, preservation, and enhancement of soil biodiversity (see 2.3.3 Land degradation and 2.3.4 Biodiversity).
b) Protection of the landscape against soil erosion (see 2.3.3 Land degradation).
c) Measures aimed at limiting the emissions discharged (exclusively) into bodies of water (see 2.1.2 Water pollution).
d) Rehabilitation of abandoned mining and quarrying sites (see 2.3.3 Land degradation).

Examples of different types of policy instruments tagged based on the two-step strategy are presented in Table 7.

### Table 7. Examples of soil pollution-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments |
|---|---|---|
| Levies on manure surplus (Netherlands) | Fee for excessive soil pollution (Bulgaria) | Subsidy for pesticide-free cultivation (Greece) |
| Contamination cleanup tax (Minnesota, United States) | Charge on agricultural inputs, pesticides (Canada) | Support for treatment of agricultural waste (Canada) |
| Tax on pesticides (Norway) | Service fees of the prevention and control of environmental contamination (Mexico) | Income tax credit for brownfield revitalisation clean-up (District of Columbia, United States) |
| Registration tax on livestock (Cameroon) | Tax for remediation of contaminated sites (Liechtenstein) | Contaminated Sites Remediation Fund (New Zealand) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for tradable permits, deposit-refund schemes, and voluntary approaches.

### *2.1.4 Solid waste*

Solid waste refers to the materials that are not primary products and for which there is no further use either in production, transformation, or consumption, including solid waste, wastewater, etc. (OECD, 2003[17]). The prevention and reduction of solid waste is an essential component of the transition towards a circular economy, which brings about the efficient use of natural resources and the materials that are derived from them (OECD, 2022a[18]).

Solid waste management can help achieve progress towards SDG 12 and other targets[6], as well as the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes.

In the OECD PINE database, solid waste policy instruments incentivise the prevention of waste, waste reduction (such as preparing waste for reuse, recycling, and energy recovery) and waste management. Table 8 lists the keywords used to screen potential candidates.

**Table 8. Keywords to identify a candidate subset of solid waste-related instruments**

| |
|---|
| waste*, litter, sorting, reduc*, pre-treat*, treatment, recycl*, recover*, dispos*, incinerat*, biodegradable, |
| municipal solid*, MSW, compressor, scrap, landfill*, Basel, material, life-cycle, producer responsibility, product stewardship, |
| plastic*, resin, synthetic rubber, polyethylene, polypropylene, polyvinyl, PVC, polystyrene, single-use, bottle, can, container, batter*, WEEE, demolition, disposal, lead accum*, hazardous, toxic. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., wastewater, oil, fluid, radioactive.

The candidate instruments, selected through the keyword search, are individually reviewed to verify their compliance with one of the following **inclusion** criteria:

a) Activities to manage or operate services for solid waste handling, separation, sorting, treatment, disposal, management, storage, and recovery of hazardous and non-hazardous waste, such as:
   - Collection and transportation of solid waste (household, industrial)
   - Separation, sorting, recycling, baling, cleaning, treating, and disposing of solid waste (thermal, landfill)
   - Street cleaning (only related to public litter and collection of garbage from public spaces)

b) Activities related to installation and maintenance of equipment aimed at controlling and measuring the generation and storage of solid waste.

c) Management and installation of incinerators and landfills, also includes co-incineration for e.g., cement kilns that accept certain hazardous waste for incineration.

d) Activities directed at composting the biological component of household solid waste.

e) Management of waste electrical and electronic equipment (WEEE) (e.g., computers and related equipment, household appliances, mobile phones), end-of-life vehicles, batteries, and accumulators.

f) Production and consumption of products such as food and beverage containers (e.g., bottles, cans), packaging, plastic bags, tyres, batteries, etc.

g) Industrial solid waste from agriculture, manufacturing, or extractive operations like mining.

h) Activities related to buying and selling of waste shipments.

[6] Several SDG targets are also relevant, such as 6.3.1 (Increase wastewater treatment), 8.4 (Improve global resource efficiency and decouple economic growth from environmental degradation), 11.6.1 (Improve municipal and other waste management) and 14.1.1 (Reduce marine pollution, including marine plastic debris pollution).

Candidate instruments are **excluded** from the solid waste tag if they target:

a) Manufacturing of new materials and products from waste and scrap, and any subsequent use thereof (see 2.3.8 Circular economy).

b) Activities related to product reuse, repairing or repurposing (see 2.3.8 Circular economy).

c) Design of products and production processes to reduce material use and solid waste generation (e.g., eco-design); solid waste prevention and other upstream measures (see 2.3.8 Circular economy).

Selected examples of policy instruments tagged in the Solid waste domain are shown in Table 9.

### Table 9. Examples of solid waste-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Deposit-refund schemes | Voluntary approaches |
|---|---|---|---|---|---|
| Tax on plastic bags and plastic material (Côte d'Ivoire) | Municipal waste user charge (Albania) | Tax credit for recycling or composting equipment (Kentucky, United States) | Packaging waste recovery note and packaging waste recovery export note system (United Kingdom) | Cash for containers (Australia) | Covenant on portable and industrial waste batteries (Flanders, Belgium) |
| Solid waste charge (China) | Fee on municipal waste collection and treatment (Austria) | Subsidy for tyre recycling (Canada) | N/A | Deposit-refund system for glass (Bulgaria) | Agreement on the collection of windows containing PCB (Norway) |
| Bottled water excise tax (Malta) | Prepaid disposal fees on glass bottles for beverage (Liechtenstein) | Subsidy to the collectors of animal waste (Flanders, Belgium) | N/A | Lead acid battery take back program (Canada) | Voluntary agreement on take-back of portable accumulators (Czech Republic) |
| Tax on waste delivered to landfills (Finland) | Waste Electrical and Electronic Equipment [WEEE] fee (Italy) | VAT exemption for wastepaper (Rajasthan, India) | N/A | Deposit-refund system for toxic chemicals packages (Poland) | Fluorescent Bulb Recycling Program (Alberta, Canada) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage.

### *2.1.5 Ozone layer*

The ozone layer is the natural layer of gas above the Earth's surface that protects humans and the natural system from harmful ultraviolet (UV) radiation from the sun (EC, n.d.[19]). Ozone-depleting substances (ODS) can break down and damage the Earth's protective ozone layer. These ODS (e.g. chlorofluorocarbons, halons, methyl bromide) are found in a wide range of industrial and consumer applications.

In 1987, the international community adopted the Montreal Protocol to establish legally binding controls to cut down the consumption and production of ODS (UNEP, 2022b[20]). The phase-out of ODS achieved in the past decades is one of the most successful international environmental actions, although increases in atmospheric ODS concentrations have again been detected recently. Mitigating ODS emissions is essential to achieving progress towards SDG 3, SDG 14, and SDG 15.

Policy instruments which protect the ozone layer include those which control and limit the manufacture, trade, market, and use, of ODS and other substances with a high ozone-depleting potential. Furthermore, the instruments tagged for this domain incentivise their recycling, reclamation, and proper disposal. Table 10 lists the keywords used to screen potential candidates for the domain tag.

**Table 10. Keywords to identify a candidate subset of ozone layer-related instruments**

| |
|---|
| ozone, CFC, HCFC, CTC, halons, methyl, bromide, chlori*, trichloroethane, atmosphere, stratosphere, |
| air conditioning, cleaning supplies, dry cleaning, fridge, freezer, label, pesticide, refrigera*, solvent, |
| chemical, industrial waste, industrial sector, hazardous, toxic, incinerat*, electronic appliance, electronic waste, electronic equipment, WEEE. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives: non-hazardous, non-toxic, not toxic, petroleum, oil sector, synthetic, batter*, lead accumulator, greenhouse gases, perchloroethylene, tetrachloroethylene, trichloroethylene.

The candidate instruments are individually reviewed to verify their compliance with one of the following **inclusion** criteria:

a) Controls and measures in the manufacture, import, export, market, and use of ODS. Examples of common uses of ODS are in the following applications (based on (IFC, 1998[21]) (UNEP, 2022b[20]) (WMO, 2015[22]) (EPA, 2000[23]) (UNEP, 2019[24]) (EC, 2022[25]) (ICF, 2018[26])):
   - Chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC), and other ODS containing chlorine, such as those used in aerosol propellants, air-conditioning, refrigeration, cold storage, commercial food preservation, chillers, cooling equipment, foam blowing, photochemicals, electronic equipment.
   - Halons, such as those used in fire extinguisher and fire protection equipment, and explosion suppressants.
   - Carbon tetrachloride (CTC) such as those used in solvents for dry cleaning agent[7] and cleaning agent (e.g., spot cleaner).
   - 1,1,1-trichloroethane (TCA or methyl chloroform), such as those used in degreasing, metal cleaning, coating, inks, or medical applications.
   - Methyl bromide agents, such as those in fumigants to control pests in agriculture and shipping products.

[7] Note that common dry-cleaning agents include non-ozone depleting substances, such as PERC or n-PB. In such cases the dry-cleaning agents are excluded from the tag.

- Other applications of ODS, including 'new substances'[8] that adversely affect the stratospheric ozone layer.

b) Equipment investment, adoption of pollution control and prevention technologies to limit ODS emissions.

c) Packaging and labelling of ODS containers and related equipment.

d) Proper disposal, recycling, reclamation, storage of ODS (e.g., controls on industrial waste and wastewater, hazardous/toxic waste, electronic waste).

e) Proper destruction of ODS using approved destruction technology or transported to approved incinerator plants or hazardous waste facilities.

f) Prevention and control of any leakage and emissions when using ODS.

g) Research and development, information, training and education activities and measures aimed at protecting the ozone layer.

Candidate instruments are **excluded** from the tag if they target:

a) Instruments targeted exclusively at petroleum products (see 2.2.5 Fossil fuels).

b) Hazardous waste management targeted exclusively at the oil sector (see 2.1.4 Solid waste).

c) Hazardous waste management targeted (exclusively) at non-ODS containing electric and electronic goods (2.1.4 Solid waste or 2.3.6 Chemicals management).

d) Instruments targeted exclusively at GHGs (e.g. $N_2O$, $CH_4$, $CO_2$) (see 2.1.1 Air pollution and 2.3.1 Climate change mitigation); or exclusively at synthetic GHG (e.g. fluorinated greenhouse gases (F-gases), including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and Sulphur hexafluoride (SF6) (EC, 2022[25]) (see 2.3.6 Chemicals management).

e) Instruments targeting (exclusively) non-ozone depleting substitutes (e.g., trichloroethylene (TCE), perchloroethylene (PERC) (IFC, 1998[21]) (see 2.3.6 Chemicals management).

Selected examples of policy instruments tagged in the ozone layer domain are shown in Table 11.

### Table 11. Examples of ozone layer-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Deposit-refund schemes | Voluntary approaches |
|---|---|---|---|---|---|
| Ozone protection and synthetic greenhouse gas levy (Australia) | Chemicals' registration fee (Finland) | Hydro power smart fridge buy-back program (Canada) | Allowance system for HCFCs (Canada) | Refund scheme of the tax on trichloroethene (TRI) (Norway) | Refrigerant Management Canada Program (Canada) |
| Tax on air conditioning products (Romania) | Charge on ozone depleting substances (Latvia) | School greening grants (Illinois, United States) | Ozone depleting substances scheme to meet the target of the Montreal Protocol (United States) | Deposit-refund system for containers of pesticides for restricted use (Maine, United States) | Covenant on waste electric and electronic equipment (Flanders, Belgium) |
| Ozone depleting chemicals tax (United States) | CFC charge (Montenegro) | Company schemes focus of chemicals, waste, and water (Denmark) | Allowance system for methyl bromide* (Canada) | Deposit-refund system for toxic chemicals packages (Poland) | Eco-labelling to promote the production and use of environmentally friendly products (Czech Republic) |

[8] Such 'new substances' are halon 1202, methyl chloride (MC), ethyl bromide (EB), trifluoroiodomethane (TFIM) and n-propyl bromide (n-PB) (EEA, 2019a[52]).

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Deposit-refund schemes | Voluntary approaches |
|---|---|---|---|---|---|
| Dry cleaning environmental taxes (Kansas, United States) | Administrative fee on toxic substances (United States) | Measures for improving the environment in the agricultural sector (Sweden) | Ozone transport commission NOx Programme* (United States) | N/A | Agreement on collection and proper handling of electric and electronic waste (Norway) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. * indicates an inactive instrument.

### *2.1.6 Noise*

Environmental noise can be defined as an unwanted or harmful outdoor sound created by human and industrial activities (e.g., road traffic, aircraft, and construction) (EEA, 2020[27]). According to the World Health Organisation, prolonged exposure to environmental noise is associated with risk of negative physiological and psychological health outcomes, which include cardiovascular effects and cognitive impairment (WHO, 2018a[28]). There is also increasing evidence revealing the adverse effects of environmental noise on wildlife. For example, high levels of noise have the potential for physical, physiological, and behavioral impacts on marine mammals, fish, and invertebrates (EEA, 2020[27]). Reducing environmental noise improves human health and well-being (SDG 3) and leads to improved conservation of wildlife (SDG 14 and SDG 15). Furthermore, the United Nations' Agenda 21 (UNCED 1992), as well as the European Charter on Transport, Environment and Health (London Charter 1999) support several environmental management principles, including noise management policies.

Noise-related measures include policies directed towards minimising noise exposure, improving noise control approaches, and land-use planning to mitigate noise impacts on humans, animals, and habitats sensitive to noise. Keywords used for screening candidates for tagging noise-related instruments are presented in Table 12.

**Table 12. Keywords to identify a candidate subset of noise-related instruments**

| |
|---|
| acoustic, dB, dBA, decibels, noise, quiet, insulation |
| aircraft noise, airplane, landing, departure, city district, city zone, congestion, neighb*, toll, traffic, fee for entrance, heavy duty, heavy good, highway, road, truck, lorr*, axle, cylinder, engine, |
| bicycle, electric car, electric vehicle, electric train, greening, hybrid, motorway, public transportation, walking, |
| ecosystem conservation, nature conservation, mobility, land use, landscape, |
| boat, cruise, vessel, yacht, ship, outboard, drilling, berth, moor, dock, harbor, harbour, maritime, sonar, watercraft. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., hunting, ownership, stewardship, membership, passenger, species, air pollution, oil, IVQ, petrol, natural gas, and fishing.

The candidate instruments are individually reviewed to verify their compliance with one of the following **inclusion** criteria:

a) Modifications and adaptations of equipment or technology for prevention of noise at the source (e.g., quieter vehicle motors, aircraft and ship engines, brakes, industrial equipment) and noise derived from surface contact (e.g., reducing roughness of railway tracks).

b) Activities and measures aimed at the control, reduction, and abatement of the level of noise and vibration activities at the source, such as for:

- road traffic (e.g., use of roads differentiated on heavy goods or large vehicles, use of motor vehicles differentiated on gross weight, engine power, cylinder capacity, age, number of axles).
- air traffic noise (e.g., regulation of aircraft landing and take-off times).
- rail traffic noise (e.g., installation of soundproof infrastructure, barriers and tunnels, development of electric trains).
- water-based transport noise (e.g., port or harbour traffic, cruise, marine shipping, use of water-based motor vehicles such as ships or outboard motorboats).
- marine and ocean industries (e.g., measures to abate sonar activities, onshore and offshore drilling, mineral exploration and extraction, industrial fishing activities).
- Other noise (e.g., reduction of noise from industrial, construction or outdoor equipment).

c) Construction or reconstruction of anti-noise or anti-vibration facilities to limit industrial and vicinity noise perception (e.g., thermal insulation,[9] soundproofing of buildings, sound absorption, noise-protective windows, covering sections for urban motorways, green facades, or roofs, and regrouping of buildings).

d) Activities and measures aimed at designating or preserving quiet areas in both urban and rural settings (e.g., urban parks and recreational areas, green- and blue-spaces in residential areas, natural parks and other protected landscapes outside the city including pastures and agricultural areas).

e) Geographical restrictions to limit human exposure to noisy vehicles, particularly in built-up areas, residential areas, schools, hospitals, and other noise sensitive areas.

f) Measures aimed to improve and promote public transportation, walking and cycling.

g) Incentives to encourage the production and use of hybrid and electric vehicles as alternatives to (more noisy) conventional motor vehicles.

h) Labelling or information programmes for consumers to encourage quiet driving behaviour.

i) Research and development, information, training and education activities and measures targeted at abating noise and vibration (e.g. initiatives to raise awareness of noise issues; research to reduce noise levels in urban and marine environments).

Candidate instruments are **excluded** from the tag if they target:

a) Activities reducing transportation use which do not directly abate environmental noise (e.g. those aimed at reducing air pollution) (see 2.1.1 Air pollution).

b) Land or nature preservation activities whose main objective does not include reducing environmental noise (e.g. those aimed at protecting species, fishing and hunting activities) (see 2.3.4 Biodiversity or 2.3.3 Land degradation).

c) Noise-undifferentiated instruments levied on the *ownership* of motor vehicles (e.g., motor vehicle tax, motor vehicle license, registration fees) ) (incl. also maritime transportation and aviation), as the ownership alone does not have a direct effect on reducing environmental noise on humans, animals, and habitats (see 2.3.8 Circular economy).

Examples of different policy instruments tagged in the Noise domain are shown in Table 13.

[9] Insulation activities whose main objective is not noise/vibration mitigation, i.e. energy conservation, can still provide noise protection, therefore is part of the inclusion criteria.

## Table 13. Examples of noise-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Voluntary approaches |
|---|---|---|---|---|
| Aircraft noise taxes (Italy) | Noise pollution non-compliance fee (Bulgaria) | Sales tax exemption for bicycles (Canada) | Land management for agricultural preservation (Montgomery County, United States) | Neighbourhood Environment Improvement Plans (Victoria, Australia) |
| Inland air travel tax (India) | Mineral extraction charges (Lithuania) | Electric vehicle exemption from road-user charges (New Zealand) | Tradable development rights for pinelands management (United States) | Agreement about increased public admission to forest and nature areas (Denmark) |
| Noise-related landing charge (Switzerland) | Harbour tax (Albania) | Deduction of business expenses incurred for the storage of bicycles and electric bicycles (Belgium) | Tradable development rights for land preservation (France) | Ecotender - bids to be paid to landowners to manage their land in ways that provide environmental improvements (Victoria, Australia) |
| Commercial passenger vessel excise tax (Alaska, United States) | Heavy goods vehicle road toll (Germany | Support to installation of charging infrastructure for electric vehicles (Sweden) | N/A | Land for Wildlife for supporting landholders or managers who provide habitat for native wildlife (Australia) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes.

