Environmental accounts - establishing the links between the environment and the economy

Statistics Explained

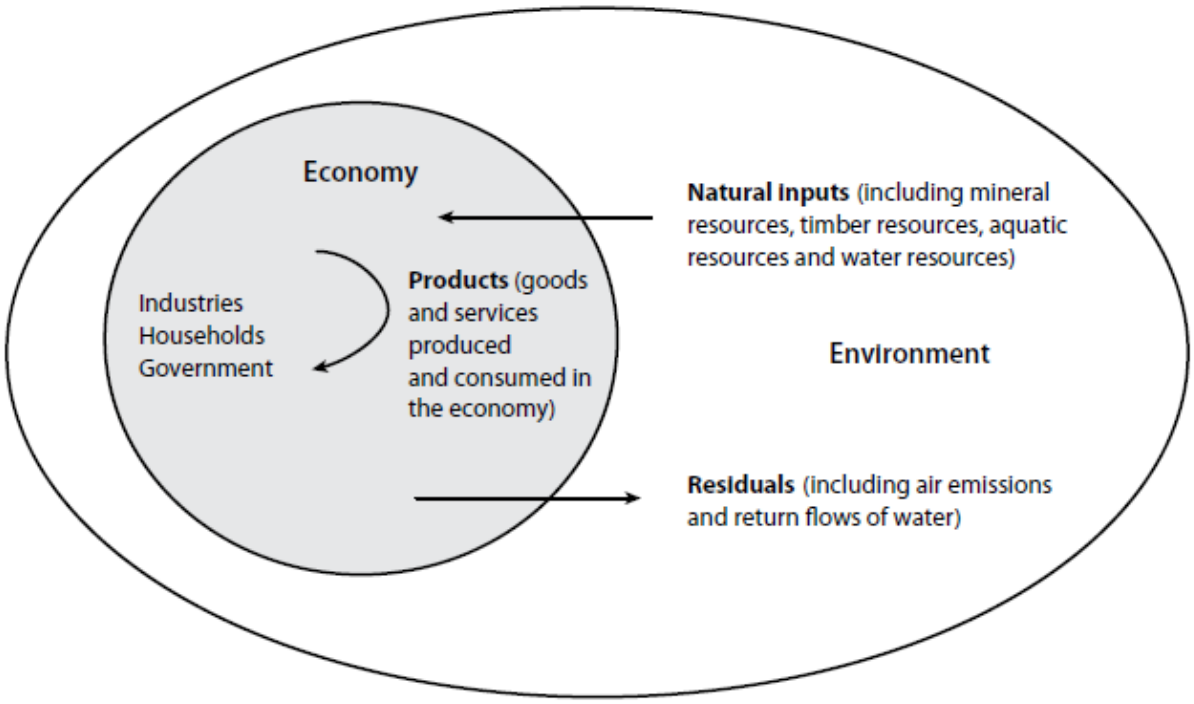
Environmental accounts are a statistical system bringing together economic and environmental information in a common framework to measure the contribution of the environment to the economy and the impact of the economy on the environment. They offer a means of monitoring the pressures exerted by the economy on the environment and of exploring how these might be abated. Environmental accounts organise environmental data from many domains using the same concepts and terminology as the national accounts, and thus they show the interaction between economic, household and environmental factors and consequently are more informative than national accounts alone.

Environmental accounts can be used to answer questions such as: Which industry is emitting most greenhouse gases? How do patterns of consumption and production affect the environment? What is the effect of economic policy measures, such as an environmental tax on the generation of waste or air emissions? How fast is the environmental economy growing and how does it compare with the rest of the economy?

European environmental accounts are used for EU policy making e.g., SDGs , circular economy , the 8th Environment Action Programme , etc.

