

ENVIRONMENT AND ECONOMY: MAIN INDICATORS | YEARS 2021-2023

Growth and sustainability: physical flows fall, environmental protection expenditure rises

In the two-year period 2022-2023, the main environmental accounts' physical flows indicators decrease against the increase in GDP in volume.

2023 shows an absolute decoupling: GDP grows by +0.7% and all three main physical flows indicators decrease: **net energy consumption** drops by 4.1%, **Greenhouse gas emissions** by 5.3% and **Domestic material consumption** by 6.4%.

In 2022, with a GDP growth by 4.7%, only net energy consumption drops (-3.1%), while Domestic material consumption shows a relative decoupling (+1.3%), similarly to Greenhouse gas emissions, remaining stable.

In 2022, the value of **goods and services** produced by the economy for environmental protection rose to 79.9 billion (+40.6%), the **Expenditure on environmental protection** to 51.4 billion (+9.4%), while **Environmental Tax Revenue** fell to 45.4 billion (-18.9%), to rise again in 2023.

+19,4%

Growth in the revenue from environmental taxes in 2023

The incidence on GDP is 2.5% in 2023.

54,0

The tons of CO₂ emitted per terajoule of energy consumed in 2023

In 2023 a new decrease -2.4%, after two years of growth, in line with the 2021-2020 trend

250

Tons of material used in the Italian economy per million euros of GDP

The trend of material intensity keeps falling in 2022 and 2023

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Decline of physical flows, environmental protection expenditure on the rise

The main physical indicators provided by the environmental economic accounts show a declining trend against GDP growth in volume. This kind of dynamic in the main environmental and economic indicators, known as “decoupling”, points out to a reduced pressure of the economy on the environment.

The decoupling is absolute in 2023, where, compared to GDP growth of 0.7%, Energy consumption of resident units decreases by 4.1%, Greenhouse gas emissions by 5.3% and Domestic material consumption by 6.4%. In 2022, by contrast, GDP growth of +4.7% occurred together with a decrease only in the case of Energy consumption (-3.1%), while the decoupling of Domestic material consumption (+1.3%) was only relative, and greenhouse gas emissions remained stable.

In 2022, the stability of greenhouse gas emissions despite the contraction of energy consumption is largely due to the increased use of more carbon-intensive products in response to the energy crisis and drought. Households' own-account transport increased (+9.3 for emissions and +8.3 for consumption), but there were also significant reductions in emissions and consumption in other households' uses (-12.8% and -10.1%). According to the provisional estimates available for 2023, energy consumption of resident units decreased by 4.0% in productive activities and by 4.4% in households (transport use increased by a further 0.6%, while other households' uses decreased by 8.0%), while greenhouse gas emissions decreased by 6.0% in productive activities and by 3.5% in households (transport +0.6%; other households' uses -9.3%).

While in 2022 the overall revenue from environmental taxation decreased by 19.0%, reaching the historical minimum incidence on GDP (2.3%), due to the measures to contain the growth of energy prices (reduction of excise duties on fuels and elimination of general charges of the electricity system), 2023 shows a recovery (+19.4%), which brings the revenue back almost to the level of 2021, mainly due to the cancellation of the 2022 economic measures.

In 2022, the expansion of the environmental goods and services sector continued (+40.6% in terms of value added), bringing the sector's share on the entire economy from 3.1% in 2021 to 4.0% in 2022. This trend can be explained by measures to increase the energy efficiency of buildings (the tax incentives known as Superbonus 110% as well as the European standard for new buildings Nzeb - "Nearly Zero Energy Buildings").

The increase in National expenditure for environmental protection, 9.4% in current prices, occurred together with the growth in the share of wastewater management activities (from 24.4% to 25.5%). The distribution of overall expenditure between corporations (53.1%), general government (27.5%) and households (19.4%) remained nearly stable.

ENVIRONMENT AND ECONOMY: MAIN INDICATORS. Years 2021-2023, absolute values, values per unit of GDP^(a) and percentage change.

INDICATORS	Unit of measure	2021		2022			2023		
		Absolute values	Values/GDP (a)	Absolute values	Values/GDP (a)	% change on 2021	Absolute values	Values/GDP (a)	% change on 2022
Net domestic energy use – Ndeu	Thousands of terajoule	6,757	3,7	6,547	3,4	-3,1%	6,277	3,3	-4,1%
Greenhouse gases in CO ₂ equivalents	Million tons	422	232	422	222	+0,0%	399	208	-5,3%
Domestic material consumption	Million tons	505.5	278	512.3	269	+1,3%	479.4	250	-6,4%
Value added of environmental goods and services	Billion euros	56.8	3,4%	79.9	4,3%	40,6%	n.d.	n.d.	n.d.
Revenue from environmental taxes	Billion euros	56.0	3,0%	45.4	2,3%	-19,0%	54.2	2,5%	+19,4%
Expenditure on environmental protection	Billion of euros	47.0	2,6%	51.4	2,6%	9,4%	n.d.	n.d.	n.d.

(a) Ratios of physical indicators to GDP in millions of euros at chain linked prices with reference year 2020 (Ndeu: Tj/mln of euros, Greenhouse gases: Tons/mln of euros, Dmc: Tons/mln of euros); ratios of monetary indicators to GDP in billions of euros at current prices. Source: Istat, Environmental Accounts

Energy consumption declines in 2022 and 2023

Italy's overall energy requirement, measured by the Net Domestic Energy Use - Ndeu, falls to 6.3 million terajoules (Tj) in 2023 (-3.1% in 2022 and -4.1% in 2023), in line with the trend observed since 2018.

The intensity of energy consumption in relation to GDP, nearly stable in the years 2018-2021, recorded a sharp decline both in 2022 (-7.4%) and in 2023 (-4.8%), reaching 3.3 Tj per million euros (the lowest value in the last sixteen years) due to the different trend between the decreasing energy data, and the increasing economic data (namely GDP growing by 4.7% in 2022 and 0.7% in 2023).

The contraction in energy consumption in 2022 (210 thousand Tj) is mainly due to the reduction in demand for natural gas. This is due to several factors: the sharp increase in prices also linked to the Russian-Ukrainian conflict, the measures to contain energy consumption and the particularly mild weather conditions in the second half of 2022. All production sectors recorded a drop in energy consumption (-3.0% Agriculture, -4.2% Industry and -0.7% Services), with an overall reduction of 3.1%, corresponding to 139 thousand Tj. In 2022, households also reduced their energy consumption by 3.2% (-71 thousand Tj), albeit with opposite trends between transport uses, which increased by 8.3% (reaching 908 thousand Tj, a value higher than the pre-pandemic level) and all other households' uses, which decreased by 10.1% (reaching 1,257 thousand Tj).