### *2.1.7 Radiation*

Radiation can take on two forms: non-ionising (radio waves, visible or ultra-violet radiation) and ionising (X-rays, gamma rays, cosmic rays). Exposure to ionising radiation arises from naturally occurring sources, such as radiation from outer space and radioactive material from terrestrial sources, and from sources with an artificial (anthropogenic) origin (e.g. radiation applications used in medicine; nuclear energy) (UNEP, 2016[29]). Exposure to high-levels of radiation can produce acute health effects or even cause damages at the level of cells (UNEP, 2016[29]).

Radiation instruments in the PINE database can help mitigate radiation contamination impacts on human health and the environment, thereby linking with SDG 3 (good health and well-being), SDG 14 (life below water) and SDG 15 (life on land). The definition and tagging strategy for this domain is aligned with developments for the mandate of UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), which helps meet SDG 17 (partnership for goals) through national and international collaboration to lower the sources of ionising radiation.

The radiation tag refers to policy instruments incentivising the reduction or elimination of the negative consequences of particle radiation emitted from any source. Table 14 lists the keywords used to screen potential candidates.

**Table 14. Keywords to identify a candidate subset of radiation-related instruments**

| |
|---|
| alpha, atom, atomic, becquerel, Bq, beta, plutonium, radium, radon, terabecquerel, Tbq, tritium, uranium, molecule, ionising, ionizing, |
| decommission, nuclear, nuclide, particles, radiation, radioactive, radionuclide, reactor, sealed-source, spent. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., abstraction, non-ionising, digital imaging, x-ray.

Second, candidate policy instruments are reviewed in order to verify their compliance with one of the following **inclusion** criteria:

a) Protection of the environment (air, water, and soil) and of humans from radiation exposure:
   - Safety and security measures (e.g. action plan for nuclear safety, measures to restrict use of area on territory of nuclear power plant)
   - Reducing or controlling exposure to natural radiation sources (e.g. radon).
   - Reducing or controlling exposure to industrial radiation sources (e.g. uranium mining, processing, transport, use and disposal).

b) Activities and measures aimed at limiting the quantity of high-level radioactive materials from entering the general environment arising from energy production. (e.g. production of high-level radioactive waste[10] or spent fuel[11], installation of nuclear station or equipment).

c) Activities related to the management (e.g. collection, treatment, storage, transport, and disposal) of high-level radioactive waste or spent fuel and/or equipment and devices containing elements with high-level radioactivity. This includes decommissioning of nuclear plants and the recycling of radioactive materials.

[10] 'Radioactive waste' means radioactive material with high radionuclide content at levels greater than the "exempt quantities" established by the competent authorities, for which no further use is foreseen (SEEA, 2014[3]).

[11] 'Spent fuel' means nuclear fuel that has been irradiated in and permanently removed from a reactor core; spent fuel may either be considered as usable resource that can be reprocessed or be destined for final disposal with no further use foreseen and treated as radioactive waste (European Union, 2011[51]);

d) Activities aimed at the monitoring of ambient radioactivity and radioactivity from radioactive waste, research in nuclear activities.

e) Research and development, information, training and education activities and measures aimed at protecting humans and the environment against radiation (e.g. testing nuclear products).

Candidate instruments are **excluded** if they target:

a) Activities directed at the abstraction of water for nuclear energy production (see 2.2.3 Freshwater).

b) Collection and treatment of low-level radioactive waste, such that it contains low radionuclide content that does not require shielding during normal handling and transportation (see 2.1.3 Soil pollution and 2.3.6 Chemicals management).

c) Activities directed at reducing or controlling exposure to artificial radiation sources (e.g. X-ray radiation devices, digital imaging technology).

Some examples of policy instruments tagged in the radiation domain of the PINE database are shown in Table 15.

### Table 15. Examples of radiation-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments |
|---|---|---|
| Tax on installing nuclear equipment (or nuclear facility tax) (Slovak Republic) | Charge on nuclear waste (Finland) | Radon programme - Action plan for nuclear safety (Czech Republic) |
| Ionizing radiation permits (Israel) | Radioactive waste charge (Bulgaria) | Special tax rate for nuclear decommissioning reserve funds (Maine, United States) |
| Nuclear energy research levy (Finland) | Fee for the monitoring of the activities related to the management of radioactive wastes (Spain) | Support related to nuclear safety (national and international) (Sweden) |
| Contribution of nuclear power plant to finance its de-commission (Slovenia) | Fee for the elaboration of reports and studies needed for monitoring activities related to the management of long term, high-level radioactive wastes (Spain) | N/A |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no tradable permits and deposit-refund schemes tagged.

## 2.2 Natural resource management

### *2.2.1 Fisheries*

Fisheries are essential in providing food security globally, in addition to supporting livelihoods in coastal communities (OECD, 2020b[30]). Alarmingly, the proportion of global fish stocks that are within biologically unsustainable levels increased from 10% in 1974 to 35.4% in 2019 (FAO, 2022[31]). The sustainable management of fisheries resources is essential to preserve aquatic biodiversity and protect ecosystem services for future generations. A series of specific targets under SDG 14 aim to conserve and sustainably use the oceans, seas, and marine resources for sustainable development.[12] Strategies to incentivise the sustainable management of fisheries respond to international instruments, such as the 1982 United Nations Convention on the Law of the Sea (UNCLOS) and the 1995 United Nations Fish Stock Agreement and the 1992 Convention on Biological Diversity, which call for the conservation of biological diversity and productivity of aquatic and marine species and habitats.

In the PINE database, the tag for the fisheries resources domain includes policy instruments which promote sustainable use of fisheries resources and sustainable aquaculture practices, as well as aquatic biodiversity conservation and expansion of freshwater and marine fish stocks. Table 16 lists the keywords used to screen potential candidates.

**Table 16. Keywords to identify a candidate subset of fisheries-related instruments**

| |
|---|
| aqua*, ITQ, IUU, UNCLOS, fishing quota, fisher-boat, fishing license, sports fishing, fishing fleet, fishing vessel, fishing vessel registration, |
| gear, sea-based hunting, total allowable catch, TAC, individual vessel quota, IVQ, |
| fish*, bluefin catch, species, trout, tuna, salmon, seafood, oyster, lobster, ecologically produced food, |
| ecotourism, marine protected area, marine environment. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., forests, agriculture.

The candidate instruments are individually reviewed in order to verify their compliance with one of the following **inclusion** criteria of the fisheries domain tag:

a) Measures preventing or reducing the exploitation of fish stocks (e.g. regulated catch of marine species, prevention of discarding in fisheries, limitations on the total allowable catches (TACs), fishing quotas, fishing permits, landing obligation, international trade).
b) Measures aimed at minimising the impact of fishing on marine ecosystems and the environment (e.g. specifications for the design and use of gears, minimum landing sizes, seasonal restrictions).
c) Measures aimed at fishing fleet capacities and access to waters (e.g. fishing license, access to fisheries, fishing vessel registration).
d) Measures aimed at protecting vulnerable aquatic ecosystems and fish species (e.g. managing deep-sea fishing activities, activity restrictions in aquatic and marine protected areas) (see also 2.3.5 Ocean for additional domain tags).
e) Measures to combat illegal, unreported, unregulated (IUU) fishing activities, including the restriction of access to goods and services (e.g. fuel, landing, insurance, communications and navigation services etc.) by non-compliant operators and other unsustainable fishing practices.

[12] Specific targets include, 14.4 (by 2020, effectively regulate harvesting and end overfishing, IUU fishing, and destructive fishing practices); 14.6 (by 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, and IUU fishing).

f) Management of activities for aquaculture and fishery products (e.g. trade in fisheries and aquaculture products, standards for marketing and production of seafood, monitoring and limitations of aquaculture activities, water management for aquaculture, eco-labelling and certifications).

g) Research and development, information, training and education activities and measures aimed at the sustainable management of fisheries (e.g. pollution prevention directly targeted at maintain fish stocks, fishery research planning, monitoring and surveillance, data collection and sharing, assessing fish stocks, assessing ecological risk on fisheries).

Candidate instruments are **excluded** from the tag if they target:

a) Marine environment protection instruments (e.g. pollution management) not directly targeting fisheries (see 2.1.2 Water pollution).

b) Ecosystem or species protection that does not target aquatic biodiversity (i.e. exclusively on land) (see 2.3.4 Biodiversity).

c) Vehicle registration fees not related to fishing vessels.

d) Downstream processing of fish landings.

Some examples of different policy instruments tagged in the Fisheries domain are shown in Table 17.

### Table 17. Examples of fish-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Voluntary approach |
|---|---|---|---|---|
| Fishery resource landing tax (Alaska, United States) | Deep-sea fishing license (Morocco) | Subsidies for conservation of wildlife, hunting and fishing (Switzerland) | Fisheries quota management system (ITQ) (New Zealand) | Ecologic seal to promote the production, commercialisation and consumption of ecologically produced food (Colombia) |
| Sport fishing (Mexico) | Tax on fishing and concessional royalties (Equatorial Guinea) | Sustainable Farming Fund, incl. aquaculture projects (New Zealand) | Individual Transferable Quotas for fisheries (ITQ) (Peru) | Voluntary agreement on bottom paint for pleasure boats (Denmark) |
| Export duties on fish products (Iceland) | Fees on fishing licenses (Nauru) | Data Collection Scheme to evaluate state of fish stocks (Ireland) | Individual quotas for fisheries (Portugal) | N/A |
| Salmon enhancement tax for salmon sold in or exported from Alaska (Alaska, United States) | Entrance fee to parks for fishers and hunters (Canada) | Grant for salt marshes (United Kingdom) | Territorial Use Rights for Fisheries for benthics (Chile) | N/A |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes.

### *2.2.2 Forests*

Forests provide a range of ecosystem services and they are essential to biodiversity conservation, wildlife protection, low-carbon development strategies and climate change mitigation. Nevertheless, forests have been decreasing or degrading rapidly around the world, in large part due to logging, overexploitation and land-use conversions such as deforestation for agriculture (OECD, 2022a[18]).

The international objective highlighted in SDG 15 (protect, restore, and promote sustainable management of forests, combat desertification, halt and reverse land degradation, halt biodiversity loss) underscores the importance of protecting forest resources. Furthermore, in recognising the need for scaling up international support in the forest sector, leaders from 145 countries endorsed the Glasgow Leaders' Declaration on Forest and Land Use at the COP26 World Leaders Summit 'Action on Forests and Land Use' event, to accelerate action to halt and reverse forest loss and land degradation by 2030. Sustainable forestry was also referred to in Aichi Target 7 under the Convention on Biological Diversity and similar targets are likely to be forthcoming in the CBD Post-2020 Global Biodiversity Framework.

In the PINE database, the tag for the forest resources domain includes policy instruments which promote the sustainable use of forest resources and sustainable silviculture practices, as well as the conservation of forest biodiversity and expansion of natural forests and other natural wooded areas. Table 18 lists the keywords used to screen candidate policy instruments.

**Table 18. Keywords to identify a candidate subset of forest-related instruments**

| |
|---|
| afforestation, deforestation, reforestation, regenerat*, restoration, regrowth, forest*, grassland, terrestrial, |
| plantation, wood, harvest, hectare, planting, seed, sequest*, tree, REDD, silviculture, |
| firewood, wildfire, dryland logger, logging, timber, sinks. |

Note: A wildcard (*) denotes the possibility of any series of characters. Certain keywords are excluded from the automated search as they yield many false positives, e.g., street, biomass, biofuel, energy, renewable.

The candidate instruments identified through the keyword search are **included** in the forest domain if they are relevant to:

a) Prevention and control of deforestation, forest fragmentation and unsustainable management of forests and other wooded land (e.g. directed at logging operations, road construction, agricultural expansion) as well as measures affecting the health and resilience of forest ecosystems (e.g. prevention of forest fires, mitigating the impacts of drought and extreme heat, invasive species).

b) Restoration and replenishment of forest areas (e.g. reforestation and afforestation, the planting and seeding of trees, natural regenerated forests, reclamation of unproductive land for forest development/regrowth (excludes soil or land conservation outside forest areas, see 2.1.3 Soil pollution)

c) Measures aimed at protecting and managing forest use (e.g. minimise conversions of natural forest lands, forest conservation, management of the use of forests).

d) Activities aimed at minimising the intake of timber resources per unit of output (e.g. wood product manufacturing, international trade, harvesting of forests, promotion of the use of wood residuals).

e) Research and development, information, training and education activities and measures aimed at the protection and management of forests and forest resources (e.g. training in forest resource management for renewable energy projects).

The tagging strategy is further refined by **excluding** candidate instruments from the tag if they target:

a) Land conservation outside forest areas (see 2.1.3 Soil pollution).

b) The exploitation and trade in wildlife and endangered species (exclusively) (see 2.3.4 Biodiversity).

c) Activities incentivising the production and use of wood for energy (e.g. wood-based fuels for heating and energy generation).

Selected examples of policy instruments tagged in the Forest domain are shown in Table 19.

### Table 19. Examples of forest-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Voluntary approaches |
|---|---|---|---|---|
| Fee for the withdrawal of forest land (Czech Republic) | Forestry and wildlife permits (Democratic Republic of the Congo) | Subsidy for forest management (Denmark) | Tradable development rights for pinelands management (United States) | Agreement about increased public admission to forest and nature areas on private land (Denmark) |
| Logging tax (British Columbia, Canada) | Tree cutting non-compliance fees (Lithuania) | Accelerated depreciation for establishment costs for carbon sink forests (Australia) | Emissions Trading Scheme - owners of post-1989 forest land (New Zealand) | National firewood certification system (Chile) |
| Charge for tree protection (Vienna, Austria) | Charge for transfer of rights on forest/forestland (Croatia) | Exemption in the real property tax for forests, agricultural land and waters (Finland) | J-credit scheme to certify the amount of greenhouse gas emissions reduced and removed by sinks (Japan) | Forest Stewardship Council (Chile) |
| Forest charges (Philippines) | Tree cutting charge (Serbia) | Forest management planning tax credit (Maine, United States) | N/A | Permanent Forest Sinks Initiative (New Zealand) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes.

### *2.2.3 Freshwater*

Freshwater abstraction and water use affect the natural integrity of rivers, lakes, aquifers, and wetlands (OECD, 2022c[32]). Sustainable management of freshwater resources is essential to supply quality freshwater suitable for supporting aquatic and ecosystem services, human use and well-being, and economic activities (OECD, 2022c[32]).

Efforts to promote water-use efficiency are outlined under targets SDG 6 (to ensure availability and sustainable management of water)[13] and SDG 3 (to ensure healthy lives and well-being), and are aligned with the goals set out in the 1992 Convention on the Protection and Use of Transboundary Watercourses.

In the PINE database, the freshwater domain comprises policy instruments which incentivise the minimisation of intake from, and the restoration of, freshwater resources. These instruments aim to manage the demand for water quantity, promote water efficiency, and increase the stocks of freshwater. Keywords used for screening candidate instruments for tagging the freshwater domain are presented in Table 6.

**Table 20. Keywords to identify a candidate subset of freshwater-related instruments**

| |
|---|
| abstraction, agricultural water, aquifer, basin*, catchment, drought, flood, stormwater, fresh water, groundwater, hydroelectric, hydropower, |
| infiltration, irrigation, lake, livestock, rainwater, riparian, river, salinity, surface water, watershed waterway, wetland, water fund, water saving, water activities, water conservation, water consumption, water extraction, water rights, water supply, water use, watercourse, water service, water resource, water management, water efficiency, natural resource water, tap water, drinking water, water withdrawal, mineral water, water research. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., air basin, phosphorous, emission, pollut*, quality, sanitation, sewage, sewerage, treatment, waste, wastewater, effluent, discharge, water heater, heating, solar hot water, recreational, fisheries, hunting, transportation, fishing, liming, material, driver.

Instruments screened through the keywords above are individually reviewed to verify their relevance to the freshwater domain based on the following **inclusion** criteria:

a) Reducing and preventing the intake of freshwater in activities related to household use and public supply, agricultural use and irrigation, electric power plants).
b) Reducing the potential of water losses and leaks, water reuse and savings (e.g. rainwater collection, enhancing irrigation systems, improvements in hydrometry monitoring, water saving systems, water recirculation).
c) Replenish or revitalise water stocks (e.g. recharge of groundwater bodies, restoring natural waterways, re-vegetation programmes to increase water infiltration and recharge phreatic water bodies), other than the activities with the primary purpose of prevention and remediation of soil and groundwater salinity (see also 2.1.2 Water pollution and 2.1.3 Soil pollution for additional domain tags).
d) Instruments incentivising the efficient allocation, supply, and use of freshwater resources (e.g. licences for water abstraction, water rights fees and water permits, rainwater management).
e) Instruments addressing or limiting the risks of climate impacts from specific hazards such floods, storms or droughts (see also 2.3.2 Climate change adaptation).
f) Research and development, information, training and education activities and measures related to the protection and remediation of freshwater resources and promotion of water savings.

The tagging is further refined by **excluding** instruments from the freshwater domain if:

[13] Including Target 6.4 (increase water-use efficiency across all sectors), 6.5 (implement integrated water resources management at all levels, and 6.6 Protect and restore water-related ecosystems).

a) Directed at wastewater management (e.g., wastewater treatment, emissions discharge, effluent collection (see 2.1.2 Water pollution).

b) Directed (exclusively) at improving water quality (e.g. reducing and monitoring water pollution or emissions, restoring aquatic habitats) (see 2.1.2 Water pollution or 2.2.1 Fisheries or 2.3.4 Biodiversity); protection of soil against erosion (see 2.3.3 Land degradation).

c) Relate to recreational water activities (e.g., fishing activities, water transportation, tourism, etc.).

d) Instruments directed at household energy savings (e.g., rebates for solar water heaters, hot water usage) (see 2.3.7 Energy efficiency).

e) Restoring or rehabilitating rivers and lakes that involve liming water bodies (see 2.3.4 Biodiversity, 2.3.3 Land degradation or 2.1.3 Soil pollution), or extracting materials (e.g. sand, gravel, stone, minerals) (see 2.2.6 Minerals).

Based on this two-step approach, Table 21 presents selected examples of policy instruments tagged in the freshwater domain.

### Table 21. Examples of freshwater-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Voluntary approaches |
|---|---|---|---|---|
| Water consumption charge (Slovenia) | Water service fee - discharge of rainfall waters (Poland) | Subsidies to small communities for groundwater management (California, United States) | Transferable rights for wetlands conservation (United States) | Designation of green companies - for sustainable management and development of water withdrawals (Korea) |
| Groundwater tax (Flanders, Belgium) | Water Resource Management Charge (South Africa) | Rotorua Lakes Protection and Restoration Programme (New Zealand) | Surface water and groundwater trading rights (Australia) | Green building standard - Eco-building is focusing on water aspects (Israel) |
| Water generated electricity (Idaho, United States) | Fee on the use of continental waters for the production of electric energy (Spain) | Subsidies for revitalisation of rivers and lakeshores, restoring semi-natural habitats (Switzerland) | Tradable water abstraction rights (Chile) | Ecotender - Landholders submit bids to be paid to manage their land and water resources (Victoria, Australia) |
| Water service fee - abstraction for aquaculture (Poland) | Payment for public supply of drinking water (Slovak Republic) | State Environmental Fund for water protection programmes and water monitoring (Czech Republic) | Water allocation transfers in the South Saskatchewan River Basin (Alberta, Canada) | Payment for Environmental Services - to conserve natural ecosystems in strategic areas for water supply (Colombia) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes.