Introduction to environmental accounting

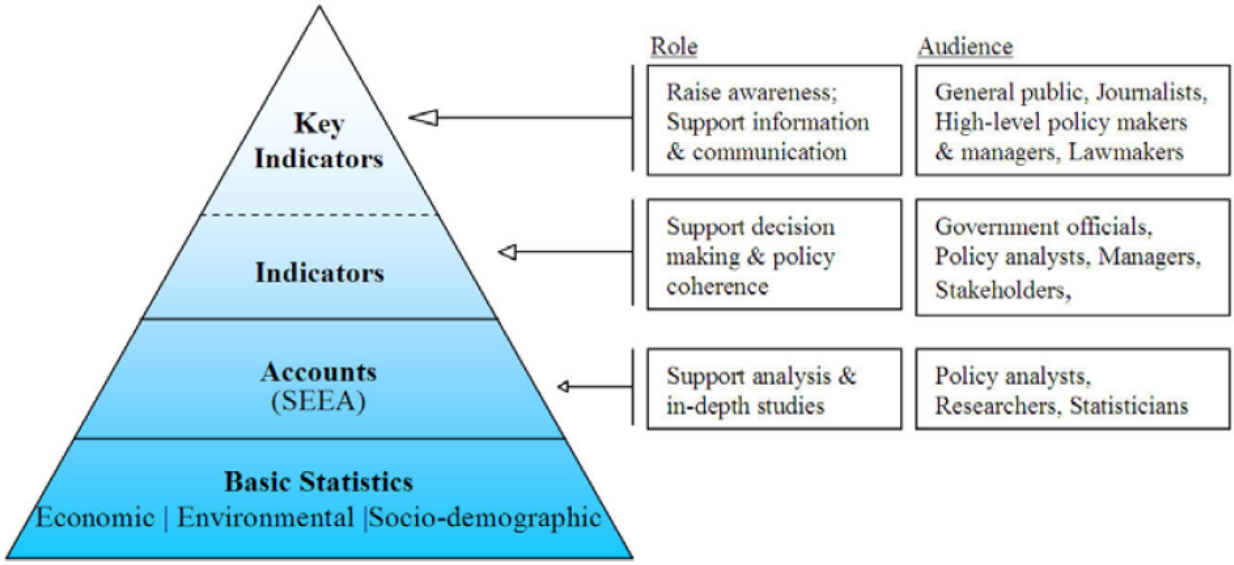
Environmental accounts are a multipurpose data system encompassing a conceptual framework and tables which describes the interrelations between the economy and the environment in a way that is consistent with the national accounts. For instance, they shed light on the amount of pollution produced by industries and households and allow a comparison with the employment and value of output produced by these sectors, or with the expenditure made by these sectors to avoid pollution. Politicians can use this information to decide where it is most efficient to act.



Environmental accounts provide an integrated framework for data, indicators and analysis. Integrating environment-related data with the national accounts framework makes the resulting indicators more consistent among themselves and permits aligning also with the social aspects of sustainable development and the employment aspects of green growth.

The accounts allow bringing together, in a single accounting framework, information on a range of natural resources (for example water, minerals, energy, timber, fish, oil, land and ecosystems) and human activities (e.g., pollution and waste, production, consumption and accumulation). The European environmental accounts do not yet cover all these aspects, because the international standards from the System of Environmental-Economic Accounting 2012 are being implemented gradually (see next section about present developments).

Environmental accounts integrate existing data and provide coherence. The structure of the accounts enables a wide range of source information to be compared and contrasted to provide better estimates. The accounting system enables the organization of information into tables and accounts in an integrated and conceptually coherent manner. This information can be used to create coherent aggregates, indicators and trends across a broad spectrum of environmental and economic issues. From the viewpoint of compilation of estimates, one advantage of the environmental accounts is that they are (mostly) compiled by reorganising already existing data.



One of the most important features of the environmental accounts is their capacity to organise and present coherently information in both physical terms (often for the environment) and monetary terms (often for the economy). A key focus of measurement is the use of physical units to record flows of materials and energy that enter and leave the economy and flows of materials and energy within the economy itself. These are called physical flows. Environmental accounts apply the accounting concepts, structures, rules, classifications and principles of the national accounts to environmental information. Particularly important is the alignment to the national accounts' production boundary and residence principle, i.e. adopting a scope based not on territory but on residence of the producer units, the scope used for Gross Domestic Product . This makes environmental accounts consistent, in general, with national accounts , and allows joint analysis.

In practice, the basic framework includes physical and monetary supply and use tables (which report what flows go in and what come out), functional accounts and asset accounts for natural resources (which report how the opening stock plus changes give the closing stock). The measurement of physical flows is structured around the flows of natural inputs from the environment to the economy, flows of products within the economy and flows from the economy to the environment i.e., residuals.

The range of applications of environmental accounts includes resource efficiency and productivity , decomposition analysis, analysis of net wealth and depletion, sustainable production and consumption. The accounts also provide an information base for the development of models e.g. input-output analysis and general equilibrium modelling.

The international standard is the System of Environmental-Economic Accounting 2012 – Central Framework (SEEA 2012 CF) . It was produced and released under the auspices of the United Nations Statistics Division, the European Commission (Eurostat), the Food and Agriculture Organisation of the UN, the OECD , the International Monetary Fund and the World Bank group. It was endorsed as an international standard by the United Nations Statistical Commission in 2012. The SEEA 2012 CF builds on the previous versions, SEEA 2003 and 1993.


System of
Environmental-Economic
Accounting 2012
Central Framework
United Nations
European Commission
Food and Agriculture Organization of the United Nations
International Monetary Fund
OECD
Organisation for Economic Co-operation and Development
The World Bank

European environmental accounts

The European environmental accounts are established in Regulation (EU) 691/2011 . The Regulation provides a legal framework for a harmonised collection of comparable data from all EU Member States and EFTA countries. The European environmental accounts are consistent with the SEEA 2012 CF and are structured in modules. Only some parts of the SEAA 2012 CF are presently implemented. The Regulation includes six modules. Links to Statistics Explained articles reporting results of those accounts can be found at the bottom of this article. The following are the present modules:

1) Air emissions accounts (AEA) record the emissions to the atmosphere of six greenhouse gases including CO2and seven air pollutants. AEA offer breakdowns by 64 emitting industries plus households and a coverage consistent with the residency principle of national accounts. These features are not available from national emission inventories under the international conventions CLRTAP and UNFCCC , making AEA suitable for integrated modelling, e.g. of greenhouse gas footprints and climate-change modelling scenarios. See figure 1. Furthermore, Eurostat also produces quarterly estimates of greenhouse gas emissions using models building on (annual) air emissions accounts and statistical predictors.