In absolute terms, the chemical industry recorded the most significant decrease in energy consumption (-88 thousand Tj; -24.1%), followed by metallurgy (-47 thousand Tj; -16.1%) and construction (-18 thousand Tj; -10.7%). On the contrary, energy consumption increases especially in the production of electricity, gas, steam and air conditioning (+27 thousand Tj; +3.0%), in oil refineries (+26 thousand Tj; +9.3%) and in the wood industry (+19 thousand Tj; +81.2%). In almost all Services activities energy consumption decreases (-9 thousand Tj); the reduction is significant in maritime transport corporations (-14 thousand Tj; -6.5%) and in land transport corporations (-12 thousand Tj; -4.0%) as well as in General government (-10 thousand Tj; -16.8%) while, with the opposite sign, the increase is significant in air transport activities (+41 thousand terajoules; +101.1%).

In 2023 the contraction of Ndeu continued (269 thousand Tj), mainly due to the reduction of natural gas and coal in electricity production but also to the particularly mild weather, especially in the first months of the year, and to the increase in energy efficiency in the civil sector (due to energy refurbishing projects supported by the *superbonus* and other forms of incentives) which allowed a lower use of gas for heating. Overall, energy consumption decreased in industry (185 thousand Tj; 6.4%), within the households sector (100 thousand Tj; -8.0%) and in agriculture (7 thousand Tj; -4.4%), while it increased in the Services sector (+18 thousand Tj; +1.4%) and, to a lesser extent, for household transport (+6 thousand Tj; +0.6%).

Italy accounts for 11% of total Eu27 Ndeu, after Germany (21%) e France (17%) and followed by Spain (8%), Poland (7%) and the Netherlands (5%). Only Poland recorded an energy intensity of GDP higher than the Eu27 average, while the values of Italy and Germany are the lowest ones.

Figure 1. "NET DOMESTIC ENERGY USE" BY ECONOMIC SECTOR AND HOUSEHOLDS.
Years 2020-2023, thousands of terajoules and percentage change



Greenhouse gas emissions to decline in 2023

Three years after the pandemic crisis, the Italian economy's greenhouse gas emissions started to decline again, amounting to just under 400 million tons of CO₂ equivalent (t.CO₂eq.).

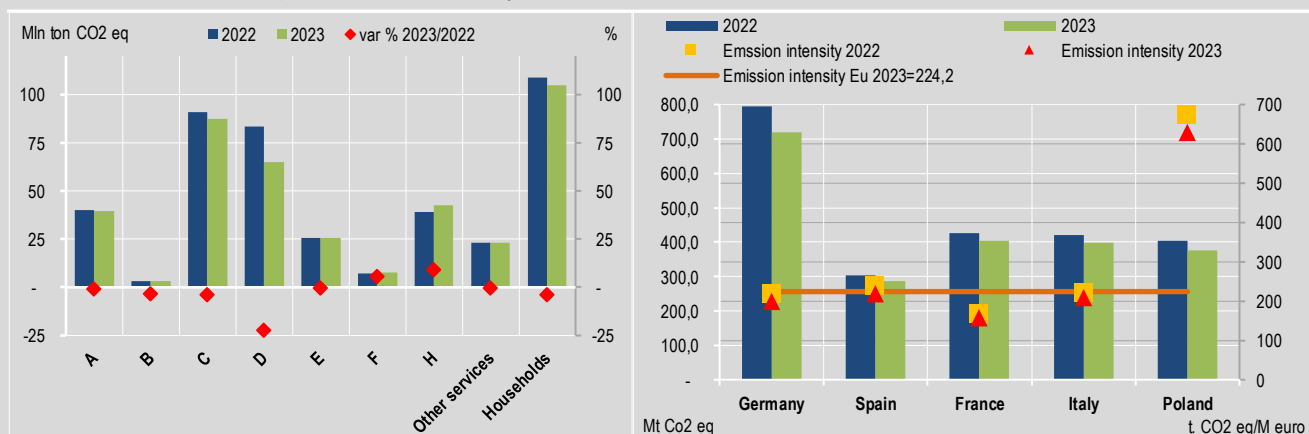
The reduction, estimated for 2023 at 5.3% compared to the previous year, is mainly due to the electricity, gas, steam and air conditioning supply industry, which released 22.2% less greenhouse gases into the air than in 2022. This result is due to the contraction in both overall electricity production (-6.9%), and in the use of fossil fuels (natural gas and coal), thanks to the greater use of renewable sources. Also of note is the reduction in emissions from manufacturing industries (-3.8%) and households' heating (-9.3%), activities that account for significant shares of emissions (respectively 21.9% and 10.3% of the total for Italy), and hence contribute significantly to the total reduction observed in 2023. This favorable trend is countered by Transport corporations, whose emissions increased by 9.1%.

The GDP intensity of emission continues to decline, reaching 208.3 t.CO₂eq. per million euros (M€), compared to 221.6 in 2022. This indicator also confirms the negative contribution of Transport corporations, with an 11.6% increase in emissions per M€ of value added.

The CO₂ emission intensity of energy consumption (calculated as the ratio between CO₂ emissions and the Ndeu - Net domestic energy use - for energy purposes) also decreased in 2023 (-2.4%) after the trend reversal in 2021 (+2.0%) and 2022 (+2.7%). The increase in 2022, when CO₂ emissions slightly increased and energy consumption decreased, is mainly attributable to the change in the energy mix used in the production of electricity in response to the energy crisis and the drought. In fact, there was a sharp drop in hydroelectric energy production (-37.4%) in favor of traditional thermoelectric energy (+6.5%) and, for the latter, a lower use of natural gas (-1.8%) in favor of fossil fuels with a higher carbon content, such as coal, petroleum products and others. In 2023, by contrast, the reduction in the indicator is due to a drop in CO₂ emissions more marked than that of energy consumption. This trend is the result, in addition to the reduction in electricity production (-6.9%), partially offset by an increase in net imports (+19.2%), of the lower use of fossil fuels for its production (-19.3% overall; natural gas: -15.8%; coal -41.6%) in favor of renewable sources (+15.6% overall, hydroelectric +42.5%).

Eu27 greenhouse gas emissions decreased in 2023 by 238 Mt.CO₂eq. (-6.6%) compared to 2022. Significant contributions to this reduction come from Germany (whose emissions decreased by 74 Mt.CO₂eq., equal to 9.3% of national emissions in 2022) and Poland (-26 Mt.CO₂eq.; -6.3%), as well as from France (-24 Mt.CO₂eq.; -5.6%), Italy (-23 Mt.CO₂eq.; -5.3%) and Spain (-17 Mt.CO₂eq.; -5.5%). Among the major economies, France, with 157 t.CO₂eq./M€, is the one with the lowest emission intensity on GDP, while Poland has an emission intensity of 629.3 t.CO₂eq./M€, much higher than the European average (224.2 t.CO₂eq./M€).

Figure 2. GREENHOUSE GAS EMISSIONS AND EMISSION INTENSITY OF ITALIAN GDP BY ECONOMIC SECTOR AND HOUSEHOLDS, OF THE EU27 AND OTHER EU COUNTRIES. Years 2022-2023, Mt CO₂ eq., percentage changes and t./M€ at chain linked prices with reference year 2020



Legend: A-Agriculture; B - Mining industry; C - Manufacturing activities; D - Supply of electricity, gas, steam and air conditioning; E - Water supply; sewerage, waste treatment and remediation activities; F - Constructions; H - Transport and storage
Source: Istat, Environmental Accounts - Air Emissions Accounts

Material flows up in 2022, down in 2023

In 2022, Domestic material consumption (Dmc) grew by 1.3%, with an increase of approximately 6.8 million tonnes (Mt) compared to the previous year, reaching 512.3 Mt.