### *2.2.4 Renewable energy*

Renewable energy is energy derived from natural sources that are replenished naturally on a human timescale (EESI, n.d.[33]). Renewable energy is essential to reduce the carbon intensity of economies and, as renewable energy is constantly being replenished, appropriate planning, storage and transportation of renewable energy can help improve energy security.

Efforts to promote the use of renewable energy respond to SDG 7 (ensure access to affordable, reliable sustainable, and modern energy for all), specifically target 7.2, which aims to increase the acceleration of renewables in all sectors. It also aligns with the International Renewable Energy Agency (IRENA) work on promoting the widespread adoption and sustainable use of renewable energy globally.

Large-scale deployment of renewables requires increased policy support. In the OECD PINE database, the renewable energy domain is comprised of policy instruments incentivising the planning, storage, production and consumption of renewable energy. Keywords used for screening candidates for tagging renewable energy related instruments are presented in Table 22.

**Table 22. Keywords to identify a candidate subset of renewable energy-related instruments**

| |
|---|
| renewable, bioenergy, biogas, biomass, ocean energy, solar, tidal, tide, wave, wind, animal waste, vegetable waste, vegetal waste, vegetative waste', renewable waste, |
| green electricity, green energy, geothermal, hydro*, cogeneration, co-generation, heat pump |
| photovoltaic, smart, electric storage, thermal storage, fuel cell, feed-in tariff. |

Note: A wildcard (*) allows any series of characters to follow the keyword, e.g., the wildcard hydro* includes, hydroelectric, hydrothermal, hydropower. Certain keywords are excluded from the automated search as they yield many false positives, e.g., window, saltmarsh, exploitation, extraction, abstraction.

The instruments are **included** in the domain tag if they are directed at:

a) Production of electricity, heat, and fuel, from renewable sources (see also 2.3.1 Climate change mitigation for additional domain tags). For example:
   - production of electricity from solar, wind, marine or ocean and small hydro sources (excluding pump storage).
   - production of heat from aerothermal, hydrothermal, solar thermal and geothermal sources as well as using heat pumps.
   - production of fuels from organic waste (e.g. sewage, vegetable waste) or from recycled materials (e.g. cooking oil) (see also 2.3.8 Circular economy for additional domain tags).
   - production of renewable energy as a non-market output for own use by households and as secondary output by producers.

b) Production of energy through incineration of biodegradable waste (see also 2.3.8 Circular economy for additional domain tags).

c) Production of energy from cogeneration plants and waste heat using renewable fuels.

d) Specific equipment for the production of energy from renewable sources and integrated technologies (e.g. solar panels, photovoltaic cells, hydraulic turbines, wind turbines, biomass boilers, offshore wind component technology, household appliances, solar boilers, heat pumps), including international trade.

e) Energy storage technology associated with renewable energy sources (e.g. pumped storage, compressed air storage, thermal storage, latent heat storage, hydrogen storage from renewable sources, power-to-gas i.e. storage of wind power in the form of hydrogen or methane, electricity grid).

f) Activities aimed at incentivising household to uptake renewable energy products, equipment, and projects.

g) Research and development, information, training and education activities and measures related to aimed at the production of energy from renewable sources (e.g. training in resource management, monitoring and measurement, inventories and assessments, renewable energy certificate system).

The instruments are **excluded** from the tag if they are directed at:

a) The exploration and management of non-renewable energy sources.

b) Fuels derived from wood (e.g. fuel wood, wood pellets) or from agricultural crops (e.g. corn, rapeseed, bagasse, rice husks).

c) Diversion of water for large-scale (i.e. power output over 50 MWth) hydropower production (see 2.2.3 Freshwater).

d) Energy production from other low GHG-emitting transitional sources that do not naturally replenish (e.g. nuclear, natural gas) (see 2.3.7 Energy efficiency).

e) Production of methanol or butanol, if they include non-renewable sources, such as natural gas or coal (see 2.2.5 Fossil fuels).

Selected examples of policy instruments tagged in the Renewable energy domain are shown in Table 23.

### Table 23. Examples of renewable energy-related instruments in the PINE database

| Taxes | Subsidies and payments | Tradable permits and offsets |
|---|---|---|
| Wind energy production tax (Minnesota, United States) | Hydro Ottawa PowerWISE (Canada) | Tradable green electricity and CHP certificates (Flanders, Belgium) |
| Renewable energy obligations (United Kingdom) | Tax credits for solar and wind power (Arizona, United States) | Green certificates to promote renewable energy (Italy) |
| Fee for incentivizing electricity production from renewable energy sources and cogeneration (Croatia) | Sale of excess energy from photovoltaic (Malta) | Renewable Energy Certificates (Australia) |
| Tax on hydropower generation (Burkina Faso) | Incentives to renewable energy producers - Feed-in tariffs (Israel) | Green trading certificates, solar and wind energy (China) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are no tagged fees, deposit-refund schemes, or voluntary approaches.

### *2.2.5 Fossil fuels*

Phasing-out the production and use of fossil energy resources is paramount for limiting climate change. As such, measures which directly reduce the production and use of fossil fuels, and measures that redirect support away from fossil fuels are critical, as emphasised in SDG 12 (notably target 12.c.[14]) on reforming inefficient fossil fuel subsidies.

Instruments in the PINE database tagged under the fossil fuel domain include measures and activities that minimise the extraction and use of fossil energy resources as primary fuels, the transformation to secondary fuel products or material goods, and the use of fossil fuel products. Table 24 lists the keywords used to screen potential candidates, which include the terms and keywords related to fossil fuels.

**Table 24. Keywords to identify a candidate subset of fossil fuel-related instruments**

| |
|---|
| anthracite, coal, cok*, crude, excavation, drill, fossil fuel, hidro*, hydrocarbon, mined, mining, natural resource, offshore, pipeline, petro*, severance, shale, stockholding, stockpiling, |
| aviation fuel, blend, biomass, biofuel, biodiesel, butanol, CNG, diesel, distillate, ethylene, refinery*, *gas*, heavy fuel, HGL, jet fuel, kerosen*, lignite, LNG, LPG, methanol, motor fuel, motor spirit, naphtha, oil*, unleaded, |
| acetylene, asphalt, bitum*, cement, grease, lacquer, lubrica*, paint, paraffin, propane, propylene, rubber, solvent, varnish, wax, heavy oil, mineral oil, oil filter, used oil, heating oil. |

Note: The acronym for CNG is Compressed Natural Gas, LNG is Liquefied Natural Gas, LPG is Liquefied Petroleum Gas or Propane Liquefied. A wildcard (*) allows any series of characters to precede or follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g. timber, taconite, pollution, NOx, biodiesel, toilet, radioactive, vehicle, biofuel, biomass, clean-up, pollut* water, remediation, oil spill, spill, coastal, determined, dolomite, emission, renewable, enhancement, ethanol, forest, replacement, greenhouse gas, hunting, road, marble, salt, soil, metal, motor vehicle, spent, contamin*, displacement, sand, wetland, zinc, sulphur,

The candidate instruments are reviewed to verify their relevance to the fossil fuel domain based on the following **inclusion** criteria:

a) Minimising fossil fuel production (e.g. natural gas, coal, crude oil) along the supply chain, including exploring, excavating, extracting, processing, stockholding, and delivering.
b) Minimising the intake of fossil fuel resources for energy production and transformation.
c) Minimising the intake of primary fossil energy resources as raw material or as feedstock for the production of secondary fuels (e.g. petrol, diesel, kerosene, aviation and jet fuel, methanol, butanol and biofuel blends).
d) Minimising the intake of fossil fuels in materials and products (e.g. industrial oil, lubricants, asphalt, plastics, rubber, paraffin waxes, solvents, detergents, paints, lacquers, varnishes).
e) Recovery of oils, oil filters, or materials made from fossil energy resources (e.g. processing of petroleum-based waste into secondary raw materials (plastic recovery); recovery of textiles (from petrochemical materials), the collection and recycling of petroleum based oils and greases.
f) Research and development, information, training and education activities and measures that minimise the intake of fossil energy resources (e.g. action plans to become independent of fossil fuels, monitoring and measurement).

The following candidate instruments are **excluded** from the fossil fuels tag:

a) Incentives that increase fossil fuel consumption or production[15].

[14] SDG target 12.c. aims to rationalise inefficient fossil fuel subsidies that encourage wasteful consumption by removing market distortions, including restructuring taxation and phasing out harmful subsidies.

[15] Note that environmentally harmful incentives are, by definition, not in scope of the OECD PINE database.

b) Activities related to the replacement or adjustment of production processes to improve fuel efficiency (e.g. integrated technology improvements) (see 2.3.7 Energy efficiency and 2.1.1 Air pollution).

c) Activities related to oil spills or oil-field clean-up (see 2.1.2 Water pollution and 2.1.3 Soil pollution), including after clean-up treatment (e.g. remediation projects, decommissioning activities)

d) Activities aimed (exclusively) at reducing air pollution, such as instruments levied on motor vehicles (including aviation and maritime) (see 2.1.1 Air pollution and 2.3.1 Climate change mitigation) or levied (exclusively) on the sulphur content of gas oil (see 2.1.1 Air pollution).

e) Activities related to road usage (see 2.3.1 Climate change mitigation, 2.3.3 Land degradation or 2.1.6 Noise).

f) Exclusively the production of biofuel from renewable sources, such as biodiesel and ethanol (see 2.2.4 Renewable energy), unless used as feedstock for, or a blend in fossil fuel products.

Selected examples of policy instruments tagged in the Fossil fuel domain are shown in Table 25.

### Table 25. Examples of fossil fuel-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Voluntary approaches |
|---|---|---|---|---|
| Motive Fuel Taxes Unleaded gasoline (Newfoundland, Canada) | Natural resources extraction charge Field stones (from deposits) (Latvia) | Grants for used oil recycling (California, United States) | Transferable consumption allowances for degreasing solvents (Canada) | Memorandum between Ministry of Environment and Italian Mines Association - Reduction of environmental impacts of hydrocarbon exploration (Italy) |
| Liquefied petroleum gas tax (Japan) | Environmental handling charges for used oil (Alberta, Canada) | Loans for preventing environmental pollution caused by mining activities (Japan) | Energy Efficiency Certificates (TEE) for saving electricity, natural gas and/or other fuels (Italy) | Covenant on waste oils (Flanders, Belgium) |
| Basic tax on mineral oil (Norway) | Charge on lubricating oils waste (Portugal) | Subsidies for alternative fuels (Illinois, United States) | N/A | SAFED NZ -Safe and Fuel Efficient Driving to e.g. helps organisations reduce fuel and maintenance costs (New Zealand) |
| Individual consumption tax on petroleum products, Kerosene (Korea) | Fee on petrol (Denmark) | Energy Development and Demonstration Programme To achieve energy policy goals including assisting in being independent of fossil fuels in 2050 (Denmark) | N/A | N/A |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes.

### *2.2.6 Minerals*

Minerals are naturally occurring materials which are generally solid, inorganic and abiogenic. They are subdivided into metallic (e.g. iron, aluminium) and non-metallic (e.g. potash, rock salt) raw materials. Minerals are used by virtually every sector of the economy. More than 150 billion tonnes of rock are mined each year to meet the global demand for minerals (UNEP, 2022a[34]). With population expansion, urbanisation, and the shift to renewable energy sources, demand for a range of mineral materials and products is expected to rise further. The mining industry and raw materials are closely linked with SDG 12 on ensuring sustainable consumption and production patterns to operate sustainably in the future.

The policy instruments in the Minerals domain of the PINE database are aligned with such an objective, and they help promoting sustainable resource management initiatives and approaches recommended by the Mineral Resource Governance adopted in 2019 by the UN Environment Assembly (UNEA). Policy instruments in the Minerals domain are aimed at the minimisation of production and use of mineral resources. Keywords presented in Table 26 were used for screening candidate instruments (EC, 2020[35]) (BRGM, 2020[36]) (USGS, 2022[37]).

**Table 26. Keywords to identify a candidate subset of mineral-related instruments**

| |
|---|
| alumin* gold, manganese, metal*, mineral, natural, resource, salt, sand, silver, stone, subsoil, zinc, gravel, iron, raw material, dirt, rock, barite, bauxite, beryllium, cadmium, chromium, cobalt, graphite, steel, iodine, lead, lime, lithium, magnesium, mercury, molybdenum, nickel, niobium, platinum, rare earths, rubidium, gravel, selenium, steel, talc, tantalum, tellurium, thallium, thorium, titanium, tungsten, vanadium, zirconium, zinc, |
| accumulator, batt*, copper, clay, ceramic, glass, beverage, recycl*, scrap, |
| abstraction, severance, excavation, exploration, extraction, geolog*, quarr*, mining, mined, crush, backfilling, demolition. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., coal, determining, diesel, electronic, environment, fishing, forest, hunting, milk, oil, shale, peat, restoration, saltmarsh, timber, water.

The candidate instruments are individually reviewed to verify their relevance to the Minerals domain based on the following criteria for **inclusion** in the domain tag:

a) Exploration, excavation, and extraction of mineral resources (e.g. copper, cadmium, iron, gold, silver, manganese, chromite). Such activities include also abstraction of sand, gravel, soil or sub-soil; mining and quarrying operations; discovery of new reserves.
b) Minimising the intake of mineral resources through e.g. consumption (including international trade) and production processes (including in-process modifications, e.g. in packaging material, transport equipment and infrastructure), and backfilling using demolition waste.
c) Activities aimed at substituting mineral-based materials by those of other abundant or renewable resources (e.g. wood-based materials for construction).
d) Reducing scrap and the recovery of mineral-based materials, e.g. the processing of metallic and non-metallic mineral materials, waste and scrap, and end-of-life products into secondary raw materials. For example:
    - mechanical crushing or reduction of metal waste from used cars, washing machines, bikes, railway wagons, etc.
    - shredding of metal waste, end-of-life vehicles, dismantling of vessels, etc.
    - physical-chemical and thermal processes for recovery, especially for metals.
    - other methods of mechanical treatment as cutting, pressing to reduce the volume.
    - reclaiming metals out of photographic waste, e.g. fixer solution or photographic films and paper; recycling of spent batteries and accumulators.
    - crushing, cleaning and sorting of e.g. glass, aluminium, steel, or ceramics.

- crushing, cleaning and sorting of other waste such as demolition waste to obtain secondary raw materials.

e) Research and development, information, training and education activities and measures aimed at the minimising the intake of mineral resources (e.g. monitoring and measurement activities, research on recycling mineral resource materials).

The tagging is further refined by **excluding** instruments from the tag if they target:

a) Extraction and use of fossil energy resources (see 2.2.5 Fossil fuels).

b) Extraction and use of water (see 2.2.3 Freshwater) and biological natural resources (see 2.3.4 Biodiversity).

c) Measures and activities that improve the efficiency of mineral resources extraction.

d) Collection, transportation and sorting of household waste and similar (see 2.1.4 Solid waste and 2.3.8 Circular economy).

e) Production of energy from the incineration of biodegradable waste (see 2.2.4 Renewable energy and 2.3.8 Circular economy).

Finally, resulting from this two-step process Table 27 presents selected examples of policy instruments tagged in the Minerals domain.

### Table 27. Examples of mineral-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Deposit refund schemes | Voluntary approaches |
|---|---|---|---|---|---|
| Excise on disposable beverage containers (Finland) | Soil abstraction control fee for gravel (Finland) | Bonus for consumers purchasing electric or hybrid two-wheel vehicles when scrapping old one (Italy) | Packaging waste recovery note and packaging waste recovery export note system (United Kingdom) | Deposit-refund system for beer bottles (Mexico) | Agreement on selective demolition to improve recycling and resource effectiveness (Denmark) |
| Severance tax on lead, zinc, thorium, molybdenum, manganese, rare earth, and other metals (New Mexico, United States) | Charges for exploitation of minerals, exploration license (Albania) | Subsidies for construction and demolition waste treatment plans (Israel) | N/A | Deposit-refund system for lead-acid accumulators (Poland) | Covenant on end-of-life vehicles (Belgium) |
| Tax on iron ore, manganese ore & chrome ore (India) | Natural resource extraction charge, field stones (from deposits) (Latvia) | Steer clean vehicle scrappage program (Nova Scotia, Canada) | N/A | Deposit refund system for beverage containers (Lithuania) | Voluntary agreement on take-back of portable accumulators (Czech Republic) |
| Duty on sealed NiCd-batteries (Denmark) | Packaging waste charge, iron cans, handling charge (Croatia) | Free registration tax on all battery powered electric vehicle (Malta) | N/A | Lead acid battery take back program (Canada - Prince Edward Island) | Covenant for the basic metals sector (Netherlands) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes.

## 2.3 Cross-cutting domains

### *2.3.1 Climate change mitigation*

Climate change is increasingly impacting the planet's ecosystems, disrupting national economies and transforming people's lives (IPCC, 2018[38]). Efforts to tackle climate change respond principally to SDG 13, as well as the goals set out in the 2015 Paris Agreement, and the subsequent Conferences of the Parties to the UN Framework Convention on Climate Change.

In the OECD PINE database, climate change mitigation instruments are directed towards reducing or limiting greenhouse gas (GHG) emissions, and enhancing nature-based or technology-based GHG sequestration. Table 28 lists the keywords used to screen potential candidates; the list includes general climate change terms and keywords related to mitigation actions.

**Table 28. Keywords to identify a candidate subset of climate change-related instruments**

| |
|---|
| climate, aerosol, carbon*, $CO_2$, methane, $CH_4$, nitrous oxide, $N_2O$, ETS, energy, electricity, warming, annex, greenhouse, GHG, Paris, IPCC, UNFCCC, Kyoto, LULUCF, CCU, CCUS, carbon capture, emission, retrofit, |
| renewable, bioenergy, solar, wind, tide, tidal, ocean, hydro, geothermal, green energy, animal waste, vegetable waste, vegetal waste, vegetative waste, renewable waste, biogenic, livestock, beef, cattle, nitrous, hydrofluorocarbons, perfluorocarbons, sulphurhexafluoride, sulfur, nitrogen trifluoride, HFC, PFC, $SF_6$, $NF_3$, F-gases, |
| stratosphere, thermochemical, transpiration, traffic, congestion, road, passenger, highway, haul*, shipping, shipment, freight, cargo, transport*, rail, flight, charter, airport, airplane, aviation, air ticket, departure, travel, coal, natural gas, diesel, petrol, kerosen*, mineral oil, motor spirit, unleaded, fuel, circulation, oil, gas, LNG, LPG, naphtha, methanol, butanol, cement, steel, |
| forest, timber, wood, afforestation, reforestation, nature-based solutions, sequest*. |

Note: A wildcard (*) allows any series of characters to precede or follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., fund, disaster, water, soil, NOx, carbon monoxide, sulphur oxide, SOx, nitrogen oxide, non-methane volatile organic compound.