Figure 1

2) Economy-wide material flow accounts (EW-MFA) report the amounts of physical inputs into the economy, material accumulation in the economy and outputs to other economies or back to nature. Physical inputs are classified in 50 material categories of biomass, metal ores, non-metallic minerals and fossil energy materials. EW-MFA are used to estimate, among other things, resource extractions by the economies, material consumption, resource productivity , material footprints and the decoupling between economic growth and extraction of natural resources. See figure 2.

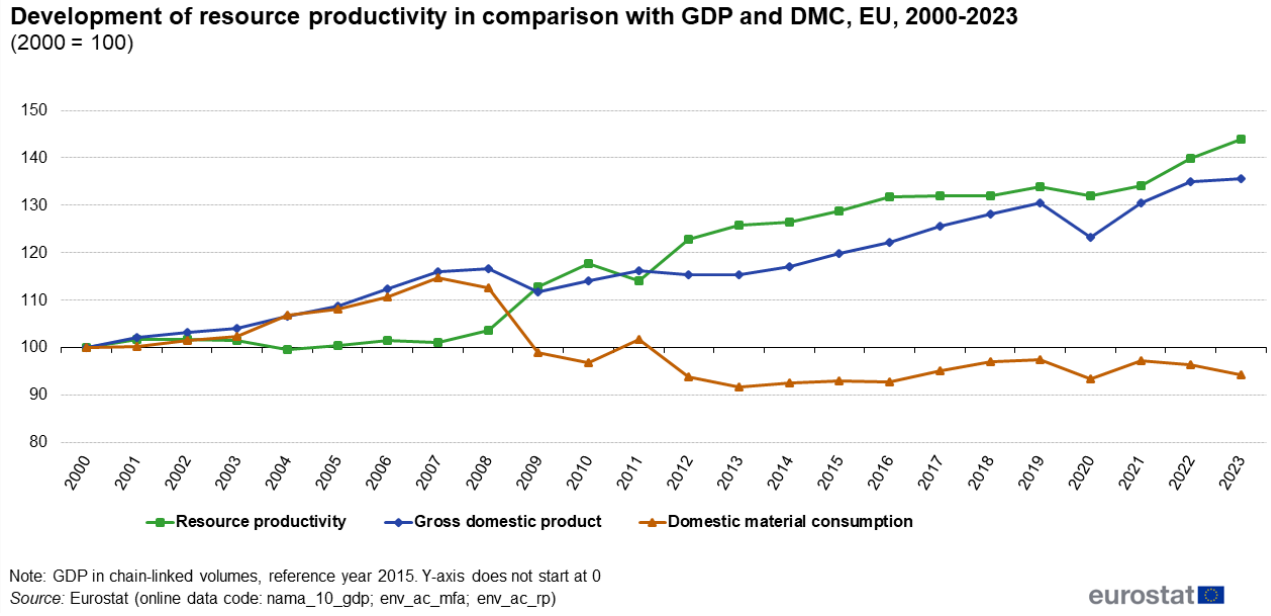


Figure 2: Resource productivity in comparison to GDP and DMC, EU, 2000-2023 Source: Eurostat (nama_10_gdp) (env_ac_mfa) (env_ac_rp)

3) Physical energy flow accounts (PEFA) report flows of energy (including natural inputs used to manufacture energy products and energy residuals) from the environment into the economy, within the economy and from the economy to the environment. Energy flows are reported with a breakdown by type of natural inputs, products and residuals as well as by supplier and user (64 industries plus households). PEFA can be used for energy productivity, analyses, modelling, etc.