The increase is entirely due to the Physical trade balance, Ptb, (standing at 173 Mt, +21.9%), which grew significantly for energy minerals (+7.8 Mt) and biomass (+6.1 Mt). Net imports of non-metallic minerals and derivatives also increased (from 0.8 to 2.5 Mt), while imports of metallic minerals and derivatives (15.9 Mt) decreased by 5.8%.

Despite a higher Ptb of 14.6 Mt, the increase in Dmc was mainly contained by the sharp decrease in domestic biomass production (-7.6%, equal to -7.8 Mt), which reached a historic low – at least since 1950 – of 95.4 Mt (it was 132.5 Mt in 2004; only in 2017 and 2018 did it fall below 100 million tonnes). In particular, compared to 2021, the used residues of crops (5 Mt) and harvests (-2.4 Mt) decreased.

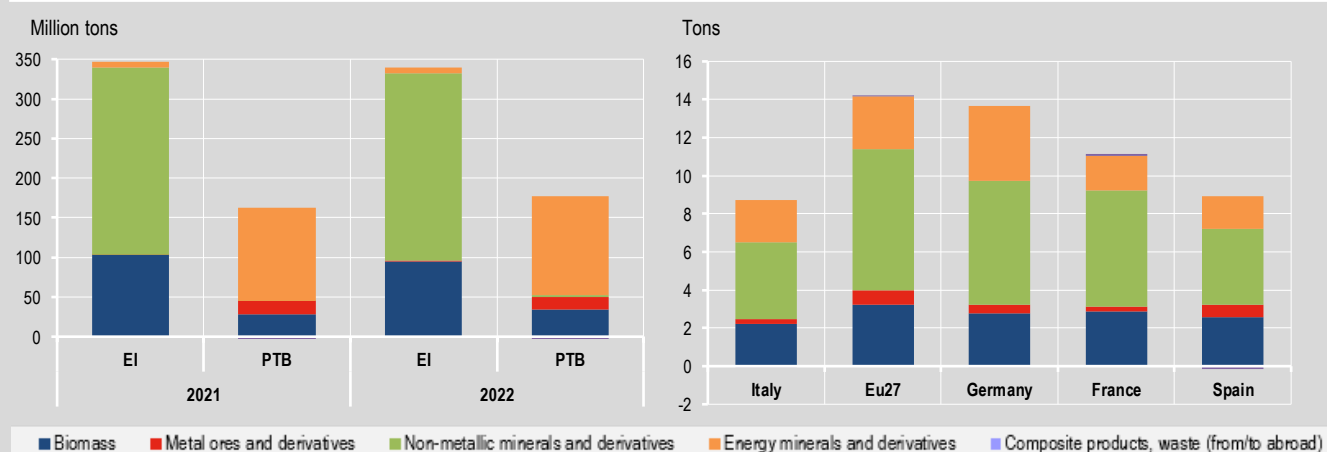
Material consumption per unit of GDP decreased again, from 278 to 269 tonnes per million euros (chained linked prices – reference year 2020).

In 2023, according to the first estimates (provisional especially for the “non-energy minerals” component of the Ei), there was a sharp drop in Dmc, of around 33 Mt (-6.4%), which corresponds to 250 tons per million euros.

In 2022, the Italian DMC is the fifth in the Eu27 (6,670 Mt), where, after Germany (1,143 Mt), Romania (986 Mt) is the country in which the largest quantities of material resources are extracted and economically exploited, or “consumed”, followed by France (760 Mt) and Poland. Fossil fuels dominate the Ptb of all countries, non-metallic minerals and biomass dominate the DE.

All the major European economies have a DMC per capita lower than the average of the Eu27 (14.2 t). Although it has about 100 Mt of DMC less than Italy in absolute terms, Spain has a material consumption similar to that of Italy in terms of composition by type of material. The value of Germany (13.6 t) is close to the average of the Eu27, while the DMC per capita of France is equal to 11.2 t.

Figure 3. ITALY'S DOMESTIC MATERIAL CONSUMPTION (DMC) BY ORIGIN AND TYPE OF MATERIAL. Years 2021-2022, million tons; DMC PER CAPITA IN EU27 AND IN ITS MAJOR ECONOMIES. Year 2022, tons



Environmental taxes: Energy taxes pull revenue recovery

In 2023, environmental tax revenue in Italy amounted to 54.2 billion euros, 19.4% more than in 2022, when there was an overall sharp decline (-19.0%) due to the cut in excise duties on fuel and the elimination of general charges for the electricity system.

The overall increase in environmental taxes in 2023 is driven by the reintroduction of the previous 2022 legislation on energy taxes (+23.9%), despite the sharp reduction in the tax on extra profits linked to the production of renewable energy, whose revenue in 2023 is only 69 million compared to 3.7 billion euros in 2022, year of its introduction. Revenue from the tax on mineral oils returned to 2021 levels (25.7 billion compared to 18.1 in 2022) following the reintroduction of excise duties, while the reactivation, from the second quarter of 2023, of electricity system charges brought the revenue from the tax on electricity as a whole to 9.1 billion (4.5 in 2022). Transport and pollution taxes contributed to the overall growth, recording +5.9% and +1.2% respectively.

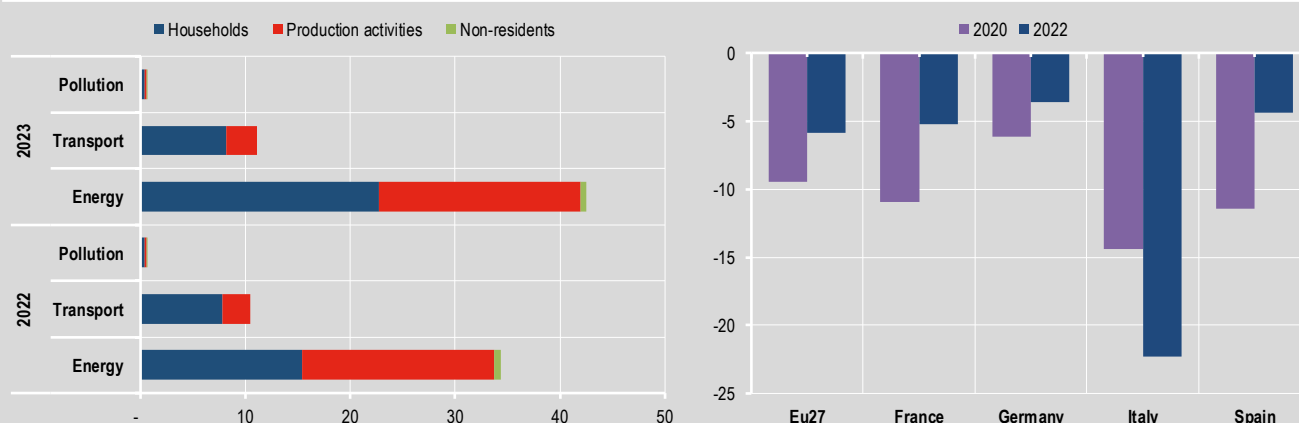
Both the share of environmental taxes on total taxes and social contributions and the incidence of their revenue on GDP have shown, since 2014, a downward trend, leading to, in 2023, 6.1% (2.7 percentage points less than in 2014) and 2.5% (1.3 percentage points less) respectively. This trend is mainly influenced by energy taxes, which represent approximately 80% of the total revenue from environmental taxes in the period.