The candidate instruments identified are individually reviewed in order to verify their compliance with one of the following criteria. The instruments are **included** as relevant to climate change mitigation if they are directed at:

a) Avoiding, limiting, or reducing emissions of GHGs (e.g., carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride) in the following sectors:[16]
   - Energy (e.g., promoting renewable energy generation (see also 2.2.4 Renewable energy for additional domain tags).
   - Industry and manufacturing (e.g., industrial processing of cement, steel, aluminium, glass, chemicals, and carbon capture utilisation and storage (CCUS) technology applications).
   - Transport (e.g., use of motor vehicles (incl. also maritime transportation and aviation), use of roads, switch to low-carbon fuel, low GHG in shipping, emission-differentiated instruments on the ownership or registration of motor vehicles vehicles).
   - Buildings (e.g. low emission construction material, energy efficient building design and inducing energy saving practices (see also 2.3.7 Energy efficiency for additional domain tags), retrofit of buildings (see also 2.3.8 Circular economy for additional domain tags).
   - Waste (e.g., methane (biogas) capture from landfills, energy recovery from incineration of biodegradable waste, reducing food waste).

[16] Four indirect greenhouse gases – nitrogen oxides ($NO_X$), carbon monoxide (CO), non-methane volatile organic compounds (NMVOC), sulphur oxides ($SO_X$) – are not considered climate change-related in the PINE database as they cause increase in the radiative forcing indirectly by increasing tropospheric ozone concentrations.

- Agriculture and land use, land-use change, and forestry (LULUCF) (e.g., reducing agriculture land needs, projects to reduce methane and GHG emissions from livestock production, energy saving machinery).

b) Limiting or reducing extraction and processing of GHG-intensive resources (e.g., coal, petroleum, natural gas, shale oil/gas, peat) (see also 2.2.5 Fossil fuels for additional domain tags).

c) Protection or enhancement of GHG sinks and reservoirs (e.g., coastal and oceanic sinks, forests, peatlands, reforestations, sequestration, nature-based coastal protections (see also 2.3.2 Climate change adaptation for additional domain tags).

d) Research and development, information, training and education activities and measures aimed at reducing or limiting GHG emissions, and enhancing nature-based or technology-based GHG sequestration (e.g. monitoring and surveillance, data collection and sharing).

The following candidate instruments are **excluded**:

a) Instruments targeted exclusively at local air pollution (e.g., investment in SOx/NOx pollution abatement) (see 2.1.1 Air pollution).

b) Instruments targeted (exclusively) at ozone layer depletion (see 2.1.5 Ozone layer)

c) In the transport sector (incl. also maritime shipping and aviation), emission-undifferentiated instruments levied on the *ownership*, licensing, or registration of motor vehicles. Transport instruments are also excluded in cases where rates are not differentiated according to the GHG emissions or energy efficiency of the vehicle (see 2.3.8 Circular economy and 2.3.7 Energy efficiency).

d) Instruments directed exclusively at climate change adaptation (e.g., flood prevention, disaster management, certification of buildings and structures of resistance to high winds and other climate-related hazards, etc.) (see 2.3.2 Climate change adaptation).

e) Instruments directed at waste disposal, incl. recycling of batteries and accumulators, food and beverage containers, electrical appliances, end of life vehicles (see 2.1.4 Solid waste and 2.3.8 Circular economy).

f) Instrument directed at energy savings household goods (e.g., energy efficiency appliances, energy efficient certificate scheme) (see 2.3.7 Energy efficiency).

Table 29 gives examples of policy instruments tagged in the climate change domain.

### Table 29. Examples of climate change mitigation-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets |
|---|---|---|---|
| Tax on diesel and liquefied gas (Argentina) | Fee for the use of national roads (Switzerland) | Subsidy for forestry sequestration (Iceland) | Renewable Energy Certificates (Australia) |
| Contribution for intervention in economic domain (excise tax on fuels) (Brazil) | Heavy goods vehicle road toll (Germany) | Tax credit for investments in environmental facilities and equipment (Korea) | EU Emissions Trading System (European Union) |
| National tax for diesel and petrol (Colombia) | Environmental duty for passenger cars and vans (Denmark) | The Permanent Forest Sinks Initiative (New Zealand) | Swiss $CO_2$ Emissions Trading Scheme (Switzerland) |
| Domestic tax on electricity final consumption (TICFE and TCFE) (France) | Charge on premature harvesting of forests (Poland) | Grant for low-emissions cars (United Kingdom) | Carbon Reduction Commitment Energy Efficiency Scheme (United Kingdom) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes and voluntary approaches.

### *2.3.2 Climate change adaptation*

Climate change adaptation is a complex process of adjustment to actual or expected changes in climate and its effects, with core objectives of reducing vulnerability, and strengthening resilience and adaptive capacity. Adaptation measures are generally distinguished into structural, social and institutional measures (IPCC, 2014[39]). Structural adaptation measures include any physical measures that reduce or avoid undesirable impacts from climate variability and climate extreme events. Structural measures are further categorised into nature-based solutions (NbS)[17], and grey or "engineered" solutions (e.g. dikes, levees and fire walls). Social measures may target the specific vulnerabilities of disadvantaged groups, such as community-based adaptation, social protection schemes and education campaigns surrounding disaster responses, and hazard and vulnerability mapping (IPCC, 2014[39]). Institutional measures include laws, regulations and planning measures such as protected areas, building codes and land zoning to improve the safety of hazard-prone communities, as well as taxes, subsidies and insurance arrangements to foster adaptation (IPCC, 2014[39]). Efforts to tackle the impacts of climate change respond principally to SDG 13, the 2015 Paris Agreement goals, and Sendai Framework for Disaster Risk Reduction.

Climate change adaptation policies incentivise all activities that reduce or avoid negative impacts of climate change on people, the economy and the environment. In this respect, climate change adaptation is linked to multiple policy areas which go beyond the scope of the PINE database, currently limited to less environmentally harmful ("green") economic instruments (see discussion in Section 2.). Therefore, the climate change adaptation domain tag in PINE focuses exclusively on the subset of adaptation instruments that incentivise nature-based solutions addressing climate-related impacts and risks. Keywords used for screening candidates for tagging the adaptation domain are presented in Table 30.

**Table 30. Keywords to identify a candidate subset of climate change adaptation-related instruments**

| |
|---|
| adaptation, adapt, filtration, bioretention, fire, climate change, climate risk, damage, drought, landslide, mudflow, mudslide, ocean acidification, sea level rise, ecological restoration, ecosystem-based |
| embankment, flood, riparian, *forest*, green infrastructure, green roof, grassland, extreme heat, heat island, heatwave, mangrove, nature based, NBS, porous, rainwater, resilient, retention areas, runoff, saltmarsh, peatland, coral reef, sink, desalin*, |
| shade, storm, urban park, weather, wetland, wildfire, erosion, vegetation, buffer, disaster, cool roofs, blue infrastructure, floodplain, silvo-pastoral, crop. basin. |

Note: A wildcard (*) allows any series of characters to precede or follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., mitigation, seismic, species.

The candidate instruments are individually reviewed in order to verify their compliance with one of the following **inclusion** criteria:

a) Instruments that incentivise the use of nature-based solutions to address or limit the risks of climate impacts from specific hazards such as:
   - Floods, storms and rising sea level, e.g. activities that rehabilitate and restore rivers, floodplains and wetlands (including riparian buffers), promote healthy coastal wetlands and coral reefs (including no-take marine reserves) to protect against storm surges and rising sea levels, instruments promoting green and/or blue infrastructures (e.g. storm water retention ponds, downspout disconnection), and rainwater harvesting systems (including rain gardens, planter boxes and bioswales) to control runoff and flooding associated with increases in precipitation.

[17] NbS is defined as "measures that protect, sustainably manage or restore nature, with the goal of maintaining or enhancing ecosystem services to address a variety of social, environmental, and economic challenges" (OECD, 2020).

- Heatwaves or extreme heat, e.g. the promotion of green infrastructure in cities to moderate the heat-island effect (including green spaces, green roofs/walls, shade trees and urban parks).
- Wildfires, e.g. bushfire reduction, prescribed fires, promoting fire-resistant species and plantation patterns (see also 2.2.2 Forests for additional domain tags).
- Droughts, e.g. plantation of grasslands, afforestation and reforestation that support hydrological ecosystem services (see also 2.2.2 Forests for additional domain tags), grass strips and vegetation near water sources and water ways to act as natural eco-system buffers preventing soil runoff, changing cropping practices/varieties, desalinisation (see also 2.3.3 Land degradation for additional domain tags).

b) Adaptive land use planning and management to prevent or avoid the risk of impact from climate hazards (e.g. zoning areas to improve microclimate, land use adaptive design to climate risks, restoration of natural flood plains, nature-based flood management).

c) Instruments incentivising nature-based solutions to avoid the impacts of climate risks on vulnerable and exposed areas (e.g. riparian conservation payments, subsidies for NbS adaptation investments, public private partnerships for payment of ecosystem services, incentives for watershed protection); or impacts on vulnerable and exposed individuals and communities (e.g. subsidies to address energy poverty through NbS options).

d) Research and development, information, training and education activities and measures linked to nature-based solutions (e.g. training of NbS for water practitioners, grants for promoting research projects on climate change impacts and adaptation, monitoring and evaluating adaptation plans, vulnerability and risk assessments, and applications of NbS particular to adaptation).

Candidate instruments are **excluded** from the tag if they target:

a) Adaptation efforts in the form of exclusively man-made (“grey”) engineered infrastructure. These include hard structures such as dams, dykes, sea walls, artificial reefs, pipes, embankments, etc. This is because they are not directly beneficial for the environment (see discussion in Section 2.) and would be out of the scope of the PINE database. Rather, the climate change adaptation domain in PINE comprises of instruments that are natural solutions that reduce climate-related risks.

b) Biodiversity-related NbS without an explicit focus on a climate risk that requires adaptation. To distinguish adaptation NbS from conservation actions more broadly, it is useful to demarcate and tag the socio-economic service that is serving the adaptive purpose. For example, forest restoration would be included if it contained provisions for adapting to wildfires, but excluded if it enhances biodiversity in broad terms.

c) Instruments exclusively targeting climate change mitigation activities, without incentive to reduce the impacts associated to climate-related risks, (see 2.3.1 Climate change mitigation).

d) Institutional measures related to disaster risk that is non-climate related e.g. seismic zoning restrictions.

Selected examples of policy instruments tagged in the climate change adaptation domain are shown in Table 31.

## Table 31. Examples of climate change adaptation-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Voluntary approaches |
|---|---|---|---|---|
| Extra-consumption water levy (Drought levy) (Israel) | Fee for the management of urban stormwater (France) | Financing scheme for manufacturing and services sectors to conform to legislation in the areas of energy saving, recycling, health and safety (Malta) | Watershed preservation and recreation (United States) | Ecotender Scheme - Landholders submit bids to be paid to manage their land and water resources in ways that provide environmental improvements (Victoria, Australia) |
| Tax on large commercial establishments that produce negative externalities in land use planning and infrastructure (Spain) | Charge for entrance to exploitation zone (Canada) | Sustainable Land Management Hill Country Erosion Programme (New Zealand) | Transferable rights for wetlands conservation (United States) | Bush Tender - an auction-based approach to protecting and improving the management of native vegetation on private land. (Victoria, Australia) |
| N/A | Marine ecosystem conservation fee (Korea) | Operational programme quality of environment to support efficient resource use ensuring environmental protection, active adaptation to climate change (Slovak Republic) | Water allocation transfers (Canada) | Bush Broker (native vegetation offset scheme) to help improve the quality and extent of native vegetation (Victoria, Australia) |
| N/A | Charge for prevention of development restriction zones (Korea) | Agri-Environment Payment Scheme (GLAS) for farmers to help tackle climate change, preserve biodiversity, protect habitats and promote environmentally-friendly farming (Ireland) | N/A | Permanent Forest Sinks Initiative (New Zealand) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes. Note that the Climate change adaptation domain tag in PINE focuses exclusively on the subset of adaptation instruments that incentivise nature-based solutions addressing climate-related impacts and risks.

### *2.3.3 Land degradation*

More than 70% of the Earth's ice-free land has been transformed from its natural state, impacting billions of people who rely on land resources for their livelihoods (IPCC, 2019[40]). Land degradation is defined as the reduction of the capacity of land resources (soils, water, and biodiversity) to provide ecosystem goods and services (UNCCD and WOCAT, 2021[41]). Land degradation is often caused by a range of factors such as deforestation, pollution, and unsustainable land management practices.

Efforts to combat land degradation respond to SDG 15 (protect, restore, and promote sustainable use of terrestrial ecosystems, combat desertification, and halt and reverse land degradation). Target 15.3 specifically focuses on combating desertification and restoring degraded land and soil. This target is integral to the UN Convention to Combat Desertification (UNCCD) goal on Land Degradation Neutrality, which highlights the importance of the conservation dimensions of reversing land degradation to keep land as healthy and productive as possible. Further, the land degradation domain ties into the UN Decade on Ecosystem Restoration which aims to boost investment in implementing sustainable land management practices, such as restoring the biodiversity, the productivity of land and the resilience of ecosystems peatlands, mangroves, and increasing forest cover on mountains.

In the PINE database, land degradation policy instruments incentivise the protection, conservation and restoration of land resources so that land will be able to provide ecosystem goods and services. Table 32 provides the keywords used to screen instruments relevant to the land degradation domain.

**Table 32. Keywords to identify a candidate subset of land degradation instruments**

| |
|---|
| bush, cultivat*, excavation, national parks, protected area, natural areas, natural sites, veget*, turf, conservation of areas, ecological areas, land care, land conservation, land conversion, land management, land preservation, land protection, landscape, lands, land-use, natural lands, |
| soil, conservation practices, compost, erodi*, erosion, tillage, tilling, salin*, buffer strip, filter strip, |
| agricult*, agri-environmental, ecological production, crop, grazing, silvopastoral, organic*, agricultural land, environmentally friendly agriculture, agricultural management, farmers, environmentally friendly farming, organic agriculture, organic farming, organic production, regenerative farming, hedge, terrace, field margin, |
| quarr*, mining, site rehabilitation, remediation, nitrate vulnerable zones. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., biofuel, corncrake, island, landing, mari*, motor vehicle, Netherlands, ponds, saltmarsh, wetland, wildlife.

The candidate instruments, identified through the keyword search, are **included** in the land degradation domain if they meet one of the following criteria:

a) Protection and conservation of natural and semi-natural landscapes (e.g. promotion of landscape conservation practices, minimising mining excavation activities, preservation of nature, protected areas, conservation of wetlands, salt marshes, or streambanks (see also 2.3.4 Biodiversity and 2.2.2 Forests for additional domain tags).

b) Protection and conservation of soils (e.g. protection against soil erosion, limiting soil abstraction, composting activities, liming of soils to improve soil quality, restoration of soil fertility, activities minimising soil acidification and salinisation (see also 2.1.3 Soil pollution for additional domain tags).

c) Land protection and maintenance activities related to agricultural practices (e.g. environmentally friendly farming, sustainable crop and vegetable production, managing overgrazing of livestock, silvopastoral systems, agricultural land restoration, agroforestry, conservation tillage practices).

d) Restoration and rehabilitation of unproductive or degraded lands (e.g. rehabilitation of abandoned mining and quarrying sites (see also 2.3.4 Biodiversity for additional domain tags), landfills, and other contaminated sites (see also 2.3.4 Biodiversity and 2.1.3 Soil pollution for additional domain tags).

e) Research and development, information, training and education activities and measures aimed at the protection, conservation, and sustainable management of land resources (e.g. education or training programmes to farmers, local businesses, and communities; national certification system of organic agricultural products).

The tagging strategy is further refined by **excluding** instruments if they target:

a) The exploitation and trade in wildlife and endangered species (exclusively) (see 2.3.4 Biodiversity).

b) Protection of natural areas located in marine or ocean bodies (see 2.1.2 Water pollution).

Selected examples of policy instruments tagged in the land degradation domain are shown in Table 33.

### Table 33. Examples of land degradation-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Voluntary approaches |
|---|---|---|---|---|
| Taxes on land conversion - Land conservation rights (Mauritania) | Charge on entrance to national parks and monuments (Greece) | Subsidy for ecological areas (Greece) | Tradable development rights for pinelands management (United States) | Covenants with farmers for sustainable agriculture (Flanders, Belgium) |
| Farmland for non-agricultural use tax (China) | Soil abstraction control fee (Finland) | Subsidy for land conservation (Iceland) | Tradable development rights for land preservation (France) | Land for Wildlife (Victoria, Australia) |
| Tax on excavation areas (Slovak Republic) | Fee for landscape and nature protection (Austria) | Nitrate vulnerable zones - to protect and employ best management practices in nitrate sensitive areas (United Kingdom) | Land management for agricultural preservation (Montgomery County, United States) | National certification system for organic agricultural products (Chile) |
| Charge for bush and tree removals (Poland) | Fines for breaching nature protection laws in protected areas (Bulgaria) | Multi-materials stewardship board backyard composting program (Newfoundland, Canada) | N/A | Certification for environmentally friendly agricultural products (Korea) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes.

### *2.3.4 Biodiversity*

Human pressures are undermining the biological diversity[18] that underpins all life on land and in water (IPBES, 2019[42]). Covering all species, ecosystems and genetic diversity, the vital ecosystem services delivered by biodiversity, such as crop pollination, water purification, flood protection and carbon sequestration, are being jeopardised. Biodiversity-relevant instruments in the PINE database can help reduce pressure on biodiversity by incentivising producers and consumers to conserve and sustainably use biodiversity. The data collected by PINE has been used to help monitor progress towards CBD Aichi Biodiversity Target 3[19] under the 2011-2020 framework, and is now used to monitor progress towards Target 18 under the CBD Kunming-Montreal Global Biodiversity Framework, which states: …*and scale up positive incentives for conservative and sustainable use of biodiversity.* The biodiversity domain is also relevant to SDG 14 and SDG 15 on marine and terrestrial biodiversity, respectively.

Protection of biodiversity refers to measures and activities aimed at the protection and rehabilitation of fauna and flora species, ecosystems, and habitats as well as the protection and rehabilitation of natural and semi-natural landscapes (Eurostat, 2020[4]). It covers conservation, sustainable use and restoration of biodiversity. Table 34 lists the keywords used including generic biodiversity terms, and keywords related to biodiversity on land and in water.