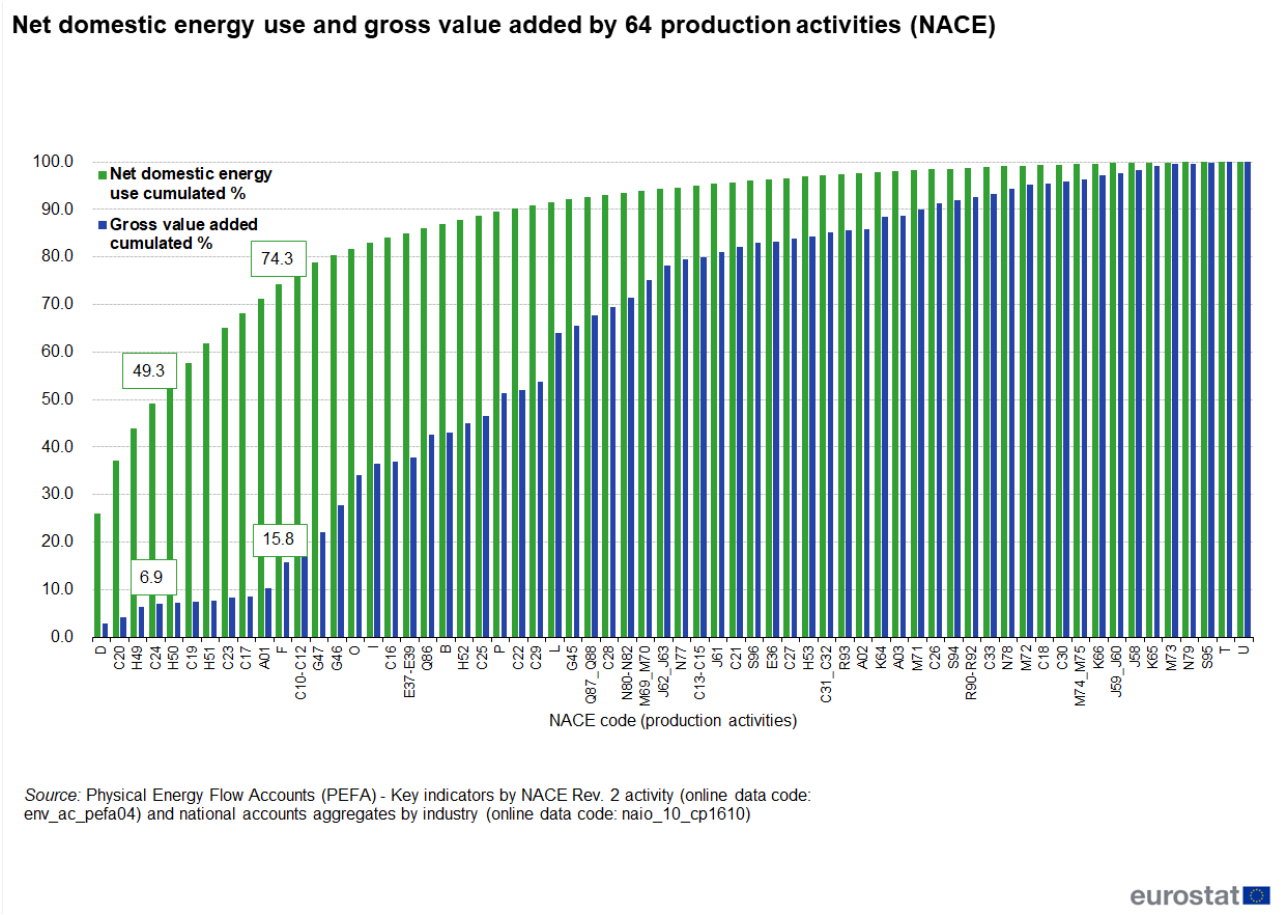


Figure 3: Net domestic energy use and gross value added by 64 production activities (NACE) European Union (EU), 2022 Source: Eurostat (env_ac_pefa04), estimations based on (naio_10_cp1610) For list of NACE Rev 2 codes see here

4) Environmental taxes report environmental taxes (in four broad groups: energy, transport, pollution and resources) with a breakdown by 64 paying industries plus households. All tax figures are consistent with national accounts and can be compared with GDP, total taxes and social contributions , and other economic aggregates. See figure 4.