Out of the total growth in environmental tax revenue in 2023, 88% results from the greater amount paid by households, estimated at 7.7 billion euros (+ 32.9%), due also in this case to the abolition of the price containment measures of the previous year. A lower contribution (over 1 billion) to the revenue growth came from production activities, which together provide 41.1% of the total revenue from environmental taxes.

In 2022 (the last year for which detailed environmental tax data by economic activity are available for Italy), the revenue paid by economic activities is mainly fueled by the Energy (25% of the total), Manufacturing (23.7%), Transport (14.3%), Services (13.1%), and Trade (10.6%) sectors. In terms of variation compared to 2021, with the exception of the Energy sector (+25%) - which in 2022 is burdened by the aforementioned new tax on extra profits - all sectors recorded contractions in the revenue paid. The largest reductions were recorded in Manufacturing (-53.2%), Extraction industries (-44.4%), Trade (-31.3%) and Agriculture (-25.9%).

The shares of environmental taxes on total taxes and contributions and on GDP in 2022 are higher for Italy than both the Eu27 average (respectively 5.5% and 2.3% compared to 5.0% and 2.0%), and some of the major European countries such as France (4.5% and 2.1%), Germany (4% and 1.6%) and Spain (4.1% and 1.5%). For the same year, the contraction in energy tax revenue from the previous year was larger for Italy. Furthermore, for our country the 2022 contraction was higher than that recorded in the year of the pandemic (2020), unlike what is observed for the Eu27 and its major countries.

Figure 4. REVENUE FROM ENVIRONMENTAL TAXES BY CATEGORY AND PAYING UNIT - Years 2022-2023, billion € and CHANGE IN ENERGY TAX REVENUE IN EUROPE - Years 2020 e 2022, percentage value.



Fonte: Istat, Environmental accounts – Environmental taxes by economic activity; Eurostat

The eco-industry sector growing in 2022

In 2022, the value at basic prices of the output of environmental goods and services (eco-industries sector) carried out by all economic operators (market and non-market) and including the own account output by the production sectors and households, stood at 217.4 billion euros (at current prices), with a value added of 79.9 billion euros. The increases in production and value added compared to the previous year were 37.7% and 40.6% respectively. The positive trend in the value added of eco-industries also exceeded that of GDP in 2022 (+8.4% in current prices), determining an increase in the incidence of the sector on the entire economy, which in terms of value added went from 3.1% in 2021 to 4% in 2022.

Growth affected all areas of the eco-industries sector, with the exception of activities for the containment of noise pollution. The most significant increase was recorded for activities aimed at improving energy efficiency (+87.4%). This marked trend, already evident in 2021, can be traced back to the effects of two legislative measures that have affected the sector since 2021. The first concerns the application of European Directive 2010/31/EU, which requires all new buildings to be compliant with the standards of nearly zero energy buildings (Nzeb); as a result, the eco-industries account for the entire value of construction activities of new buildings built in the country. The second measure that determined the strong growth of activities aimed at energy efficiency concerns the tax incentives commonly known as *superbonus* 110%, the greatest effects of which were recorded in 2022 with the increase in the number of interventions for the energy efficiency of buildings.

Again in the energy sector, a significant increase in value added is recorded in the production of energy from renewable sources (+66.9%). This growth in value does not occur together with a greater quantity of energy produced but was determined by the increase in the basic unit price of energy, driven by the price of gas, which has affected the entire energy sector, including renewables.

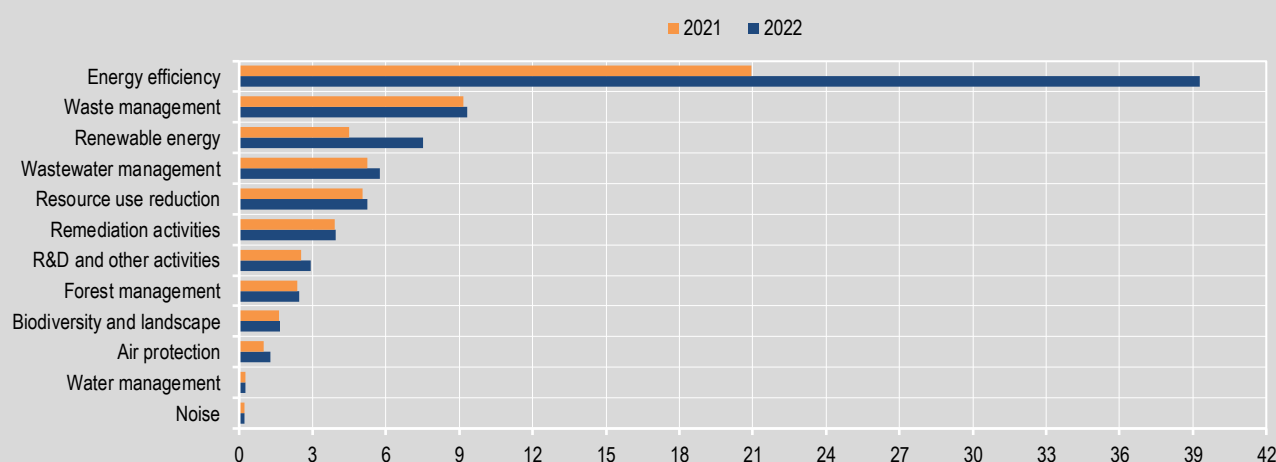
These phenomena contribute to confirming the primacy of the activities carried out in the energy sector on the overall value added generated by the eco-industry sector. In 2022, interventions for energy efficiency and the production of energy from renewable sources constitute 58.6% of the sector, a higher share than previous year (44.8%).

In 2022, the relevance of wastewater management, waste management and resource use reduction (which includes material recovery activities) is also confirmed. These three areas together account for a quarter of the value added generated by the eco-industries sector and have recorded a positive trend of +9.6%, +1.9% and +3.9% respectively.

At European level, based on the latest available data, Italy is among the countries with the highest incidence of the eco-industries sector on GDP, with the average incidence for the Eu27 being 2.5% in 2021.

Figure 5. VALUE ADDED BY ENVIRONMENTAL PURPOSE

Years 2021-2022, billions of euros



Source: Istat, Environmental accounts - Environmental goods and services account

The incidence of environmental protection expenditure on GDP stable in 2022.