**Table 34. Keywords to identify a candidate subset of biodiversity-related instruments**

| |
|---|
| flora, fauna, landscape, natur*, forest, habitat, diversity, biome, buffer zone, conserv*, |
| ecology, ecological restoration, ecosystem, endangered, species, evolution, ex situ, in situ, extinction, gene, land use, protected, tourism, |
| native, exploit*, IUCN, red list, threatened, rehabilitation, seedbank, restor*, sustainable, wild*, conserv*, field margin, hedge, |
| hunting, logging, agricultur*, fertiliser, fertilizer, timber, fur, agri*, pesticide, wood*, soil, wildlife, coniferous, deciduous, animal, |
| bird, crop, cattle, bush, grazing, plant, mushroom, insect, mammal, erosion, peat, farmland, vege*, food, horti*, lumber, pulp, organic, |
| alien invasive, biocide, tillage, tilling, grass, meadow, quarry, bog, marsh, wetland, stumpage, mountain, |
| ocean, sea, marine, coral, reef, mussels, oysters, lagoon, mudflat, coastal, mangrove. |
| river, estuary, sewage, pond, lake, riparian, irrigate*, effluent, drought, reservoir, dam, hydro*, stream*, basin, abstraction, extraction, |
| water*, aqua*, flood, fish*, salmon, chemical, nitrogen, sand, vessel, boat, angling. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives.

Second, the candidate instruments are individually reviewed in order to verify their relevance to the biodiversity domain based on the following **inclusion** criteria:

a) Protection of natural and semi-natural landscapes to maintain and increase their role in biodiversity preservation (e.g., maintenance of landscapes that are the result of traditional agricultural practices threatened by prevailing economic conditions); preservation or conservation of legally protected sites for non-market ecosystem services, such as conserving genetic heritage, protecting forests for their ecosystem regulation functions, etc.

b) Conservation, reintroduction or recovery of fauna and flora species, in addition to the restoring, rehabilitation and reshaping of damaged habitats for the purpose of strengthening their natural

[18] The Convention on Biological Diversity defines "Biological diversity" as the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

[19] Aichi Target 3 states: “By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions”.

functions (e.g. restoring degraded ecosystems, addressing exploitation and trade in wildlife and endangered species, rehabilitation of abandoned mining and quarrying sites (see also 2.1.3 Soil pollution and 2.3.3 Land degradation for additional domain tags), re-naturalisation of river banks, burying of electric lines).

c) Water-based transport vehicles, operation, and infrastructure.

The tagging strategy is further refined by **excluding** candidate instruments if they target:

a) The protection and rehabilitation of historic monuments or predominantly built-up landscapes.

b) Protection of cultural landscapes exclusively to maintain and increase their aesthetic value.

c) The establishment and maintenance of green spaces along roads and recreational structures (e.g., golf courses, other sports facilities).

d) The control of weed for agricultural purposes as well as the protection of forests against forests fire when this predominantly responds to economic reasons (e.g., obtaining firewood).

e) Actions and expenditure related to urban parks and gardens unless biodiversity is explicitly targeted.

f) Land- and air-based transport vehicles, operation, and infrastructure.

Selected examples of policy instruments tagged in the biodiversity domain are shown in Table 35.

### Table 35. Examples of biodiversity-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets |
|---|---|---|---|
| Tax on forests, hunting and fishing (Burkina Faso) | Water resource management charge (South Africa) | Subsidy for forest development agencies (Canada) | Tradable development rights for pinelands management (United States) |
| Forestry fund tax (Hungary) | Environmental fee on Svalbard (Norway) | Native Forest Investigation Fund (Chile) | Individual transferable fishing quotas (Australia) |
| The quarries rehabilitation tax (Israel) | National Parks entrance fee (Poland) | Subsidy to promote green areas [green bonus] (Italy) | Territorial User Rights for benthics (Mexico) |
| Tax on maritime transport to protected natural areas (France) | Fee for the exploitation of wildlife (Colombia) | Subsidy programme for the care of landscape (Czech Republic) | Total Allowable Catches for fisheries (Mozambique) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no available tagged instruments for deposit-refund schemes.

### *2.3.5 Ocean*

The ocean is a shared global resource with an immense potential to foster economic development. However, ocean-related industries in many countries have expanded with insufficient consideration for the environment, placing at risk the natural resources and essential marine ecosystem services on which economies and the well-being of people depend (OECD, 2022b[2]); (OECD, 2016b[43])). Efforts towards the sustainable protection of the ocean respond principally to SDG 14, as well as the 1994 UN Convention on the Law of the Sea, the Convention on Biological Diversity and its Aichi Targets, as well as similar targets subject for discussion in the CBD Post-2020 Global Biodiversity Framework.

The transition towards a sustainable ocean economy requires supporting the long-term planning horizon of ocean-based industries (marine fishing, shipping, offshore wind, etc.), sustainable use of natural assets (fish, wildlife resources, raw materials, genetic material) and marine ecosystem services ($CO_2$ absorption and sequestration, coastal protection, breeding habitats, shipping lanes, recreation and tourism) (Barbier, 2017[44]). Table 36 lists the keywords used, including generic ocean terms, keywords related to ocean industries and the ocean economy.

**Table 36. Keywords to identify a candidate subset of ocean-related instruments**

| |
|---|
| ocean, sea, marine*, maritime, offshore, blue, reef, deep-sea, deep-water, sea-bed, benthic, lagoon, mudflat, tidal, mangrove, coast*, coastal wetland, coastal marsh, salt marsh, salt water, brackish, exclusive economic zone, EEZ , subsea, |
| fish*, aqua*, mariculture, cod, tuna, coral, mussel, oyster, crustacean, mollus*, pelagic, seafood, algae, algal, seaweed, sea grass, piranha, shellfish, endanger, threatened, conservation area, |
| ship*, boat, cargo, craft, vessel*, ferry, floating, light attractor, naval, port, sea-port, harbour, harbor, dock, freight, ballast, oil spill*, oceanogra*, plastic*, |
| cruise, dredg*, sea salt, desali*, hurricane, cyclone, typhoon, flood, robotics, wave, underwater, blue water, international water, territorial sea, high sea, continental shelf, seabed. |

Note: Keywords on sustainability are not needed because all instruments in the PINE database are environmentally related by definition, so any instrument identified as relevant to the ocean is also relevant to ocean sustainability. A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded (e.g., freeze, ecological) from the automated search as they yield many false positives.

Second, the candidate instruments are individually reviewed in order to verify their relevance to the *ocean* domain. The instruments are **included** if they are directed at:

a) Prevention of spills and leaks into the sea, and marine litter (e.g. plastic waste).
b) Marine and coastal zone protection.
c) *Use* of water-based motor vehicles for maritime transportation and the related infrastructure (e.g., ports).
d) Production of energy from the sea (e.g., offshore wind, ocean currents, wave, and tidal energy).

The following candidate instruments are **excluded**:

a) For land-locked countries, no instruments are tagged as ocean-related unless ocean or marine elements are explicitly mentioned. This is particularly important for instruments related to fisheries.[20] On the other hand, some land-locked countries have introduced economic instruments that are directly relevant to the ocean.[21]

[20] e.g., all fishing taxes in Switzerland are excluded.

[21] e.g., Austria applies a charge on the import of plants and animals which explicitly differentiates on those resources harvested from the ocean.

b) Activities related to climate change or land-based waste disposal unless they target specifically coastal or marine areas. Such instruments can be identified using the "climate change mitigation" and "solid waste" domains.

c) Instruments related to water abstraction are excluded, as they typically refer to freshwater, unless ocean or marine elements are explicitly mentioned (e.g., desalination of sea water is included).

d) Taxes on *ownership* of motor vehicles can include a specific tax rate for vessels or boats. In practice, the relevance for maritime transportation is rather low for such broadly defined instruments. Tagging them could overestimate the role of transport policies in the ocean domain (and subsequently inflate the estimated revenue raised from such taxes). Therefore, instruments related to general ownership of motor vehicles are excluded, unless they are defined specifically for water-based transportation (see 2.2.6 Minerals).

Selected examples of policy instruments tagged in the ocean domain are shown in Table 37. The most commonly tagged instruments relate to fish and vessels and a majority are taxes and fees.

### Table 37. Examples of ocean-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets |
|---|---|---|---|
| Hunting and fishing taxes (Germany) | Great Barrier Reef visitor charge (Australia) | Offshore wind component technologies development and demonstration scheme (United Kingdom) | Tradable fishery quota (Netherlands) |
| Tax on maritime transport to protected natural areas (France) | Fee on the occupation or use of the Maritime Terrestrial Public Domain (Spain) | Marine Energy Deployment Fund (New Zealand) | Individual Transferable Quotas for fisheries (Sweden) |
| Vehicle and vessel tax (China) | Coastal protection fee, Texas (United States) | Fund for Fisheries Investigation, FIP (Chile) | Total Allowable Catches for fisheries (Mozambique) |
| Import duties on vehicles and vessels (Indonesia) | Fishing licence fees (Cook Islands) | Marine pollution prevention fund (Israel) | Individual Vessel Quota (IVQ) system for cod and small pelagics (Norway) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are no deposit-refund schemes tagged.

### *2.3.6 Chemicals management*

Sustainable chemicals management aims at addressing the environmental and health risks posed by production, consumption, use and disposal of chemicals and chemicals in products. Public policies which seek to address the effects from exposure to chemicals should involve a comprehensive framework of measures for managing chemicals at every step of their life-cycle (UNEP, 2015[10]). Instruments for chemicals management respond to SDG 12 (sustainable production and consumption), specifically 12.4 on achieving environmentally sound management of chemicals and all wastes throughout their life cycle; and SDG 3 (health and well-being), specifically 3.9 reduce the number of deaths and illnesses from hazardous chemical. Furthermore, it supports the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, the 1998 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, the 2001 Stockholm Convention on Persistent Organic Pollutants, the 2006 Strategic Approach to International Chemicals Management (SAICM) and the 2013 Minimata Convention on Mercury.

Measures here concern the protection of individuals (consumers, workers, vulnerable populations) and the environment from hazardous chemical exposures, and the promotion of innovation for development of safe and sustainable alternatives. Policy instruments in this domain also align with the polluter-pays-principle for financing sound management of chemicals. Table 38 lists the keywords used to search for potential candidates for inclusion in this domain, building on searches developed by (Slunge and Alpizar, 2019[45]). The keywords include generic chemical terms and keywords related to chemicals and chemical products.

**Table 38. Keywords to identify a candidate subset of chemicals management-related instruments**

| |
|---|
| chemic*, toxic*, hazard*, carcinogenic, carcin*, muta*, repro*, devo*, persistent, endocrine, |
| fertili*, pestic*, insecticide, herbicide, fungicide, DDT, COD, BOD, phosphorus, nitric, ammonia, |
| plastic, PVC, polyvinyl, vinyl, chlori*, phthalate, flame retardant, hazardous waste, solvent, methanol, arom*, ethylene, propylene, butadiene, |
| tyre, tire, batter*, accumulator*, electr* waste, electr* equipment, lead, cadmium, mercury, asbestos, |
| dry-cleaning, detergent, pharmaceut*, cosmetic, hygiene, paraben, fumigation |

Note: Keywords on sustainability are not needed because the PINE database includes, by definition, only environment-related policy instruments. The wildcard (*) matches any number of characters after the keyword. Certain keywords are excluded from the automated search as they yield many false positives.

Second, the candidate instruments are reviewed to verify their relevance to the chemicals management domain based on the following **inclusion** criteria:[22]

a) Activities related to extraction of raw materials,[23] processing of natural gas and minerals into high-volume and low-value bulk chemicals like ethane, propane brine, etc.
b) Production and consumption (including international trade) of basic chemicals like petrochemicals, olefins (ethylene and propylene), aromatics (xylenes, benzene, and toluene), sulphur, sulphur derivatives, chlorine, caustic soda, titanium oxides and industrial gases.
c) Activities related to commodity chemicals like plastics, resins and synthetic rubber, PVC, polystyrene, polyethylene.
d) Intermediate chemical usage for further use in production or manufacturing of products like oils, pigment and dyes, surfactants like ethoxylates, starches and glue, activated charcoal and explosives.

[22] Adapted from the UNEP Global Chemicals Outlook–II (2019)

[23] Fossil fuels are the feedstocks for basic petrochemicals. Although today many high-value polymers and industrial enzymes can be produced from biological feedstocks.

e) Specialty chemicals designed to cater to specific functions. These include products related to:
   - Paints, coating, surfactants, electronic chemicals
   - Fine chemicals used for production of pharmaceuticals, biocides, fragrances etc.[24]
   - Advanced polymer adhesives and sealants
   - Personal care preparations, parabens, micro-plastics
   - Flame retardants
   - Nanomaterials, nanoparticle-based sunscreen products, nano-catalyst, thin film solar cells, nano-lithographic tools and nanoscale electronic memories, nano-silver (used in consumer products like electronics, information technology, health care, textiles, and personal care products)
   - Additives like stabilizers, antioxidants, plasticizers, and slipping agents used in packaging processes to improve the packaging material properties.

f) Downstream chemical processing and product manufacturing for sectors like agriculture (pesticides, fertilizer, etc.), automotive, construction, electronics, packaging, pulp and paper, pharmaceuticals, textiles and apparel, and their related consumer products (detergents, batteries).

g) Management of wastewater effluents and water runoff: Treatment of sewage and industrial wastewater, nutrient management in agriculture, livestock manure management, etc. directed at prevention and removal of COD and BOD, vet pharmaceutical residues.

h) Management of industrial and consumer product disposal and waste:
   - Demolition, retrofit, or renovation of older buildings (e.g., asbestos).
   - End-of-life recycling of e-waste, formal/ informal scraping of e-waste.
   - Release of pharmaceuticals into the environment; disposal of unused, expired drugs and medicines.
   - Disposal of carcinogenic chemicals used in solar panels, batteries, turbines.
   - Disposal of textile processing waste etc.
   - Spills and leaks of chemicals into the environment and the related clean-up.

The following candidate instruments are **excluded**:

a) Fuel consumption taxes are generally not considered as chemicals-related, unless they are targeted specifically at lead, mercury, silica, cadmium, etc.

Selected examples of policy instruments tagged in the (sustainable) chemicals management domain are shown in Table 39.

[24] Fine chemistry deals with isolating or synthesising pure chemicals. They are produced in small quantities for specific purposes, scientifically derived to function as ingredients in more complex specialty chemicals.

### Table 39. Examples of chemicals management-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets |
|---|---|---|---|
| Tax on chemicals in certain electronic products (Sweden) | Chemicals' registration fee (Finland) | Subsidy on lead-free gasoline (Türkiye) | Ozone depleting substances (United States) |
| Hazardous chemicals inventory fee (Indiana, United States) | Fees for the control of chemicals (Norway) | Tax credit for certified equipment for more precise fertiliser and pesticide application (Virginia, United States) | Tradable permits for lead in gasoline (United States) |
| Duty on pesticides (Italy) | Waste Electrical and Electronic Equipment [WEEE] fee (Italy) | Subsidies for safe household hazardous waste management (California, United States) | Transferable consumption allowances for degreasing solvents (Canada) |
| Duty on PVC-film (Denmark) | Levy for permits to handle and deliver hazardous materials [poison permit] (Israel) | Lead hazard control assistance, (New Jersey, United States) | Tradable phosphorous discharge rights (Colorado, United States) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are no deposit-refund schemes tagged.

### *2.3.7 Energy efficiency*

Energy plays an important role in environmental protection, as the energy sector is a major emitter of greenhouse gases. At the same time, energy is central to addressing global challenges such as reducing poverty, boosting employment, improving security and access to basic services. As global demand for energy is expected to increase, in part due to population and economic growth, improvements in the production, delivery, and consumption of energy are essential. Energy efficiency supports SDG 7, including specific target 7.3, which aims to double the rate of improvement in energy efficiency by 2030.

In the OECD PINE database, energy efficiency policy instruments include measures and activities directed at heat and energy savings that reduce the intake of energy from all energy sources. It can cover households, all economic sectors and value chain processes, from energy production and resource efficiency to technological development. Table 40 lists the keywords used to screen candidate instruments for the domain tag.

### Table 40. Keywords to identify a candidate subset of energy efficient-related instruments

| |
|---|
| cogeneration, district heating, electric*, heat, energy, energy conservation, energy consideration, energy consumption, energy efficiency, energy saving, energy recovery, pylon, transmission line, utility, |
| grid, incandescent, insulation, LEED, light bulb, lighting, smart*, smart grid, smart energy, and smart meter, thermal, voltage, window |
| LED, light emitting diodes, boiler, furnace |

Note: The Leadership in Energy and Environmental Design (LEED) is a rating system widely used to evaluate the environmental performance of buildings. Certain keywords are excluded from the automated search as they yield many false positives, e.g., waste, ozone, solar, hydro, wind, green, photovoltaic, mercury, PCB, petrol, natural gas, mineral oil, oil.

The candidate instruments are reviewed to verify their relevance to the energy efficiency domain based on the following **inclusion** criteria:

a) Measures and activities aimed at reducing intake of energy for heat and electricity production, electrification, through the adoption of energy efficiency technologies or production processes, including in-process modifications and/or technology replacement of energy-intensive goods and services. For example, in the:

- energy sector (e.g. equipment for heat and electricity cogeneration from non-renewable sources, manufacturing and installing of cogeneration plants, energy storage equipment, heat recovery equipment).
- industry and manufacturing (e.g. improvement energy supply management, replacement of equipment, adjustment and electrification of production, material efficiency).
- transport (e.g. reducing losses in energy transportation and mobile sources (including motor vehicles, maritime, and aviation).
- buildings (e.g. lighting retrofits, use of smart grids, smart temperature controls, replacing boilers with more efficient heat pumps, building insulation, energy efficient appliance).
- waste (e.g. production (recovery) of energy from non-biodegradable waste).
- agriculture and LULUCF (e.g. replacement machinery, energy efficient production processes, solar water pumps).

b) Activities aimed at promoting behavioural changes to reduce the consumption of energy-intensive goods and services (in absolute levels), such as model shifts in transportation (e.g. biking and walking, reducing heating temperatures in buildings, reducing time spent consuming IT services or internet in general, teleworking, incentives for investments in energy savings in technology, LED incentive programs).

c) Research and development, information, training and education activities and measures linked to the management and saving of heat and energy (e.g. audits, production of energy performance certificates, assessments of energy savings potentials, eco-labelling system, energy efficiency certificate scheme).

The following instruments are **excluded** from the energy efficiency domain tag:

a) Activities which aim to increase the supply of energy products from (exclusively) renewable sources (see 2.2.4 Renewable energy).

b) Activities aimed (exclusively) at reducing air pollution (see 2.1.1 Air pollution).

c) Production of energy through the incineration of biodegradable waste (see 2.2.4 Renewable energy and 2.3.8 Circular economy).

Selected examples of policy instruments tagged in the Energy efficiency domain are shown in Table 41.