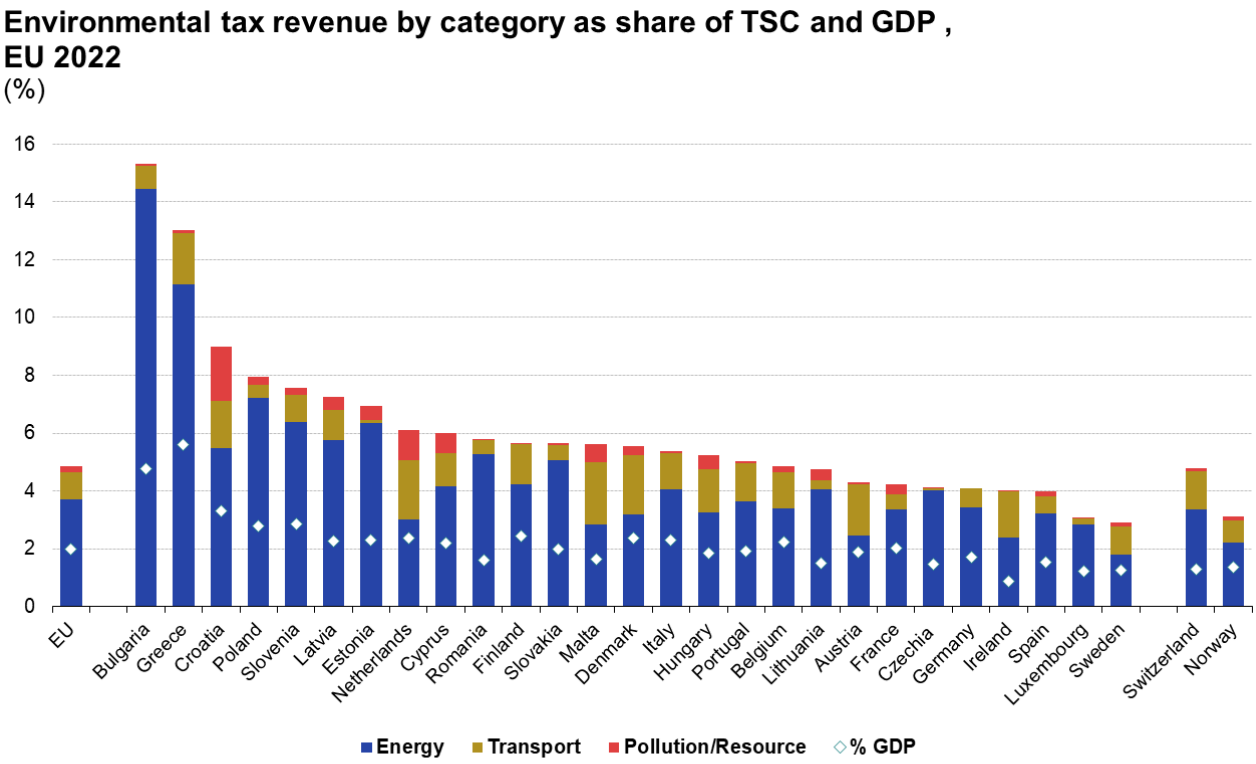
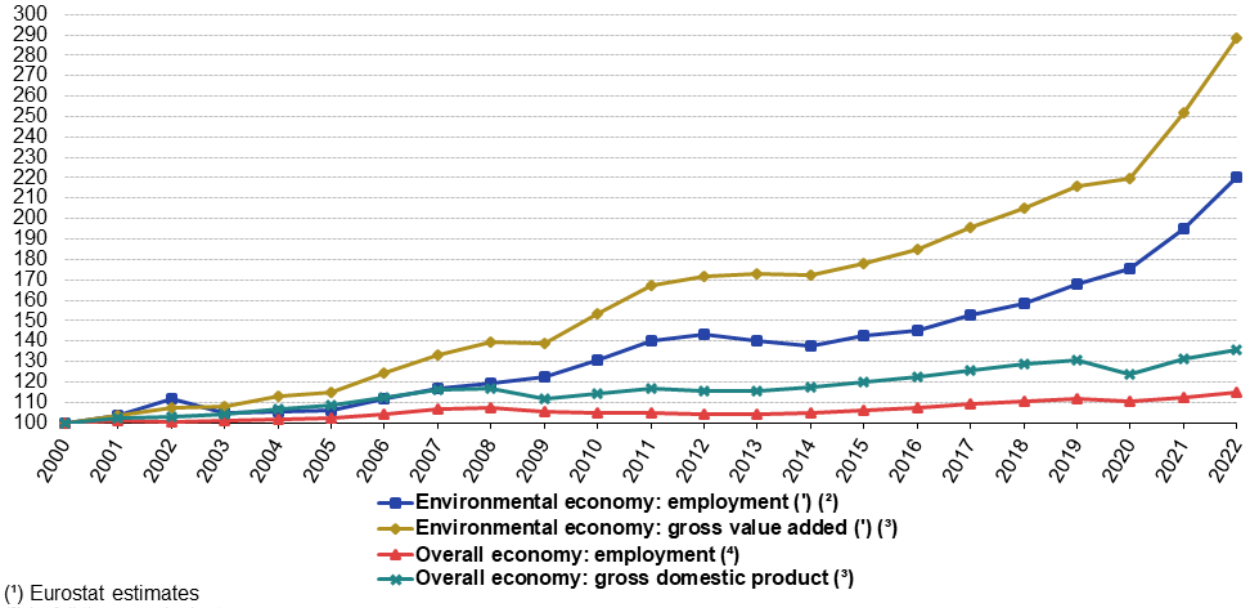


Figure 4: Environmental tax revenue by category as % of TSC and GDP, 2022 (%) Source: Eurostat (env_ac_tax)

5) Environmental goods and services sector (EGSS) accounts report information on the production of goods and services that have been specifically designed and produced for the purpose of environmental protection or resource management. The EGSS accounts cover the following characteristics: output , exports of the produced products, related gross value added and employment . The accounts have a breakdown by 21 industries and by functional classifications of environmental protection and resource management (CEPA and CReMA). EGSS can be used to monitor the growth of the environmental economy, green jobs, etc. See figure 5.