In 2022, households, corporations and general government spent a total of 51.4 billion euros for the prevention and reduction of pollution and any other form of environmental degradation. This expenditure, up 9.4% compared to 2021, is equal to 2.6% of GDP in both years.

Waste management activities - which include prevention, collection, treatment and disposal – amount to, with 23.6 billion (+5.4% on 2021), 45.8% of national expenditure for environmental protection, while they represented 47.6% in 2021.

The share of expenditure for wastewater management, i.e. for the reduction of discharges, collection and treatment of wastewater, increased from 24.4% of the total in 2021 to 25.5% in 2022. For these activities, the Italian economy spent 13.1 billion (up 14.6% on 2021).

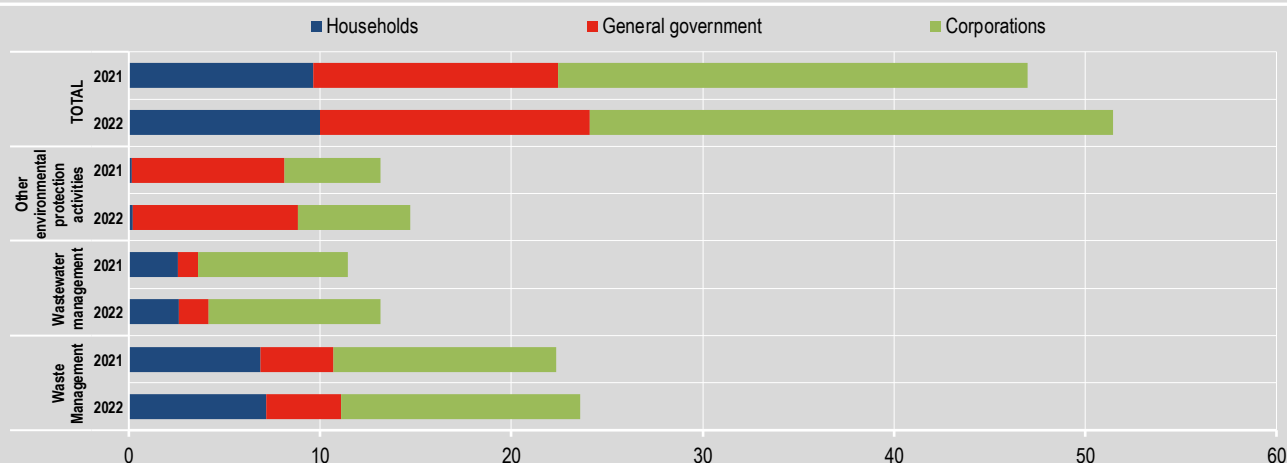
Expenditure for all other environmental protection activities was 14.7 billion current (+9.4% in the period). This includes over 5 billion for the decontamination of soil (+12% compared to 2021), almost 4 billion for research and development and protection from radiation (overall +21%), over 3 billion for the protection of biodiversity and landscape (+5%), almost 2 billion for the protection of air and climate (+9% in the period) and, for the remaining part, for noise reduction (+2%).

In the wastewater management and waste management sectors, corporations bear the majority of expenditure (68% and 53% of the 2022 total, respectively), with investments and consumption for the implementation of their activities, while households, by purchasing these services, cover 20% of the total expenditure in the case of purification and 30% in the case of waste.

The contribution of General Government to national expenditure for environmental protection, consisting of purchases of the services in question, investments by public operators and collective consumption, is over one and a half billion for wastewater management, 4 billion for waste management (12% and 17% of the total, respectively) and reaches 8.6 billion, 58% of the total expenditure, for other environmental protection activities.

With an incidence of expenditure on environmental protection on GDP of 2.6%, Italy is above the average of the 27 countries of the European Union, estimated by Eurostat at 2.2% of GDP for the years 2021 and 2022.

FIGURE 6. NATIONAL EXPENDITURE FOR ENVIRONMENTAL PROTECTION BY ENVIRONMENTAL PURPOSE AND INSTITUTIONAL SECTOR. Years 2021-2022, billions of euros



Source: Istat, Environmental accounts - Environmental protection expenditure account

Glossary

Air emission accounts: register and provide information on the emissions of greenhouse gases, acidifying substances, precursors for ground-level ozone, particulate matter, and heavy metals, released by production activities and by household's resident in Italy, according to the classification of economic activities used in the Resource and Use Tables of the Italian economy.

Basic price: The amount the producer receives from the purchaser per unit of goods or service produced, less the taxes on the products because of its production and sale (i.e. product taxes), and plus any subsidies on the products to be received on that unit as a consequence of its production or sale (i.e. subsidies on products). The basic price excludes transport costs invoiced separately, transport margins charged by the manufacturer on the same invoice are included, even if indicated as a separate item.

Biomass and derived products: include biomass from human food, forage for livestock, animals, and fish, processed products, timber and wood-based products and other products consisting predominantly of biomass.

Cepa classification: Classification of Environmental Protection Activities; it includes all the activities and actions whose primary purpose is the prevention, reduction and elimination of pollution and any other form of environmental degradation. It is divided into the following main headings: 1. Protection of ambient air and climate; 2. Wastewater management; 3. Waste management; 4. Protection and remediation of soil, groundwater, and surface water; 5. Noise and vibrations abatement; 6. Protection of biodiversity and landscapes; 7. Protection against radiation; 8. Environmental research and development; 9. Other environmental protection activities.

CO₂ emission intensity of energy consumption: it is the ratio between the quantity of CO₂ emitted and the energy consumption represented by the Energy Consumption of resident units (Net domestic energy use) for energy purposes.

Crema classification: Classification of Resource Management Activities, which includes activities and actions whose primary purpose is the conservation, maintenance, and improvement of the stock of natural resources and, their protection from depletion phenomena. It is divided into the following main items: 10. Management of water, 11. Management of forest resources, 12. Management of wild flora and fauna, 13. Management of energy resources (13A. Production of energy from renewable sources, 13B. Heat/energy saving and management, 13C. Minimization of the use of fossil energy as raw materials), 14. Management of minerals, 15. Research and development activities for resource management, 16. Other resource management activities.

Domestic extraction: aggregate of material flow accounts which includes natural resources extracted within the territory and thus transformed into products.

Domestic material consumption (Dmc): aggregate of material flow accounts which is the sum of Domestic Extraction and Imports net of Exports.

Economic activity: activity of producing goods or services that takes place when resources such as capital goods, labour and raw materials are combined to produce specific goods or services. Economic activity's distinctive features are the factors of production, a production process and an output of one or more products (goods or services). For statistical analysis purposes, the economic activities are classified according to the Ateco 2007 classification (consistent with the European nomenclature Nace Rev. 2).

Energy intensity (of the whole economy): measured by comparing the "Net domestic energy use", expressed in terajoules (unit of measurement of energy), to the GDP expressed in chain-linked values with reference year 2015.

Energy Minerals and Energy Mineral Products: Includes coal, oil, gas, other fossil fuels, and other products consisting primarily of energy minerals.