### Table 41. Examples of energy efficient-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets |
|---|---|---|---|
| Tax on electricity (Sweden) | Charge for generation of electricity from fossil fuels (North Macedonia) | Subsidy for clean technologies and products (Greece) | Energy efficiency certificate scheme (Victoria, Australia) |
| Duty on electricity for storage heaters (installed before April 1999) (Germany) | Electricity, Time- and load-differentiated tariffs for domestic consumers (Israel) | Green Fund scheme (Netherlands) | Perform Achieve and Trade - energy savings certificates (India) |
| Promotion of power-resources development tax (Japan) | Fluorescent light recycling fees (British Columbia, Canada) | Subsidy for energy sector (France) | Clean energy certificates (Mexico) |
| Federal contribution on electricity and natural gas (Belgium) | Local Government Electricity Surplus (South Africa) | Tax credit for investments in environmental facilities and equipment (Korea) | Energy Efficiency Certificates (TEE) (Italy) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are no deposit-refund schemes tagged.

### *2.3.8 Circular economy*

A circular economy aims to reduce the consumption of finite material resources by recovering materials from waste streams for recycling or reuse, using products longer (Livingstone et al., 2022[46]). Circular economy policies can improve resource efficiency and productivity, and both reduce impacts on the environment and enable a more sustainable and competitive economy.

Circular economy approaches are linked to several SDGs, such as: SDG 8 (decent work and economic growth), SDG 12 (responsible consumption and production patterns), and SDG 13 (take urgent action to combat climate change and its impacts). It can also support the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes.

In the OECD PINE database, the Circular economy domain comprises policy instruments aimed at maximising resource efficiency, and minimising waste and pollution generation of material goods production and consumption. Keywords used for screening candidates for tagging the Circular economy-related instruments are presented in Table 42.

**Table 42. Keywords to identify a candidate subset of circular economy-related instruments**

| |
|---|
| compost, recycl* ecological renovation, environmental improvement, resource management, single-use, resilience, |
| eco-design, eco-label, eco-logo, business model, circular, life cycle, energy recovery, procurement, producer responsibility, product stewardship, sharing, supply chain, sustainab*, value chain, |
| deposit refund, plastic, material*, recover, refurbish*, regener*, remanufacture, renovation, repair, restrict*, reus*, scrap, tire, tyre, material consumption, material management, *waste*, |
| disposal, incineration, landfill, registration, ownership, cars, vehicle, insurance. |

Note: A wildcard (*) allows any series of characters to precede or follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., debt recovery, energy, extract, quarr*, radioactive, nuclear, water, sewage, drainage, effluent, discharge, road, dry cleaning, emission, infrastructure.

The candidate instruments are reviewed to verify their relevance to the circular economy domain. The instruments are **included** in the tag based on the following criteria (based on (OECD, 2022a[18]) and (Livingstone et al., 2022[46]):

a) Activities and measures promoting a design of products and/or production processes, which prevents or minimises material consumption in:
   - upstream measures (e.g. reducing resource use in procurement processes, using secondary materials).
   - product design (e.g. improved design to reduce hazardous components in waste and products, reduce barriers to recycling).
   - production process (e.g. using product components and by-products, redistribution of second-hand products).
   - waste generation (e.g. packaging, single-use materials, batteries).

b) Activities aimed to make efficient use of natural resources as primary materials (e.g. wood-based materials for construction, farming practices) and in the biological cycle (e.g. composting activities).

c) Activities and measures disincentivising the consumption of *new* resource-intensive products (e.g. taxes on the ownership of motor vehicles and tires).

d) Activities aimed at improving use-intensity of existing products and services (e.g. sharing economy approaches, product repair and maintenance).

e) Activities related to the remanufacture, repurpose, refurbish, and reuse of end-of-life products.

f) Recovery of waste materials to be recycled or used as secondary raw materials *(*e.g. production of biogas and biofuels from waste (see also 2.2.4 Renewable energy for additional domain tags), energy production through incineration or methanisation of biodegradable waste (see also 2.2.4 Renewable energy for additional domain tags), collection and sorting of recyclable waste materials and material recovery, collection scheme for scrapped (passenger) cars and vans, deposit refund system for packaging).

Candidate instruments are **excluded** from the tag if they target:

a) Activities or measures that increase the extraction of natural resources.

b) Product repair, maintenance, and renovation activities requiring significant *new* investments or material resources, which do not improve overall resource efficiency over the product's life-cycle.

c) The collection and treatment of wastewater (see 2.1.2 Water pollution), radioactive or nuclear waste (see 2.1.7 Radiation).

Selected examples of policy instruments tagged in the Circular economy domain are shown in Table 43.

### Table 43. Examples of Circular economy-related instruments in the PINE database

| Taxes | Fees | Subsidies and payments | Tradable permits and offsets | Deposit-refund systems | Voluntary approaches |
|---|---|---|---|---|---|
| Advanced Disposal Surcharge for eligible tires (Alberta, Canada) | Charge on municipal waste collection (Denmark) | Subsidy for waste treatment facilities on farms (Greece) | Packaging waste recovery note and packaging waste recovery export note system (United Kingdom) | Deposit-refund system for glass, metal, laminate, plastic containers (Türkiye) | Support integrated system of dealing with municipal waste, collect data, support secondary market with raw materials (Czech Republic) |
| Charge on municipal waste collection / treatment (Hungary) | Prepaid recycling fee on electric and electronic appliances (Switzerland) | Soft loans for investments in pollution control and waste disposal (United States) | Landfill Allowance Trading Scheme* (United Kingdom) | Deposit-refund system for motor vehicles to prevent abandonment (Sweden) | Voluntary agreement to promote waste prevention through the reuse or recycling (Italy) |
| Landfill closure and contingency tax (New Jersey, United States) | Charge on glass beverage packaging (Liechtenstein) | Soft loans for fostering recycling industry (Korea) | N/A | Refund scheme of the tax on trichloroethene (TRI) (Norway) | Australian Packaging Covenant - agreement between companies in the packaging supply chain (Australia) |
| Recycling charge (Iceland) | Hazardous waste charge (Montenegro) | Accelerated depreciation for industries to support investments (France) | N/A | Deposit-refund system to increase packaging collection and subsequent reuse of glass, plastic, aluminum, steel, tetra Pak or ceramic (Spain) | Green public procurement scheme to reduce environmental impacts throughout product or service's life cycle (Slovak Republic) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. * indicates an inactive instrument.

### *2.3.9 Mercury*

Human activities such as mining, coal combustion and waste incineration generate mercury pollution, posing serious risks to human health and the environment. The persistence of mercury in the environment is of concern because it can be converted into highly toxic compounds that circulate in the air for thousands of years after it is released into the atmosphere (EEA, 2018[47]). These compounds can be transported around the globe and deposited on land and in water, where they can accumulate in the food chain. The most significant release of mercury emissions globally is from sources such as small-scale gold mining and industrial operations, followed closely by unintentional releases such as burning solid fuels, like coal, lignite, and wood (EEA, 2018[47]).

Actions taken to reduce mercury use and prevent mercury exposure contribute to SDG 1 (to end poverty) through minimising the risks of pollution exposure in occupations such as mining, and waste management; SDG 2 (to improve nutrition and sustainable agriculture) by reducing mercury build-up in the food chain; SDG 3 (to promote healthy lives and well-being) through phasing out the use of mercury in products, and SDG 14 (to conserve oceans, seas, and marine resources) through the prevention of mercury from entering water sources. Through a global approach, the 2013 UN Minamata Convention on Mercury aims to minimise the release of mercury emissions from all sources and phase out its use (UNDP, 2016[48]).

In the OECD PINE database, the policy instruments in the Mercury domain aim to minimise the exposure to mercury and mercury compounds; they concern measures and activities minimising or phasing-out of the use mercury, the release of mercury emissions in industrial processes, and the management of mercury waste. The following keywords are used to screen candidate policy instruments.

**Table 44. Keywords to identify a candidate subset of mercury-related instruments**

| |
|---|
| amalgam, ASGM, cinnabar, mercuric, mercury, mining, Minamata, Hg, quicksilver |
| cement, coal, iron ore, gold mining, metal*, nonferrous, phosphate, silver, stomatolog*, vinyl chloride, furnaces, smelt, |
| electr*, circuit, fluorescent, batt*, button cell, lamps, medic*, monitors, LCD, PVC, screen, switches, barometer, relays, |
| hazardous, inciner*, toxic. |

Note: A wildcard (*) allows any series of characters to follow the keyword. Certain keywords are excluded from the automated search as they yield many false positives, e.g., enhancement, displacement, replacement, package, and metal container.

The candidate strategies are individually reviewed in order to verify their relevance to the mercury domain. The instruments are **included** based on activities and measures in the following criteria:

a) Minimising and eliminating Artisanal and Small-scale Gold Mining (ASGM), reducing or preventing primary mercury mining and processing (e.g. metallic mercury, cinnabar, iron and mercury ores), and secondary production of mercury, i.e. as a by-product of mining or refining of other metals or minerals (e.g. zinc, silver).

b) Minimising emissions of mercury and mercury compounds to the atmosphere from point sources (e.g. stationary combustion of coal, non-ferrous metals production and recycling, cement production, incinerator facilities, smelting and roasting processes of non-ferrous metals, and the burning of mercury-containing wastes).

c) Minimising the use of mercury contained in production or manufacturing of products. This includes all kinds of replacement or adjustment of products and industrial processes aiming to reduce or phase-out mercury contained in products. For example, mercury content in batteries (e.g. mercuric oxide, button cell) or electronic products (e.g. electrical switches), the healthcare sector (e.g. medical equipment, thermometers, pharmaceuticals, dental amalgams), and vinyl chloride (PVC) production.

d) Measures aimed at reducing or preventing the import and export of mercury compounds in domestic markets and international trade.

e) Managing mercury waste and preventing mercury from entering waste streams, such as through recovery, recycling, storage, spill clean-ups, transportation, final treatment and disposal of items that contain mercury. For example, proper disposal at hazardous waste collection centres of items that contain mercury (e.g. LCD screens and monitors, fluorescent light bulbs, ultraviolet lamps), recycling of spent batteries and accumulators that contain mercury, preventing levels of mercury from contaminating waterbodies, restoration of damages caused by mercury mining and processing.

f) Research and development, information, training and education activities and measures linked to the management of mercury exposure and tracking mercury production and use (e.g. education for industries and consumers on how to recycle and dispose of items that contain mercury, monitoring mercury level in water bodies, evaluation, inventories and assessments of mercury emissions, product labelling on mercury content).

Candidate instruments are **excluded** from the tag if they target:

a) Mining of (exclusively) minerals, oil and gas, ferrous metals, and non-metallic minerals, which do not contain mercury.

b) Measures aimed at minimising air pollution from heat and power generation from all energy sources except coal and wood (See 2.1.1 Air pollution).

Selected examples of policy instruments tagged in the mercury domain are shown in Table 45.

### Table 45. Examples of mercury-related instruments in the PINE database

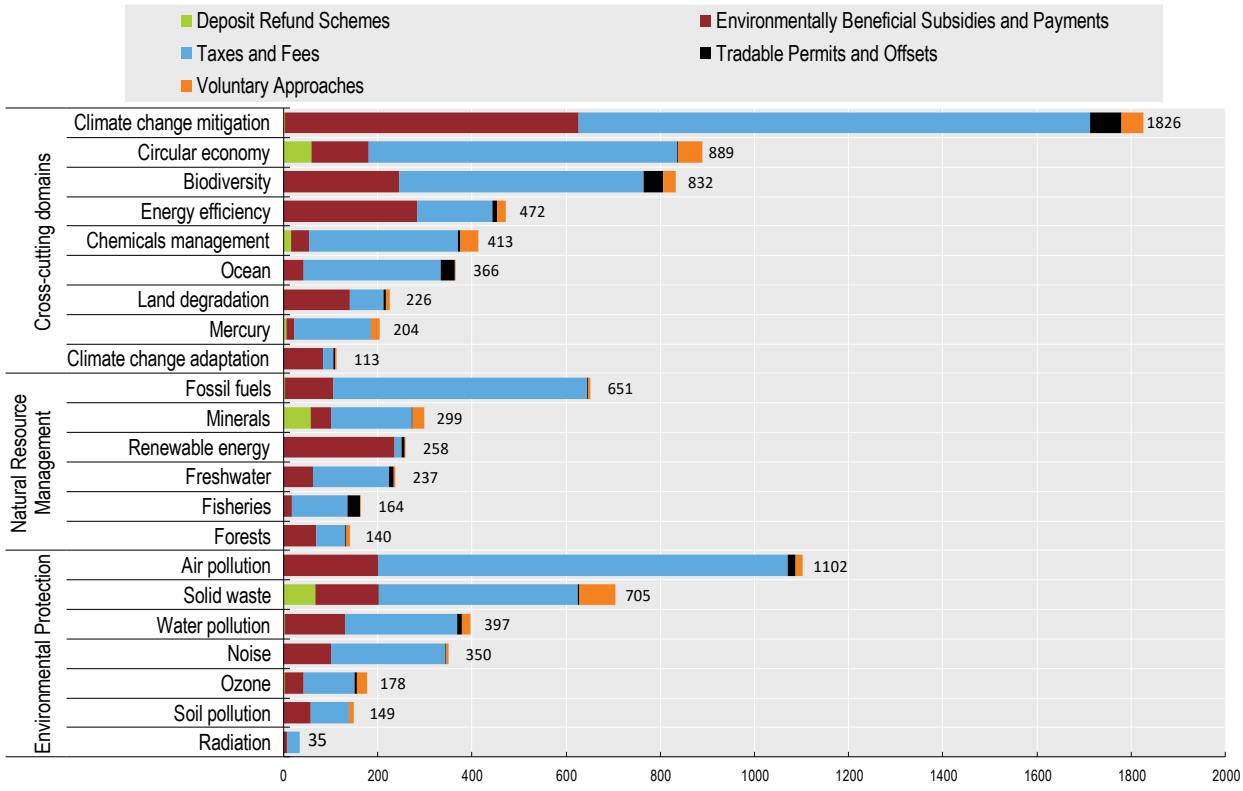
| Taxes | Fees | Subsidies and payments | Deposit refund schemes | Voluntary approaches |
|---|---|---|---|---|
| Duty on polyvinyl chloride and phthalates (Denmark) | Fees for declaration of hazardous waste (Norway) | Restoration of damages caused by mining (Czech Republic) | Deposit-refund system for lead and accumulators (batteries) (Denmark) | Covenant for the basic metals sector (Netherlands) |
| Cement excise tax (Malta) | Fluorescent light recycling fees Fluorescent tubes (British Columbia, Canada) | Subsidies for safe household hazardous waste management (California, United States) | Deposit-refund system for lead-acid batteries (by states) (United States) | Agreement on collection and proper handling of electric and electronic waste (Norway) |
| Environmentally harmful products tax (Latvia) | Recycling charges of electrical and electronic equipment (Korea) | Loans for preventing environmental pollution caused by mining activities (Japan) | Deposit-refund system for lead-acid accumulators (Poland) | Fluorescent Bulb Recycling Program (Alberta, Canada) |
| Value added tax on cement (Uganda) | Hazardous waste management charge (Serbia) | Tax deduction for mining site rehabilitation (Australia) | Lead acid battery take back program (Prince Edward Island, Canada) | FluoroCycle - Recycling and safe disposal of mercury-containing lamps (Australia) |

Note: In some cases, the name of the instrument has been adjusted from the official name to better reflect its coverage. There are currently no Tradable permits and offsets tagged.

# 3. Results

Policy instruments on cross-cutting environmental domains are the most common, followed by environmental protection and natural resource management (Figure 1). Climate change mitigation and circular economy account for the bulk of the instruments in PINE. This is due to the extensive nature of the causes and consequences of these environmental issues and the multiple policy options used to tackle them.

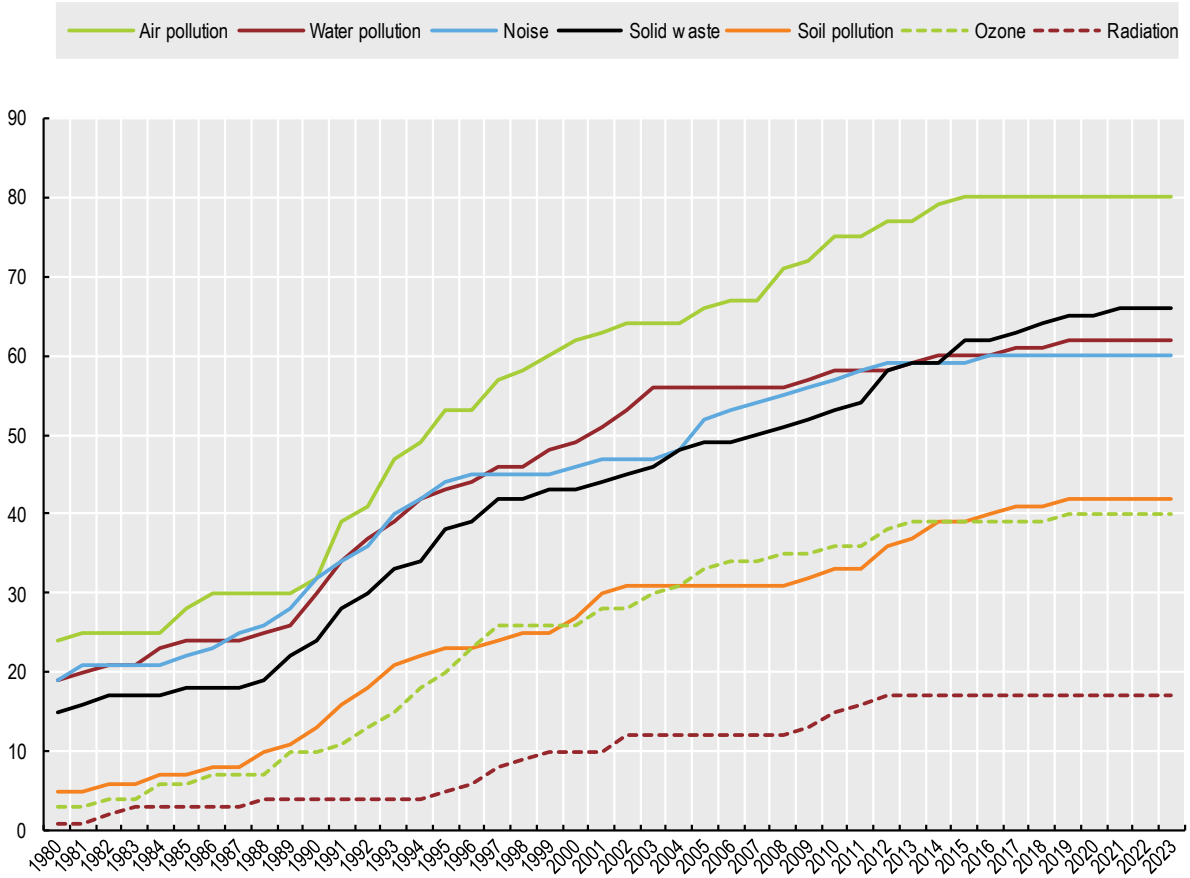
## Figure 1. Policy instruments by type and environmental domain




Source: OECD Policy Instruments for the Environment (PINE) database, extracted June 2023

The number of countries implementing environmental protection policies has substantially increased since the 1980s (Figure 2). Across the 2327 environmental protection instruments in the PINE database, 80 countries have *Air pollution*-relevant policy instruments in place, followed by 66 countries with *Solid waste*-relevant instruments, and 62 countries with *Water pollution*-relevant instruments. There has been a relative plateau after 2012 for the number of countries implementing *Radiation*-relevant instruments.