Development of key indicators for the environmental economy and the overall economy, EU, 2000–2022
(Index with base year 2000 = 100)



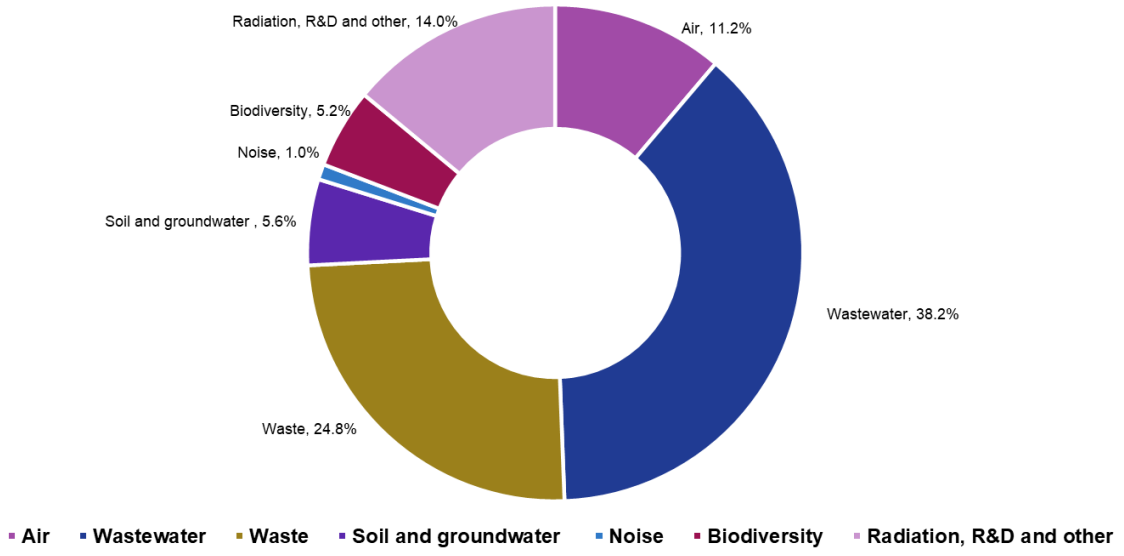
(¹) Eurostat estimates
(²) In full-time equivalents
(³) Index compiled for chain-linked volumes data in € million (reference year 2015; at 2015 exchange rates)
(⁴) Thousand persons
Note: y axis does not start at 0
Source: Eurostat (online data codes: nama_10_a10_e, nama_10_gdp, env_ac_egss1, env_ac_egss2)

eurostat

Figure 5: Development of key indicators for the environmental economy and the overall economy, EU, 2000–2022 (2000 = 100) Source: Eurostat (env_ac_egss1), (env_ac_egss2), (nama_10_gdp) and (nama_10_a10_e)

6) Environmental protection expenditure accounts (EPEA) report mostly from a demand perspective the expenditures undertaken by economic units for environmental protection purposes. EPEA collects output , intermediate consumption , imports & exports , investment (gross fixed capital formation) and transfers with a breakdown by four sectors and by functional classifications of environmental protection (CEPA). See figure 6.

Investments for environmental protection by environmental domain, EU, 2024
(% of total environmental protection investments)



Source: Eurostat (online data codes: env_ac_epigg1, env_ac_epissp1 and env_ac_epiap1)

Figure 6: Investments for environmental protection by environmental domains, EU, 2024 (% of total environmental protection investments) Source: Eurostat (env_ac_epigg1), (env_ac_epissp1), (env_ac_epiap1)

In addition to the existing mandatory 6 modules, Eurostat will start collecting forest accounts as well as environmental subsidies and similar transfers in 2025 and ecosystem accounts in 2026.

Forest accounts cover, in principle, natural assets (wooded land, timber); economic aspects (value added, output and products of the forestry and logging industry) and environmental aspects (wood balances, carbon capture, residuals and defoliation). In practice, because the collection is still voluntary, data are only complete or close to complete for the economic aspects.