Environmental economic accounts/environmental accounting: system of satellite accounts representing the interaction between economic and environmental information in line with national economic accounts and with the principles outlined by the international statistical standards "Integrated environmental and economic accounting system" (Seea Central Framework 2012 and Seea Ecosystem Accounting 2021, chapters 1-7). Pursuant to EU Regulation No. 691/2011 on environmental economic accounts (amended by EU Regulation No. 538/2014 of 16 April 2014, by EU Delegated Regulation 2022/125 of the Commission of 19 November 2021 and by EU Regulation N. 3024/2024 of 27 November 2024), it is mandatory for the Statistical Institutes of the EU the production of nine environmental accounts, three of which will be produced from 2025 onwards while six (whose data are presented in this report) are regularly produced by Istat: three accounts in physical units (material flows, physical energy flows, air emissions) and three accounts in monetary units (environmental protection expenditure, environmental tax revenue, goods and environmental services).

Environmental goods and services sector (EGSS) accounts: report and present data on activities that generate environmental products. Environmental products include goods and services made for environmental protection and resource management. Environmental protection includes all activities and actions whose primary

purpose is to prevent, reduce and eliminate pollution and any other environmental degradation (see Cepa Classification). Resource management includes the conservation, maintenance, and improvement of the stock of natural resources and, therefore, the protection of these resources from depletion phenomena (see Crema Classification).

Environmental protection expenditure accounts: record and present data on the economic resources allocated to environmental protection by resident units according to the classification of environmental protection activities (see Cepa Classification).

Environmental taxes: taxes based on a physical quantity that has a proven and specific negative impact on the environment. The revenue from environmental taxes is classified according to four categories - energy, transport, pollution, resources - and according to the economic subject that pays the tax: resident production activities, resident Households, and non-resident units.

Exports (material flows): include material exported to other territorial contexts or economies. The weight of the goods crossing the border is considered and - in the case of the national level only - the direct purchases made in Italy by units resident abroad.

Final consumption expenditure of Households: value of Households' expenditure for the set of goods and services purchased to satisfy their individual needs. In the case of the Households sector, it includes the consumption expenditure of non-profit institutions serving Households.

Greenhouse gases: some gases present in the atmosphere, of natural and anthropic origin, absorb and emit infrared radiation at specific wavelengths, determining the phenomenon known as the "greenhouse effect". These include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). "Greenhouse gases" allow solar radiation to pass through the atmosphere and hinder the passage towards space of part of the infrared radiation from the surface of the Earth, thus contributing to global warming. Each of these gases has its own specific warming potential. To calculate overall greenhouse gas emissions, the quantities relating to the emissions of individual pollutants are converted into "tonnes of CO₂ equivalent", obtained by multiplying the emissions of each gas by its global warming potential (Gwp) - expressed in relation to the warming potential of carbon dioxide. To this end, the following coefficients are applied: 1 for CO₂; 265 for N₂O; 28 for CH₄ and several different weights in relation to specific gases for HFC, PFC, SF₆ and NF₃.

Gross domestic product at market prices (GDP): the final result of the productive activity of the resident units of production. It is equal to the total production of goods and services of the economy decreased by intermediate consumption and increased by the VAT levied and indirect taxes on imports. It is also equal to the sum of the value added at basic prices of the various branches of economic activity, increased by taxes on products (including VAT and taxes on imports), net of subsidies on products.

Imports (material flows): include material imported from other territorial contexts or economies. The weight of the goods crossing the border is considered and - in the case of the national level only - the direct purchases made abroad by units, resident in Italy.

Institutional Sector: Groups institutional units that have similar economic behavior. The institutional sectors are Non-financial Corporations, Financial Corporations, General Government, Households, Non-profit institutions serving Households and Rest of the world. In Italy, Households are divided into consumer Households and producer Households.

Material flow accounts: record and provide measurements relating to the physical exchanges (in units of mass) of the Italian socio-economic system with the natural system and with the rest of the world. All materials other than water and air are included. The primary products resulting from internal extraction and all products - raw, semi-finished and finished - imported and exported are classified by type of material.

National expenditure for environmental protection: measures the economic resources devoted to prevention, reduction and elimination of pollution and any other degradation of the environment by resident operators (i.e. net of funding received from the Rest of the world). The aggregate is the result of the sum of four main types of expenditure by economic subjects: spending on environmental protection services (such as waste management or waste water purification) by Corporations, General Government and Households; investments for environmental protection by operators that produce environmental protection services sold to third parties; expenditure for the purchase of equipment and machinery, goods and services and for the payment of personnel assigned to environmental protection activities by companies that carry them out on their own and expenditure destined abroad, for example in the context of international agreements for environmental protection.

Net domestic energy use - Ndeu: statistical indicator derived from the Physical energy flow accounts - Pefa - which denotes the actual energy use of residents at the level of the entire economy. It represents the energy consumption net of what remains incorporated in the derived products during the transformation processes (it is therefore free from double energy counting); therefore, it expresses the energy consumed and un-available for further energy purposes including all the energy dissipated (through combustion and not), all types of energy loss and the amount of energy used for non-energy purposes.

Non-metallic Minerals and Derived Products: Includes construction minerals, industrial minerals, and other products consisting predominantly of non-metallic minerals.

Non-resident units (environmental taxes): category that includes both consumer Households resident abroad and economic activities not resident in the country of reference. Both are subject to the payment of taxes, for example by purchasing energy products for transport in Italy.

Ores and derived products: These include ores of iron, copper, lead and other metals, as well as other products consisting predominantly of ores.

Physical energy flow accounts: record and present the flows of energy from the environment to the economy, within the economy and from the economy back to the environment, expressed in terajoules, distinguishing natural resources, products, and energy residuals. For each energy flow, supply (resources) is recorded according to origin, and demand (uses) according to destination, through a matrices scheme based on the structure of the Resource and Use Tables of the national monetary accounts.

Physical trade balance - Ptb: aggregate of material flow accounts given by Imports minus Exports.

Production: it is an activity resulting in a product. It is used with reference to the whole range of economic activities carried out in the country by the resident units in a given period of time. There are several notions of production. The standardized national accounting distinguishes between market production of goods and services intended for sale, and object of exchange which gives rise to the formation of a market price; non-market production which is not an object of exchange (production for own final use, the collective services provided by the General Government and by non-profit institutions serving Households).

Value added at basic prices: difference between the value of the output of goods and services and the value of the intermediate costs incurred for this production. Output is valued at basic prices, i.e. net of product taxes and gross of product subsidies and intermediate costs at purchase prices. It corresponds to the sum of the wages of the production factors and depreciation.

Waste management: according to the Classification of activities and expenditure for environmental protection (Cepa), the following activities are included: waste prevention, waste collection, transport, and disposal; waste monitoring and control, regulation and administration, information, and communication.

Wastewater management: according to the Classification of activities and expenditure for environmental protection (Cepa), the following activities are included: prevention of water pollution; collection and purification of wastewater; wastewater monitoring and control, regulation and administration, information, and communication.