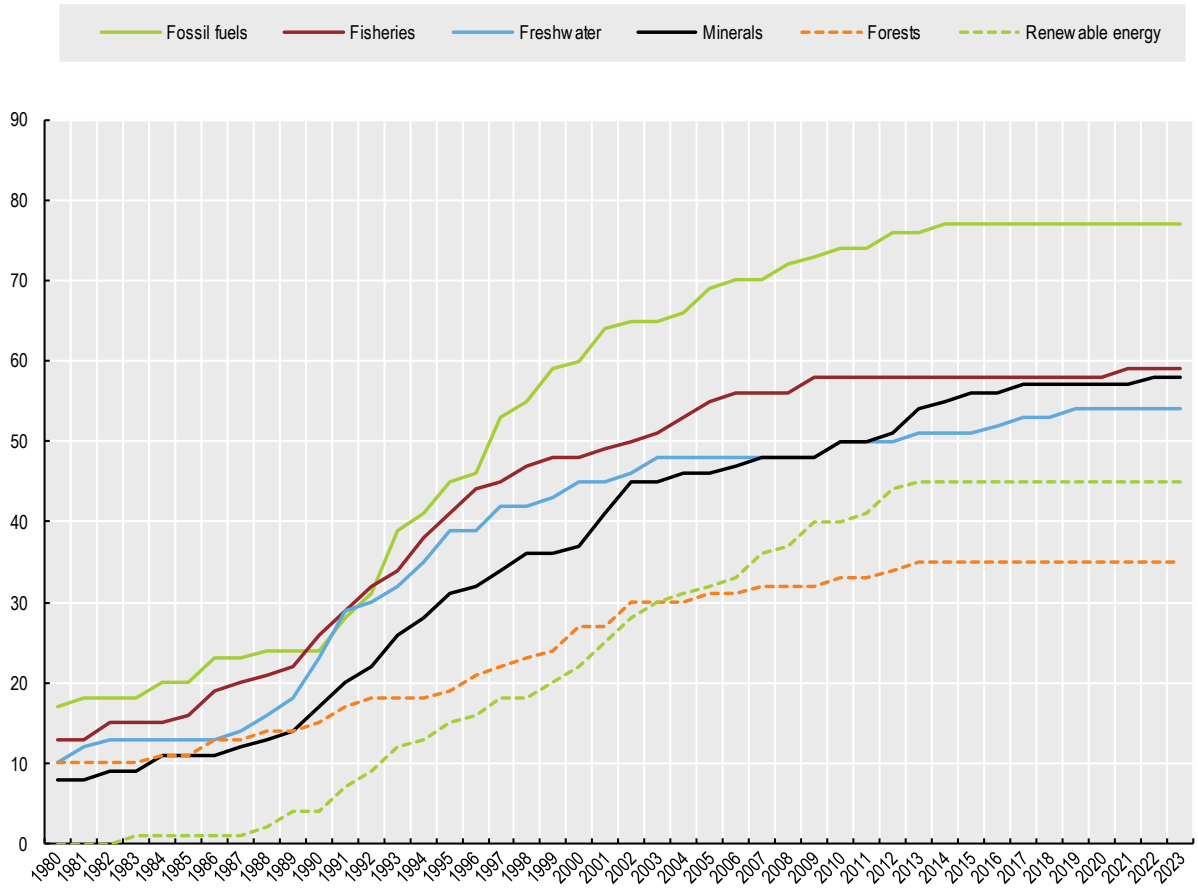
## Figure 2. Number of countries implementing policy instruments for environmental protection




Note: Number of countries introducing at least one instrument tagged with an environmental protection domain. Instruments with missing information on the year of introduction are excluded.
Source: OECD Policy Instruments for the Environment (PINE) database, extracted June 2023

The PINE database currently contains 1639 policy instruments for natural resource management. Over the years, there has been a significant rise in the adoption of policy instruments pertaining to *fossil fuels* across 77 different countries in 2023 (Figure 3). The first *renewable energy*-related policy instruments in the PINE database date back to 1983, followed by a rapid growth, encompassing 45 countries by 2013. However, since then it has remained relatively stable. Similarly, *forest*-relevant instruments reached widespread implementation in 35 countries around 2013 and have since remained relatively stable.

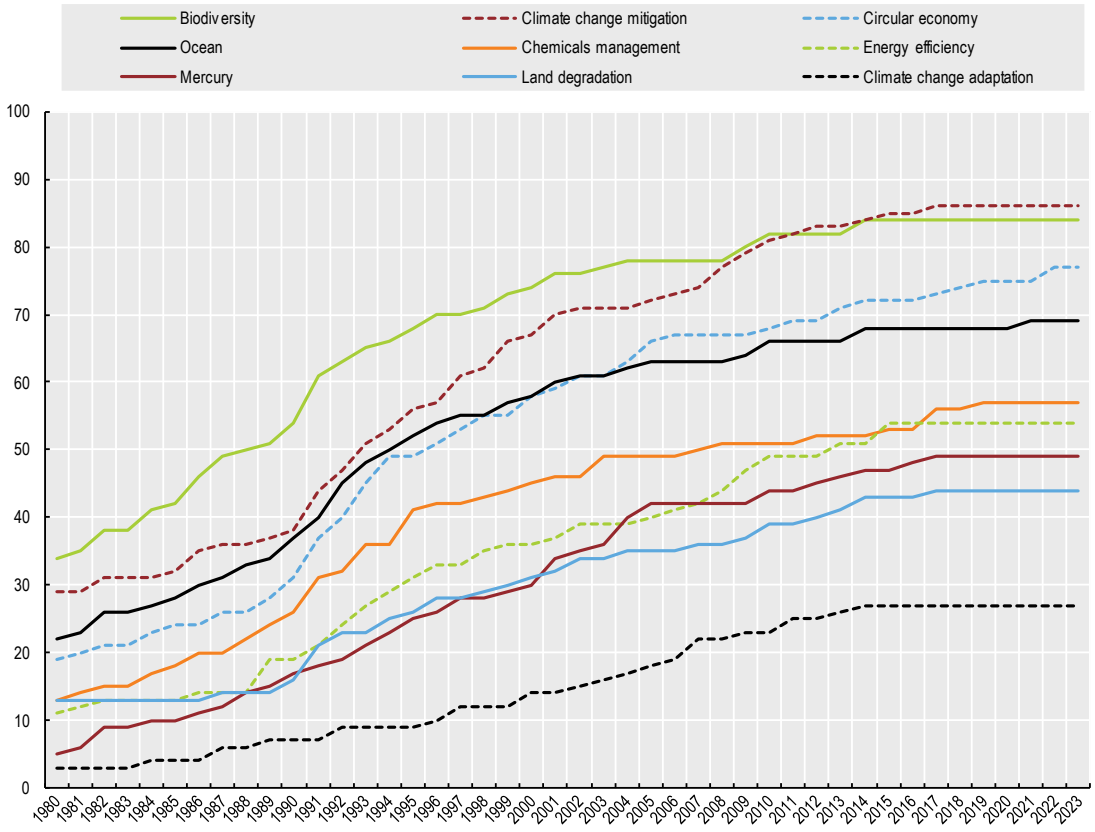
## Figure 3. Number of countries implementing policy instruments for natural resource management




Note: Number of countries introducing natural resource policy instruments. Instruments with missing information on the year of introduction are excluded.
Source: OECD Policy Instruments for the Environment (PINE) database, extracted June 2023

Within the cross-cutting domains, a total of 3497 instruments are recorded in the PINE database. Figure 4 shows that the domain with the most widespread policy implementation is *Climate change mitigation*, with 86 countries having relevant instruments in place. Next is *Biodiversity* with implementation in 84 countries, followed closely by *Circular economy* instruments in 77 countries. In contrast, *Climate change adaptation* instruments are covered in only 27 countries.

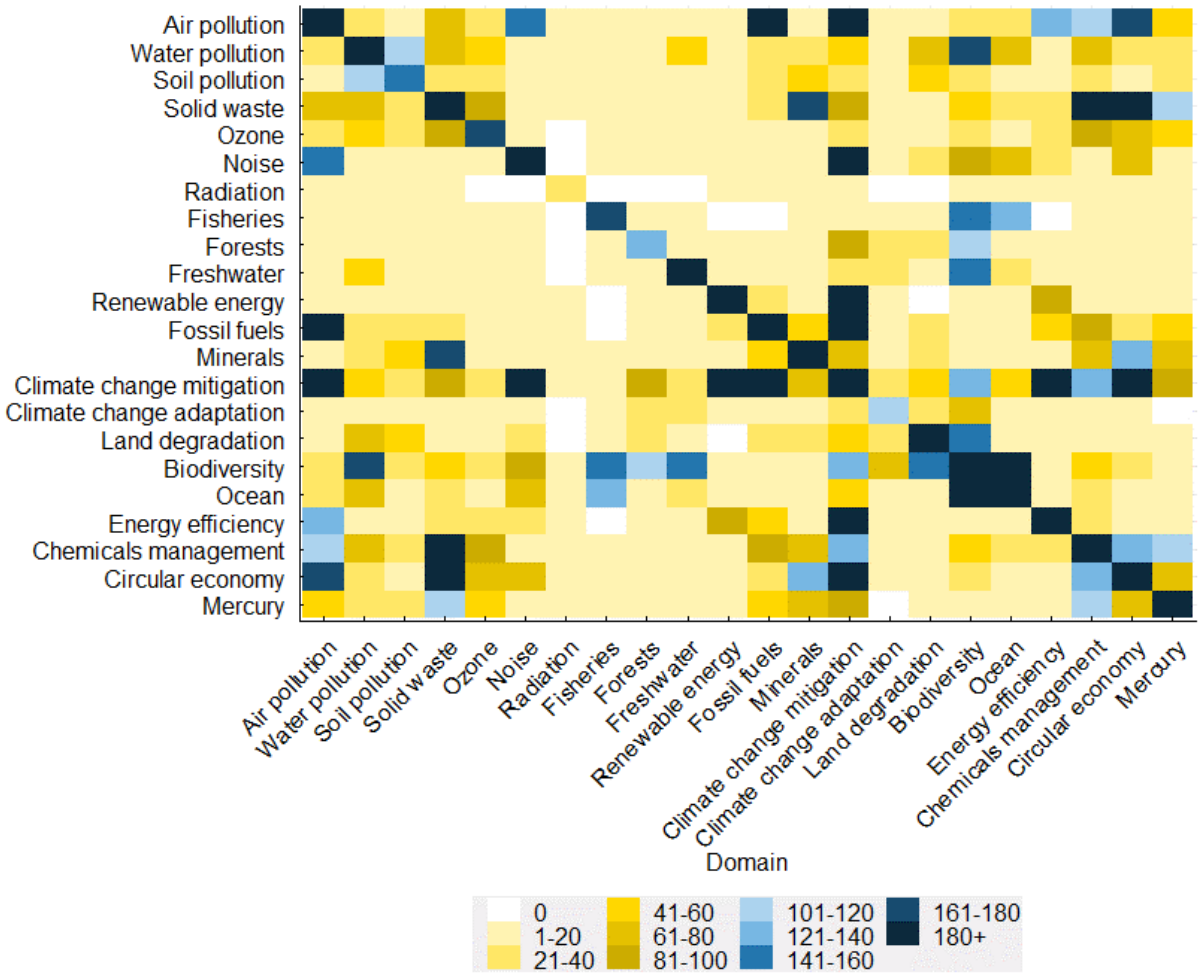
## Figure 4. Number of countries implementing policy instruments on cross-cutting domains




Note: Number of countries introducing policy instruments in cross-cutting environmental domains. Instruments with missing information on the year of introduction are excluded.
Source: OECD Policy Instruments for the Environment (PINE) database, extracted June 2023

A total of 10 006 tags are assigned to 4105 instruments in the PINE database. The instrument with the highest number of tags is thirteen and the lowest is zero[25]. Figure 5 shows the frequency of multiple tagging of environmental domains in PINE database. For example, there are approximately 276 Marine biodiversity policy instruments that have been tagged with both Biodiversity and Ocean. Additionally, 166 instruments are tagged with Air pollution and Circular economy. The highest frequency of match is Climate change mitigation and Air pollution with 829 instruments in common; the second highest is Climate change mitigation and Fossil fuels with 592 instruments in common.

## Figure 5. Frequency of multiple tagging of environmental domains




Note: Frequency of domain tags per instrument. A total of 10 006 tags are assigned to 4105 instruments in the database. The frequency shows the number of instruments that share the same environmental domain tags. Discontinued instruments are included.
Source: OECD Policy Instruments for the Environment (PINE) database, extracted June 2023

[25] Instruments without environmental tags (about a dozen) include, for example, general subsidies on environmental projects or fines for non-compliance with general environmental regulations.

# 4. Conclusion

This paper develops a methodology for tagging policy instruments in the OECD PINE database. The 22 environmental domains allow harmonised comparisons of policy instruments implemented across countries, instrument types, and over time. Domain tagging also helps to track countries' efforts towards meeting their domestic and international environmental objectives, including policies to achieve progress towards the UN Agenda 2030, UN conventions and multilateral environmental agreements. For instance, the biodiversity domain in the PINE database contributes to the monitoring of progress of the Kunming-Montreal Global Biodiversity Framework (KMGBF), specifically Target 18 on Incentives and Target 19 on Resource Mobilisation[26]. An overview of the links with the international environmental policy agenda are provided for the 22 domains covered.

Tracking policy instruments allows progress to be identified early on, even before any related environmental, economic and social outcomes are observed. It also allows assessing policy instrument choice and design. For instance, countries use a variety of instrument types for a more sustainable chemicals management, but detailed policy data is needed to develop empirical evidence on the effectiveness of alternative approaches.

Looking forward, harmonised and comparable data on policy instruments by environmental domain will enrich the messages regarding policy options to address environmental externalities. The OECD PINE database and indicators derived using this tagging methodology could support country studies, such as the OECD Environmental Performance Reviews, Economic Surveys, as well as country experiences developing their own environmental policy indicator sets.

[26] https://www.oecd.org/environment/resources/biodiversity/tracking-economic-instruments-and-finance-for-biodiversity-2021.pdf

# Annex A. Linkages with the proposed Classification of Environmental Functions

## Table A A.1. PINE domains and their links with international environmental classifications

| *PINE environmental domains* | *Proposed CEF classification** | *Differences in scope* |
|---|---|---|
| **Environmental Protection** | | |
| Air pollution | CEF 1.1 Reduction and control of air emissions | There is a direct correspondence between the two classifications. |
| Water pollution | CEF 2.1 Wastewater management<br>CEF 4.1 Protection of soil, surface, and groundwater | PINE includes both wastewater management and the protection of surface and groundwater. |
| Soil pollution | CEF 4.1 Protection of soil, surface, and groundwater | PINE disaggregates CEF 4.1 further into soil and water pollution. |
| Solid waste | CEF 3 1 Waste management | There is a direct correspondence between the two classifications |
| Ozone layer | CEF 1.1 Reduction and control of air emissions | PINE includes a focus on ODS and other substances with high ozone-depleting potential as a separate domain. |
| Noise | CEF 5.1 Protection against noise and vibration | There is a direct correspondence between the two classifications |
| Radiation | CEF 5.2 Protection against radiation | There is a direct correspondence between the two classifications |
| **Natural Resource Management** | | |
| Fish | CEF 4.2.1 Protection of biodiversity and landscapes | PINE includes a narrow focus on fish resources. |
| Forests | CEF 4.3 Management of forest resources | There is a direct correspondence between the two classifications |
| Freshwater | CEF 2.2 Water Savings and management of natural water resources | There is a direct correspondence between the two classifications |
| Renewable energy | CEF 1.2 Energy from renewable sources | There is a direct correspondence between the two classifications |
| Fossil fuels | | Unlike CEF, PINE includes a focus on minimizing the extraction and use of fossil energy resources. |
| Minerals (non-energy) | CEF 3.2 Materials recovery and savings<br>CEF 3.2.2 Mineral (metal, stone, glass, ceramics, other) | Unlike CEF, PINE also includes exploration, excavation, and extraction of mineral resources. |
| **Cross-Cutting domains** | | |
| Climate change mitigation | e.g., CEF 1.1 Reduction and control of air emissions,<br>CEF 1.3. Energy savings and management. | Unlike CEF, PINE includes Mitigation as a cross-cutting domain which focuses on mitigation strategies that limit GHG emissions and enhance nature-based GHG sequestration. This category contains additional criteria than those in CEF 1.1. and 1.3. |
| Climate change adaptation | | Unlike CEF, PINE also includes adaptation instruments focusing on nature-based solutions. |

| Cross-Cutting domains | | |
|---|---|---|
| Land degradation | CEF 4.2 Protection of biodiversity and landscape<br>CEF 4.2 2 Protection of natural and semi-natural landscapes | There is a direct correspondence between the two classifications. |
| Biodiversity | CEF 4.2 Protection of biodiversity and landscape<br>CEF 4.2.1. Protection and rehabilitation of species and habitats | There is a direct correspondence between the two classifications. |
| Ocean | e.g., CEF 2 Wastewater and water resources,<br>CEF 4.1 Protection of soil, surface, and groundwater,<br>CEF 4.2 Protection of biodiversity and landscape. | Unlike CEF, PINE includes Ocean as a cross-cutting domain, which focuses on the sustainable use of ocean resources. This domain contains criteria that are covered in CEF 2, 4.1. 4.2. |
| Chemicals management | e.g., CEF 2.1 Wastewater management,<br>CEF 3.1 Waste management,<br>CEF 4.1 Protection of soil, surface, and groundwater. | Unlike CEF, PINE includes Chemicals management as a cross-cutting domain, which focuses on limiting chemical exposures. This domain contains criteria that are covered in CEF 2.1, 3.1, 4.1. |
| Energy efficiency | CEF 1.3 Energy savings and management | There is a direct correspondence between the two classifications. |
| Circular economy | CEF 3.2 Materials recovery and savings<br>CEF 3.1 Waste management | There is a correspondence between the two classifications. Additionally, PINE includes a focus on eco-design, maximising material efficiency and use intensity. |
| Mercury | e.g., CEF 1.1 Reduction and control of air emissions,<br>CEF 2 Wastewater and water resources,<br>CEF 3.1 Waste management,<br>CEF 4.1 Protection of soil, surface, and groundwater. | Unlike CEF, PINE includes Mercury as a cross-cutting domain, which focuses on minimising exposure to mercury and mercury compounds. This domain contains criteria that are covered in CEF 1.1, 2, 3.1, 4.1., and the limitation of mining of mercury resources. |

Note: The CEF is a classification system based on CEPA and CReMA. CEPA is annexed to the SEEA-CF and is an international classification, whereas CReMA is only used at the European level. Once adopted, the CEF will supersede CEPA and CReMA.
Source: Authors' own mapping based on (Eurostat, Forthcoming-b[49]).