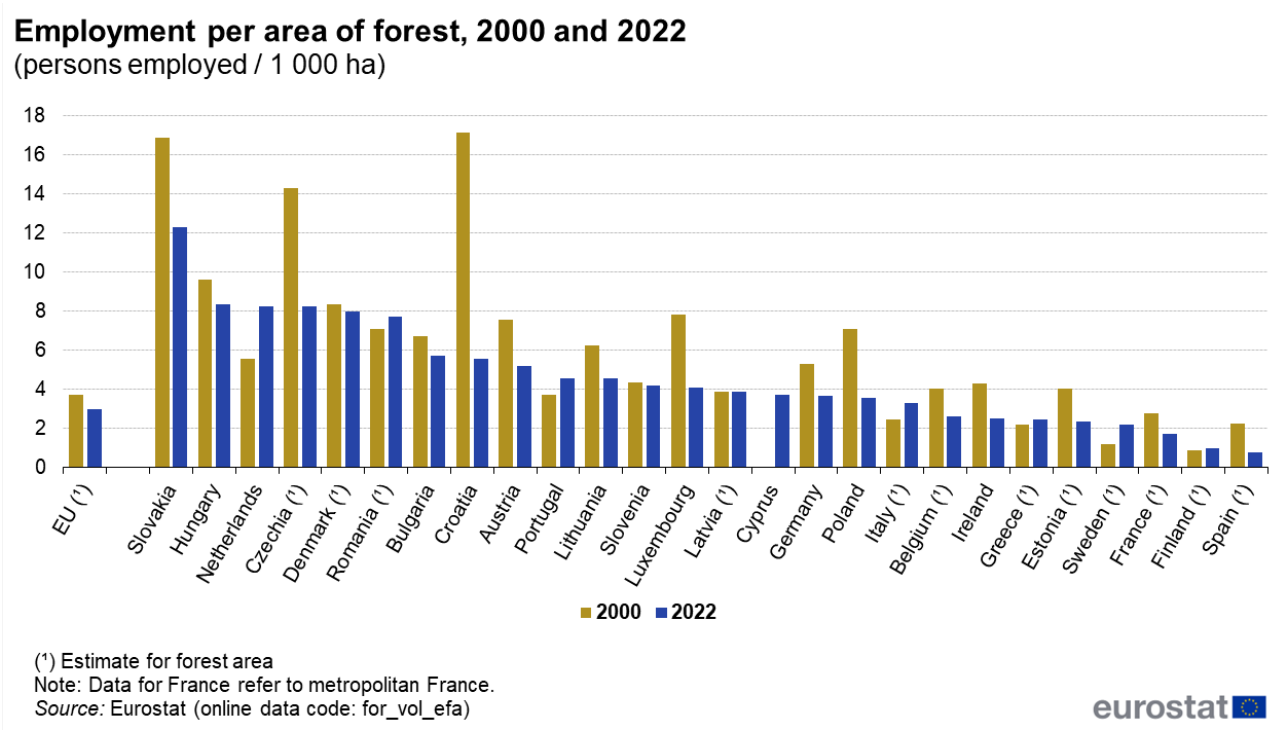


Figure 7: Employment per area of forest, 2000 and 2022 (persons employed / 1 000 ha) Source: Eurostat (nama_10_a64_e), and (for_area_efa)

Ecosystem accounts based on the standard SEEA Ecosystem Accounting , which was adopted internationally in 2021. These accounts are compiled using spatially explicit data and information about the extent of ecosystem assets, their condition and the ecosystem services they produce. There are three categories of ecosystem accounts, namely: (1) ecosystem extent accounts record the total area of ecosystems, classified by type within a specified area (ecosystem accounting area); (2) ecosystem condition accounts record the condition of ecosystems using selected characteristics at specific points in time. Over time, they record the changes to their condition and thus provide valuable information on the health of ecosystems; (3) ecosystem services accounts record the supply of ecosystem services by ecosystem assets and the use of those services by economic units, including households. Examples are global climate regulation, pollination, crops provision and ecosystem-based tourism. A separate article provides an introduction to ecosystem accounts.

Environmental subsidies and similar transfers accounts record subsidies and other forms of Government support measures that help to protect the environment such as tax rebates, tax exemptions, tax credits, tax deferrals, etc. Measures that lower prices and stimulate consumption that can lead to an increase in congestion and air pollution are called potentially environmentally damaging subsidies. The accounts distinguish between current transfers (including subsidies), capital transfers and tax abatements. Data are broken down by receiving institutional sector and functional classifications of environmental protection and resource management (classifications CEPA and CReMA). For now this is a voluntary, annual data collection.