Methodological note

Introduction: Environmental accounts: an integrated reading of economy and environment

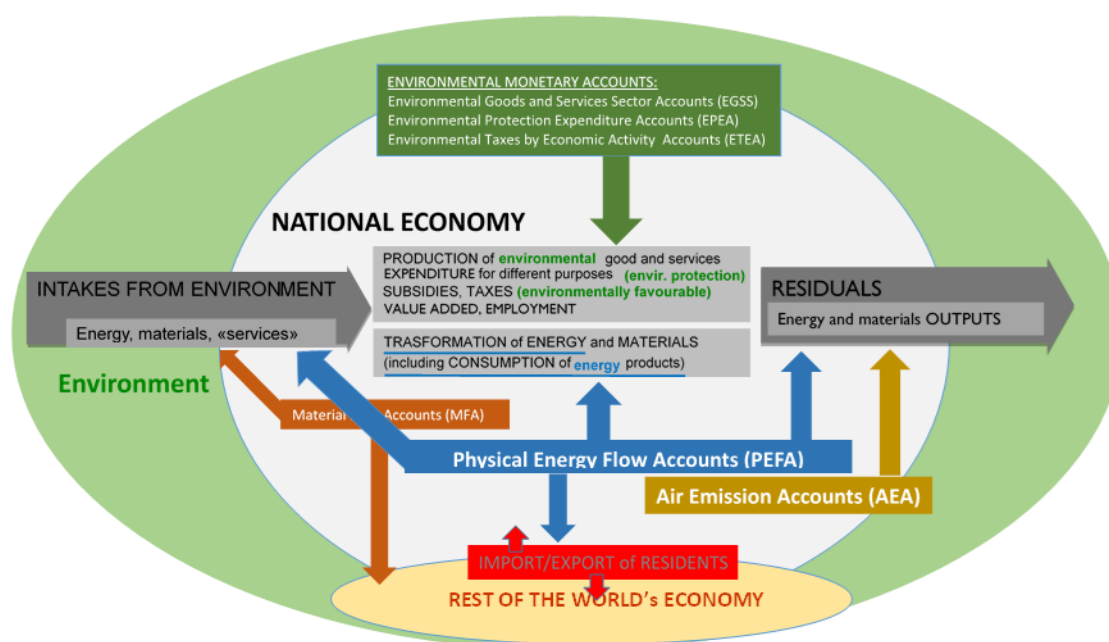
Environmental accounts describe the relationship between the economy and the environment by integrating, in a common framework, the conceptual categories and classifications of the System of National Accounts (SNA and European System of Accounts - SEC) with those of ecological science.

This integration is represented through:

- descriptions of the physical dimension of the socioeconomic system, that is its structure, interrelations with the natural environment, stocks of material and energy, flows to and from the environment of resources and residues as well as flows of products between economic units. These descriptions are based on scientific knowledge, and concern the drivers of pressures on the environment, the pressures themselves, the state of the natural system (resources and ecosystems) and its changes. The economic units affected by physical flows are defined and aggregated as in the National Economic Accounts. This allows the joint representation of the contributions that the different activities give to economic pressures and flows;
- descriptions of economic flows, already included in the national accounts - such as output, value added, employment, imports, exports, intermediate and final consumption, investments, taxes - at levels of detail functional to the analysis of the relationships between the natural environment and anthropic system. This allows, among other things, to identify the monetary flows that the economic system puts in place to prevent environmental damage or manage natural resources, as responses of the socioeconomic system to environmental challenges.

The environmental satellite accounts are produced by Istat according to the principles defined by the international statistical standard "System of Environmental Economic Accounting" (SEEA 2012). The SEEA is in turn consistent with the concepts, standards, and classifications of the national economic accounts, defined by the 2008 SNA and the 2010 SEC. Not all the accounts envisaged by the SEEA are currently implemented in Italy and in other countries. Figure 7 exemplifies the main types of flows covered by the environmental accounts that Istat regularly produces. These are the six integrated economic and environmental accounts required until 2025 by the European Regulation on European environmental economic accounts (EU Regulation no. 691/2011, and following amendments). Three of these accounts concern physical quantities (mass, energy, potential impact on the climate and air quality), three concern economic transactions and are therefore mainly expressed in monetary units. In addition to the SEEA and the above-mentioned European regulation, Istat refers, from an operational point of view to the specialized manuals produced by Eurostat, relating to each specific account, as well as to the indications emerging from the working groups active within the European Statistical System, to which Istat regularly contributes.

FIGURE 7. THE ECONOMY-ENVIRONMENT SYSTEM AND ENVIRONMENTAL ACCOUNTS



The physical environmental accounts produced by Istat

The environmental accounts of physical flows measure the "socio-economic metabolism" of the national anthropic system, such as the transformations and circulation of material and energy, in terms of exchanges of economic activities with the environmental system, with the Rest of the world and among themselves. Exchanges with the environmental system consist of withdrawals of natural resources (transformed into products) and returns of degraded materials to the environment, while those with the rest of the world and among economic activities concern the entire range of material products and energy, from raw materials to more composite finished products. The flows recorded are all those connected to the activities of the resident units, regardless of the geographical location in which they occur.

The partition of the anthropic system responds to criteria of an economic nature and is achieved using definitions and classifications specific to national accounting and with the representation of flows based on the architecture of supply and use tables specific to monetary accounts, extended as necessary to allocate flows between the environment and the economy. For this reason, environmental accounts of physical flows are particularly suitable for use in integrated environmental, energy and economic analysis. The flows described, by measuring quantities expressed in physical terms, provide additional information to that of the national economic accounts, with which they maintain consistency regarding concepts, definitions, accounting principles and classifications. This approach constitutes the peculiarity of environmental accounts and differentiates them from other sources of data on the environment - from which the accounts are elaborated, especially statistics on energy and emissions - which generally respond to the principle of geographical territory and use classifications different from those used in economic analysis. As part of the environmental accounts of physical flows, Istat regularly produces the material flow accounts as well as physical energy flows and air and emission accounts.

By determining the overall weight - with the exclusion of air and water - of the materials used in a country's production process, the **Material Flow Accounts (MFA)** refer to the anthropic pressure exerted on the environment in a holistic perspective. The materials accounted for come from the national natural environment (internal extraction) or from abroad (imports, by definition consisting of products). All flows are classified by product type (biomass, minerals and composite products, by type). Exports (the only flow accounted for on the destination side of what results from the transformations that take place in the national economy) and imports are also classified according to the degree of processing while by definition domestically extracted materials are those incorporated into primary products. Estimates do not directly cover returns to the natural environment but, by virtue of the principle of conservation of material - according to which the materials used as inputs are necessarily transformed into outputs such as emissions, wastewater, accumulation of waste, capital, and durable goods - they also provide significant information on the pressures exerted on the atmosphere, water, soil and ecosystems. Furthermore, the trend of material flows over time helps to understand the salient characteristics of a country's economic development. The data is available on a national scale, as required by the European Regulation, as well as on a regional scale.