# Annex B. Lists of environmental policy bases

## Table A B.1. Environmentally harmful bases

| *Category* | *Subcategory* | *Base* |
|---|---|---|
| Energy | Fossil fuels | Crude oil |
| Energy | Fossil fuels | Natural gas |
| Energy | Fossil fuels | Coal |
| Energy | Energy products for transport | Unleaded petrol |
| Energy | Energy products for transport | Leaded petrol |
| Energy | Energy products for transport | Diesel |
| Energy | Energy products for transport | Other energy products for transport applications |
| Energy | Energy products for stationary applications | Light fuel oil |
| Energy | Energy products for stationary applications | Heavy fuel oil |
| Energy | Energy products for stationary applications | Coke |
| Energy | Energy products for stationary applications | Electricity |
| Energy | Energy products for stationary applications | Heat |
| Energy | Energy products for stationary applications | Other fuels for stationary applications |
| Energy | Energy-related GHG emissions | Carbon dioxide (CO2) emissions |
| Energy | Energy-related GHG emissions | Other greenhouse gas emissions (CH4, N2O, O3, HFCs, PFCs, SF6) excluding ozone-depleting substances |
| Transport | Road | Road transport motor vehicles |
| Transport | Road | Road transport infrastructure |
| Transport | Air | Air transport motor vehicles |
| Transport | Air | Air transport infrastructure |
| Transport | Water | Water transport motor vehicles |
| Transport | Water | Water transport infrastructure |
| Transport | Other | Other transport equipment or infrastructure |
| Pollution | Air and climate | Ozone-depleting substances (e.g., CFCs, HCFCs) emissions |
| Pollution | Air and climate | Particulate matter (PM10, PM2.5) emissions |
| Pollution | Air and climate | Nitrogen oxides (NOx) emissions |
| Pollution | Air and climate | Sulphur oxides (SOx) emissions |
| Pollution | Air and climate | Volatile organic compounds (VOC) emissions |
| Pollution | Air and climate | Ammonia (NH3) emissions |
| Pollution | Air and climate | Mercury (Hg) emissions |
| Pollution | Air and climate | Other heavy metals or hazardous compounds |
| Pollution | Air and climate | Cement |
| Pollution | Air and climate | Cattle, meat or meat products |
| Pollution | Air and climate | Other emissions to air |
| Pollution | Water | Wastewater in general |
| Pollution | Water | Phosphorus (P) effluents |
| Pollution | Water | Nitrogen (N) effluents |
| Pollution | Water | Oxydizable matter (BOD, COD) effluents |

| *Category* | *Subcategory* | *Base* |
|---|---|---|
| Pollution | Water | Oil leaks and spills |
| Pollution | Water | Other effluents to water |
| Pollution | Solid waste | Solid waste in general |
| Pollution | Solid waste | Aluminium cans |
| Pollution | Solid waste | Glass bottles |
| Pollution | Solid waste | Plastic bottles |
| Pollution | Solid waste | Plastic bags |
| Pollution | Solid waste | Other beverage containers or food packaging |
| Pollution | Solid waste | Batteries |
| Pollution | Solid waste | Tyres |
| Pollution | Solid waste | Motor oil |
| Pollution | Solid waste | Electrical and electronic equipment |
| Pollution | Solid waste | Pallets |
| Pollution | Solid waste | Hazardous waste |
| Pollution | Solid waste | Other materials, products or waste streams |
| Pollution | Other | Synthetic pesticides |
| Pollution | Other | Synthetic fertilisers |
| Pollution | Other | Paints and solvents |
| Pollution | Other | Drugs and pharmaceuticals |
| Pollution | Other | Cosmetics and personal care products |
| Pollution | Other | Detergents and cleaning products |
| Pollution | Other | Other consumer products containing hazardous chemicals or chemicals of emerging concern |
| Pollution | Other | Noise |
| Pollution | Other | Radiation |
| Resources | Terrestrial | Freshwater resources |
| Resources | Terrestrial | Inland fisheries and aquaculture |
| Resources | Terrestrial | Timber resources |
| Resources | Terrestrial | Land and soil resources |
| Resources | Terrestrial | Terrestrial biodiversity and wildlife |
| Resources | Terrestrial | Non-energy mineral resources |
| Resources | Terrestrial | Land use: Conversion of land to agriculture |
| Resources | Terrestrial | Land use: Conversion of land to urban or transport uses |
| Resources | Terrestrial | Land use: Intensive agriculture, intensive forestry or surface mining |
| Resources | Marine | Marine fisheries and mariculture |
| Resources | Marine | Marine biodiversity and wildlife |
| Resources | Marine | Non-energy mineral resources |

Note: The list of environmentally harmful bases is non-exhaustive and is deemed to evolve over time to adequately reflect the environmental impact of products and activities.
Source: Authors based on (OECD, 2023[50])

## Table A B.2. Less environmentally harmful bases

| *Category* | *Subcategory* | *Base* |
|---|---|---|
| Energy | Renewable energy sources | Solar photovoltaic |
| Energy | Renewable energy sources | Solar thermal |
| Energy | Renewable energy sources | Wind |
| Energy | Renewable energy sources | Heat exchange with air or ground (heat pumps) |
| Energy | Renewable energy sources | Deep geothermal |
| Energy | Renewable energy sources | Hydro |
| Energy | Renewable energy sources | Marine (tide, wave, ocean currents) |
| Energy | Renewable energy sources | Biomass (liquid, gaseous or solid) |
| Energy | Renewable energy sources | Waste-to-energy (energy recovery) |
| Energy | Low-emission alternatives for stationary and transport applications | Hydrogen |
| Energy | Low-emission alternatives for stationary and transport applications | Methane |
| Energy | Low-emission alternatives for stationary and transport applications | Other biofuels |
| Energy | Energy-efficient alternatives for stationary and transport applications | Combined cycle energy generation |
| Energy | Energy-efficient alternatives for stationary and transport applications | District heating |
| Energy | Energy-efficient alternatives for stationary and transport applications | Buildings |
| Energy | Energy-efficient alternatives for stationary and transport applications | Consumer goods |
| Energy | Energy-efficient alternatives for stationary and transport applications | Other |
| Energy | Energy-related GHG emissions | CO2 capture, storage and sequestration |
| Energy | Energy-related GHG emissions | Capture, storage and sequestration of other greenhouse gases (CH4, N2O, O3, HFCs, PFCs, SF6) |
| Transport | Transport | Non-motorized vehicles (e.g., bicycles, scooters) |
| Transport | Transport | Green mobility infrastructure (e.g. bike lanes, public walkways, pedestrian zones) |
| Transport | Transport | Public transport systems |
| Transport | Transport | Electric or hybrid motor vehicles |
| Transport | Transport | Other low-emission transport or infrastructure (e.g., charging stations for electric vehicles) |
| Pollution | Air and climate | Low-emission feedstocks and production processes (e.g. ammonia and methane emissions from agriculture) |
| Pollution | Air and climate | After-treatment devices (e.g. air filters, scrubbers, catalytic converters) |
| Pollution | Air and climate | Air pollutant capture and recovery (e.g. NMVOC emissions in solvent manufacturing) |
| Pollution | Water | Low-emission feedstocks and production processes (e.g. non-chlorine bleaching in pulp manufacturing; nutrient runoff from agriculture |
| Pollution | Water | Wastewater treatment |
| Pollution | Water | Pollutant leaks and spill clean-up |
| Pollution | Land | Biological pesticides |
| Pollution | Land | Manure, compost or other natural fertilisers |
| Pollution | Land | Product eco-design (e.g. use of substitute materials; recyclable packaging, biodegradable and compostable packaging) |
| Pollution | Land | Product re-use and repairing |
| Pollution | Land | Material recycling |
| Pollution | Land | Solid waste treatment |

| *Category* | *Subcategory* | *Base* |
|---|---|---|
| Pollution | Other | Environmentally preferable substitutes to hazardous chemicals |
| Pollution | Other | Noise |
| Pollution | Other | Radiation |
| Resources | Terrestrial | Freshwater resources |
| Resources | Terrestrial | Inland fisheries and aquaculture |
| Resources | Terrestrial | Timber resources |
| Resources | Terrestrial | Land and soil resources |
| Resources | Terrestrial | Terrestrial biodiversity and wildlife |
| Resources | Terrestrial | Land use: conversion of land to less intensive use (e.g. from cropland to natural area) |
| Resources | Terrestrial | Land use: sustainable agriculture or sustainable forestry |
| Resources | Terrestrial | Ecosystem provisioning services, not covered elsewhere (e.g. food, fiber) |
| Resources | Terrestrial | Ecosystem regulating services, not covered elsewhere (e.g., pest & disease regulation, pollination, erosion control) |
| Resources | Terrestrial | Ecosystem support services, not covered elsewhere (e.g., nutrient cycle, primary production) |
| Resources | Terrestrial | Ecosystem cultural services, not covered elsewhere (e.g., spiritual, cultural, recreational, aesthetic) |
| Resources | Marine | Marine fisheries and mariculture |
| Resources | Marine | Marine biodiversity and wildlife |
| Resources | Marine | Ecosystem provisioning services, not covered elsewhere (e.g. food) |
| Resources | Marine | Ecosystem regulating services, not covered elsewhere (e.g., pest & disease regulation, seabed erosion control) |
| Resources | Marine | Ecosystem support services, not covered elsewhere (e.g., nutrient cycle, primary biomass production) |
| Resources | Marine | Ecosystem cultural services, not covered elsewhere (e.g., spiritual, cultural, recreational, aesthetic) |
| Other | Other | Information and awareness |
| Other | Other | Education and training |

Note: The list of less environmentally harmful bases is non-exhaustive and will evolve over time to adequately reflect the environmental impact of products and activities.

# References


Barbier, E. (2017), "Marine ecosystem services", *Current Biology*, Vol. 27/11, pp. R507-R510, https://doi.org/10.1016/j.cub.2017.03.020. [44]

BRGM (2020), *Évolution Base de données« Gisements France » : vers desdonnées validées (action 2020)*, Ministère de la Transition Écologique, https://infoterre.brgm.fr/rapports/RP-69922-FR.pdf. [36]

EC (2022), *Fluorinated greenhouse gases*, https://ec.europa.eu/clima/eu-action/fluorinated-greenhouse-gases_en (accessed on 15 Apr 2022). [25]

EC (2020), *Critical Raw Materials for Strategic Technologies and Sectors in the EU - a foresight study*, European Commission, https://doi.org/10.2873/865242. [35]

EC (n.d.), *Protection of the ozone layer*, https://ec.europa.eu/clima/eu-action/protection-ozone-layer_en (accessed on Oct 2022). [19]

EEA (2020), *Environmental noise in Europe*, Publications Office of the European Union, https://www.eea.europa.eu/publications/environmental-noise-in-europe. [27]

EEA (2018), *Mercury in Europe's environment : a priority for European and global action*, Publications Office of the European Union, https://data.europa.eu/doi/10.2800/558803. [47]

EEA (2019b), *EMEP/EEA air pollutant emission inventory guidebook*. [6]

EEA (2019a), *Ozone-depleting substances 2019*, European Environment Agency, https://doi.org/doi:10.2800/630584. [52]

EESI (n.d.), *Renewable Energy*, https://www.eesi.org/topics/renewable-energy (accessed on Oct 2022). [33]

EPA (2000), *Carbon tetrachloride*, https://www.epa.gov/sites/default/files/2016-09/documents/carbon-tetrachloride.pdf (accessed on 29 Mar 2022). [23]

European Union (2011), *Official Journal of the European Union*, http://data.europa.eu/eli/dir/2011/70/oj. [51]

Eurostat (2020), *Classification of Environmental Protection Activities and Expenditure (CEPA) and Classification of Resource Management Activities (CReMA) - Explanatory note*. [4]

Eurostat (2013), *Environmental taxes — A statistical guide*, http://dx.doi.org/10.2785/47492. [7]

Eurostat (2009), *The environmental goods and services sector*, http://dx.doi.org/10.2785/31117. [8]

Eurostat (Forthcoming-a), *Classification of environmental functions (CEF) - Explanatory notes*. [11]

Eurostat (Forthcoming-b), *Progress on the classification of environmental functions*. [49]

FAO (2022), *The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation.*, Food and Agriculture Organization, https://doi.org/10.4060/cc0461en. [31]

FAO (2018), *Soil Pollution: a hidden reality*, Food and Agriculture Organization, https://www.fao.org/3/I9183EN/i9183en.pdf. [15]

FAO (2017), *Voluntary Guidelines for Sustainable Soil Management*, Food and Agriculture Organization, https://www.fao.org/3/bl813e/bl813e.pdf. [16]

ICF (2018), *ODS Destruction in the United States and Abroad*, U.S. Environmental Protection Agency, https://www.epa.gov/sites/default/files/2018-03/documents/ods-destruction-in-the-us-and-abroad_feb2018.pdf. [26]

IFC (1998), *Ozone-Depleting Substances: Alternatives*, World Bank Group. [21]

IPBES (2019), *Global assessment report on biodiversity and ecosystem services, The IntergovernmentalScience-Policy Platform on Biodiversity and Ecosystem Services*, IPBES secretariat, https://ipbes.net/global-assessment. [42]

IPCC (2019), *Summary for policymakers of the IPCC Special Report on Climate Change and Land*, https://www.ipcc.ch/site/assets/uploads/sites/4/2020/02/. [40]

IPCC (2018), *Special Report: Global Warming of 1.5°C*, https://www.ipcc.ch/sr15. [38]

IPCC (2014), "Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change", in *IPCC Fifth Assessment Report: Climate Change*. [39]

Livingstone, L. et al. (2022), "Synergies and trade-offs in the transition to a resource-efficient and circular economy"*, OECD Environment Policy Papers*, No. 34, OECD Publishing, Paris, https://doi.org/10.1787/e8bb5c6e-en. [46]

McCormick, M. et al. (2018), "Boat noise impacts risk assessment in a coral reef fish but effects depend on engine type", *Scientific Reports*, Vol. 8/1, https://doi.org/10.1038/s41598-018-22104-3. [54]

Nachtigall, D. et al. (2022), "The climate actions and policies measurement framework: A structured and harmonised climate policy database to monitor countries' mitigation action"*, OECD Environment Working Papers*, No. 203, OECD Publishing, Paris. [53]

OECD (2023), *Methodological Guidelines for Environmentally Related Tax Revenue Accounts*, OECD Publishing, Paris, https://doi.org/10.1787/d752d120-en. [50]

OECD (2017), *Diffuse Pollution, Degraded Waters: Emerging Policy Solutions*, OECD Studies on Water, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264269064-en. [14]

OECD (2010), *Rio Markers for Climate: Handbook*, OECD Development Assistance Committee. [5]

OECD (2003), *OECD Glossary of Statistical Terms*, https://stats.oecd.org/glossary/index.htm. [17]

OECD (2022a), *Environment at a Glance Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/ac4b8b89-en. [18]

OECD (2022c), "Freshwater resources", in *Environment at a Glance Indicators*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9e25b016-en. [32]

OECD (2016a), *OECD Policy Instruments for the Environment - Database documentation*, https://pinedatabase.oecd.org/. [12]

OECD (2020b), *OECD Review of Fisheries 2020*, OECD Publishing, Paris, https://doi.org/10.1787/7946bc8a-en. [30]

OECD (2020a), "Special feature: Identifying environmentally-related tax revenues in Revenue Statistics", in *Revenue Statistics 2019*, OECD Publishing, Paris, https://doi.org/10.1787/52465399-en. [1]

OECD (2022b), "Sustainable ocean economy", in *Environment at a Glance Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/1f798474-en. [2]

OECD (2016b), *The Ocean Economy in 2030*, OECD Publishing, Paris, https://doi.org/10.1787/9789264251724-en. [43]

RECARE (2018), *Remediating historical soil contamination - Effective measures and policy solutions*. [9]

SEEA (2014), *System of EnvironmentalEconomic Accounting 2012 - Central Framework*, United Nations, https://unstats.un.org/unsd/envaccounting/seearev/seea_cf_final_en.pdf. [3]

Slunge, D. and F. Alpizar (2019), "Market-Based Instruments for Managing Hazardous Chemicals: A Review of the Literature and Future Research Agenda", *Sustainability*, Vol. 11/16, p. 4344, https://doi.org/10.3390/su11164344. [45]

UNCCD and WOCAT (2021), *Restoring Life to the Land: The Role of Sustainable Land Management in Ecosystem Restoration*, United Nations Convention to Combat Desertification (UNCCD) and WOCAT (World Overview of Conservation Approaches and Technologies). [41]

UNDP (2016), *Mercury Managment for Sustainable Development*, UNDP Montreal Protocol/Chemicals Unit, https://www.undp.org/publications/mercury-management-sustainable-development. [48]

UNEP (2019), *Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer*, Ozone Secretariat. [24]

UNEP (2016), *Radiation: effects and sources*, United Nations Environment Programme, https://wedocs.unep.org/20.500.11822/7790. [29]

UNEP (2015), *GUIDANCE on the Development of Legal and Institutional Infrastructures for Sound Management of Chemicals and Measures for Recovering Costs of National Administration (LIRAGuidance)*, https://www.unenvironment.org/resources/report/guidancechemicals-control-contributing-national-progress-and-safety. [10]

UNEP (2022a), *Mineral Resource Governance and Global Goals: An agenda for international collaboration*, UNEP, https://www.unep.org/resources/report/unea-419-resolution-mineral-resource-governance. [34]

UNEP (2022b), *UN Environment Programme*, https://ozone.unep.org/ (accessed on Mar 2022). [20]

USGS (2022), *Mineral Commodity Summaries 2022*, https://doi.org/10.3133/mcs2022. [37]

WHO (2018a), *Environmental noise guidelines for the European region*, WHO Regional Office for Europe, https://www.euro.who.int/__data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf. [28]

WHO (2018b), *Global Health Observatory*, https://apps.who.int/gho/data/node.main.BODAMBIENTAIRDTHS?lang=en. [13]

WMO (2015), *Twenty Questions and Answers About the Ozone Layer: 2014 Update*, World Meteorological Organization. [22]