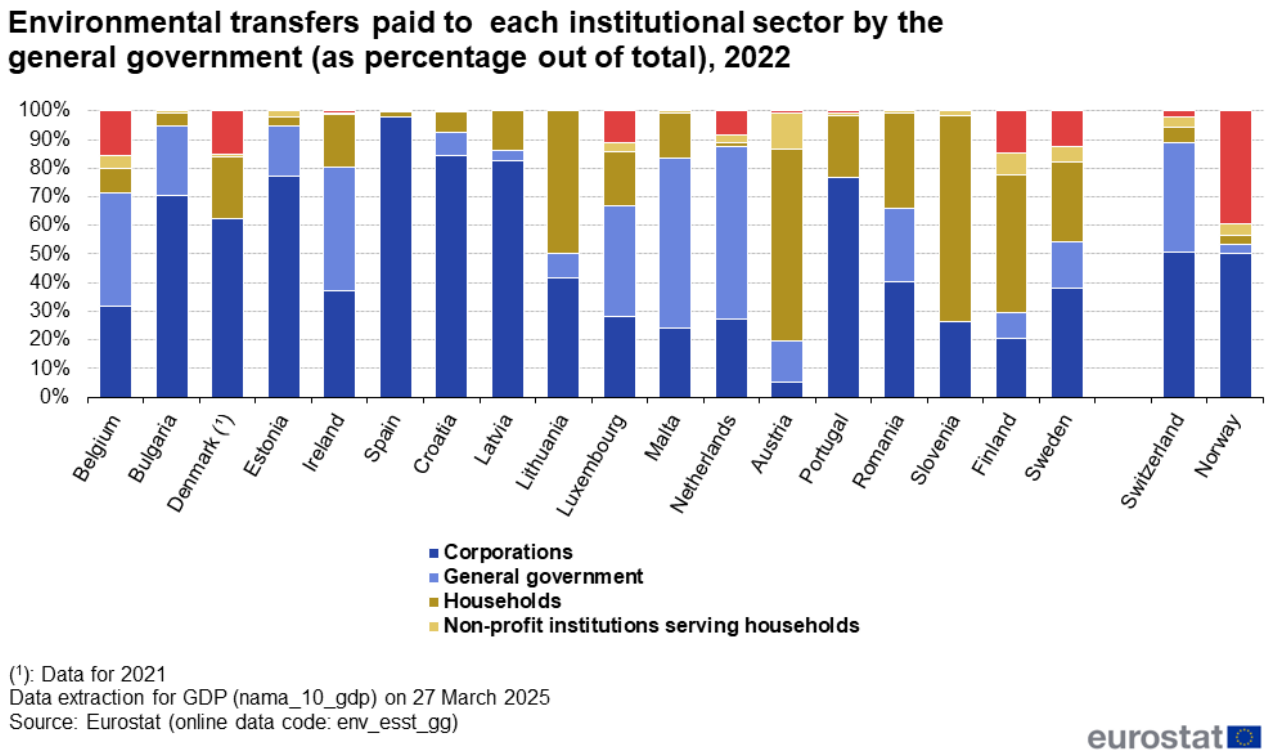


Figure 8: Environmental transfers received by corporations broken down by economic activities (%), 2022
Source: Eurostat (env_esst_ggcp)

As can be seen, these modules and accounts are at different stages of maturity. The development of European environmental accounts is set out in the multi-annual European Strategy for Environmental Accounts , the latest of which covers the period 2024-2028.

Eurostat also produces environmental statistics, such as Waste statistics , Municipal waste statistics , Water statistics and Forestry statistics .

Policy relevance and uses of environmental account

The effect of human activity on the environment has emerged as an important policy issue. On the one hand, there is growing concern about the effect of economic activity upon the local and global environment. On the other hand, continued economic growth and human welfare are dependent upon the benefits obtained from the environment. In recent years European policies focused more and more on how the European economy can be developed in a sustainable direction, with a particular focus on (mitigation of and adaptation to) climate change .

Environmental accounts are well placed to support coherent analytical and policy frameworks to inform debates and guide policy related to the interrelationship between the economy and the environment. As an accounting system, they enable the organisation of information into tables and accounts in an integrated and conceptually coherent manner. This information can be used to create coherent indicators to be used to inform decision-making and to generate accounts and aggregates for a wide range of purposes. Given their multidisciplinary scope, the environmental accounts are designed to be coherent with and complementary to other international standards, recommendations and classifications such as National Accounts (ESA 2010), the Balance of Payments and International Investment Position, NACE, CPA, etc. Environmental accounts can be used for policy development and evaluation as well as decision-making in a number of ways. Firstly, the summary information (provided in the form of aggregates and indicators) can be applied to issues and areas of the environment which are the focus of decision makers. Secondly, the detailed information, which covers some of the key drivers of change in the environment, can be used to provide a richer understanding of the policy issues. Thirdly, environmental accounts data can be used in models and scenarios designed to assess the national and international economic and environmental effects of different policy scenarios within a country, between countries and at a global level.

The European environmental accounts are used for a growing number of EU policies. Indicators derived from the accounts are used for:

- monitoring EU progress towards the sustainable development goals . Eurostat is called to regularly monitor progress towards the SDGs in an EU context. For this purpose it coordinated the development of the EU SDG indicator set and keeps it up to date. It also produces regular monitoring reports on progress towards the SDGs in an EU context. Some of the indicators in the indicator set are based on environmental accounts.

- The circular economy . A circular economy aims to maintain the value of products, materials and resources for as long as possible by returning them into the product cycle at the end of their use, while minimising the generation of waste. Indicators based on environmental accounts are part of the monitoring framework for the circular economy .

- The 8th Environment Action Programme reiterates the EU's long-term vision to 2050 of living well, within planetary boundaries. It sets out priority objectives for 2030 and the conditions needed to achieve these. The action programme aims to speed up the transition to a climate-neutral, resource-efficient economy, recognising that human wellbeing and prosperity depend on healthy ecosystems. Monitoring progress towards the EU's environment and climate goals is particularly important.

- Greening the European Semester is about ensuring that macroeconomic policies are sustainable - economically, socially and environmentally.

Furthermore, there is policy demand for potential additional applications in the areas named above as well as in green growth and green jobs, climate change and energy
union, natural capital, biodiversity, environmental taxation, transport policies, sustainable financing and bio-economy.

This article is available on-line at
http://ec.europa.eu/eurostat/statistics-explained/index.php/Environmental_accounts:_Establishing_the_links_between_the_environment_and_the_economy

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- Environmental economy – statistics on employment and growth
- Environmental economy – statistics by Member State
- Environmental protection expenditure accounts
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- Environmental accounts
- Methodology sources for environmental accounts