For the specific category of energy materials, the **Physical energy flow accounts (Pefa)** allow for a detailed analysis of the energy metabolism of the socio-economic system and the interactions between the natural system and the anthropic system connected to the supply, transformation and use of energy, providing a complete description not only of the interactions between the natural system and the anthropic system, but also of the flows within the economic system (energy products and some non-energy products used for energy purposes). Flows are measured in energy units (terajoules).

They are broken down primarily by origin (withdrawals from the environment of natural energy resources or imports) and destination (residues towards the environment, exports and accumulation within the economy). The flows are further classified into 31 different categories (7 for natural energy resources, 20 for energy products, 2 for non-energy products used for energy purposes and 2 for energy losses and other energy residues), which consider the specific physical and product characteristics of the energy or materials in which it is incorporated.

For each type of flow, the origin and destination are reported separately for production activities, households, accumulation, Rest of the world, environment. Production activities are classified into 63 branches of economic activities (by Nace classification), while households consumption activities are divided into three categories according to the purpose of use (heating/cooling, transport, other). The set of Pefa accounts also allows the calculation of indicators, including the Ndeu - Net domestic energy use used in the data disseminated in this Report as well as the bridge table between the latter and the indicator "Gross inland energy consumption (Giec)" derived from the National Energy Balance (compliant with the geographical territory principle). The data is available at the national level.

The material taken for economic use is returned to the natural environment in various forms. **The Air emissions accounts** (Aea, previously known as "Namea -type accounts"), describe a specific method of returning material to the natural environment, namely its release into the atmosphere in the form of a volatile substance, identifying its origin in productive activities, broken down according to the Nace classification, or in households activities (heating, transport and other). Data is available at national level for 24 types of substances and three derived aggregates for the main "environmental issues". Emissions directly attributable to natural phenomena and the functioning of ecosystems are excluded, even when induced by environmental transformations due to anthropic action (for example by climate change). Production activities directly generate emissions through the processes characteristic of the principal activity and any secondary and ancillary activities such as heating and own-account transport¹.

Corporations generate emissions through production processes that transform materials and products, largely due to the combustion of energy products. Households generate air emissions by using fuels for private transport, gardening, heating and cooking and through the use of solvents and paints.

Thanks to the methodological coherence of the Pefa and AEA data with the principles of the national economic accounts, it is possible to compare the contribution of productive activities to the creation of socio-economic aggregates (production, value added, employment) with the contribution to the generation of energy and emissions flows, which represent important potential and actual pressures of anthropic activities on the natural environment. The data also allows the calculation of indicators representative of the efficiency of production activities such as energy intensity and emission intensity (for example energy consumption/production, emissions/full-time employee); the higher the value of the indicator, the less efficient the production activity is.

The analysis based on environmental accounts in physical units covers both the environmental and economic spheres, capturing flows in both directions (withdrawals from the environment and returns to the environment, Figure 7) and, in the case of energy flows, even internal to the economy sphere (transformations and consumption).

The monetary environmental accounts produced by Istat

Unlike physical ones, the flows described by **monetary environmental accounts** are located entirely within the economic sphere. They describe the actions that the economic system carries out for environmental protection and for the management of natural resources, producing goods and services useful for these purposes and bearing costs for the same purposes. The relationship between the natural environment and the anthropic system, in this case consists in identifying from the national economic accounts the input component of work, output, value added, consumption, investments, foreign trade, which responds to environmental purposes. Environmental conservation and the reduction and prevention of pressures from the anthropic system on the natural environment (for example the protection of biodiversity, waste water treatment and waste management) - or the management of natural resources through their conservation, maintenance and protection (for example material recovery

¹ For a given production unit, the principal activity is the one whose value added exceeds that of any other activity carried out in the same unit, the secondary activity is an activity carried out in addition to the principal activity and the ancillary activity consists of a support activity (purchasing, sales, marketing, data processing, transport, storage, etc.) provided in order to create the suitable conditions for the principal or secondary activities.

activities, interventions for energy efficiency or the production of energy from renewable sources), constitute environmental objectives. In detail, the two reference classifications describe the two main environmental purposes covered by the accounts:

- **environmental protection**, according to the classes (or grouping of classes) of the Classification of Environmental Protection Activities (Cepa): 1. protection of the air and climate; 2. wastewater management; 3. waste management; 4. protection of soil and underground waters; 5. reduction of noise and vibrations; 6. protection of biodiversity and landscape; 7. radiation protection; 8. research and development for environmental protection; 9. other environmental protection activities. Activities that, while having a favorable impact on the environment, primarily respond to technical needs or internal hygiene or protection and safety requirements of a company or other institution are excluded. Furthermore, the prevention of natural risks (landslides, floods, etc.) and activities such as energy saving or saving of raw materials that belong to the field of natural resource management are excluded;
- **resource management**, according to the classes (or groupings of classes) of the Classification of resource management activities (Crema) : 10. Water management; 11. Management of forest resources; 12. Management of wild fauna and flora; 13. Management of energy resources (13A. Production of energy from renewable sources; 13B. Management and saving of energy/heat; 13C. Reduction of the use of fossil energies as raw materials); 14. Mineral Management; 15. Research and development activities in the field of resource management; 16. Other resource management activities.

In the case of flows connected to taxation, environmental taxes are not identified on the basis of the possible environmental purpose of use of the revenue; the selection criterion instead concerns the tax bases and includes those that have a negative impact on the environment, such as energy products. Through the effect on product costs, fiscal instruments of this type are potentially able to guide the choices of producers and consumers in a less harmful way for the environment.

As part of the monetary environmental accounts, Istat regularly produces the accounts of environmental goods and services, expenditure for environmental protection and environmental taxes by economic activity.

The **Environmental Goods and Services Account** (Egss) records and presents data on production activities that generate environmental products. Also known as the eco-industry account, despite this name, the account does not only identify producers specialized in environmental production but focuses on all goods and services with an environmental purpose regardless of who produces them.

An activity is considered "environmental" when it gives rise to the production of environmental products, i.e. goods and services that directly contribute to the purpose of protecting the environment or managing resources.

To delimit and standardize the perimeter of the account, Eurostat has prepared an indicative Compendium, consisting of the list of environmental goods and services and the economic activities that produce them². This is an indicative list as it does not take into account that some of the products listed are only relevant in some countries and not in others, nor that there are additional environmental goods, services and economic activities that are absolutely relevant at a national level.

The stated criterion (according to which environmental products and activities must be specifically aimed at environmental protection or at the management of natural resources) implies the exclusion from Egss account of production activities which use inputs derived from recycled materials, such as paper produced from recycled paper or aluminum produced from recycled material. In these cases, the contribution to reducing the use of natural resources does not stem from production of the final products but rather it takes place upstream, in the material recovery phase and in the production of secondary raw materials. Egss data are available at national level for the following variables: output, exports of internal origin, i.e. of products made in the economic territory (of which output), value added, employment. All variables are broken down by the classification of economic activities Nace Rev. 2 (aggregation level A*21 as defined in ESA2010) and by the classes or groupings of classes of the classification of activities for environmental protection (Cepa) and the classification of resource management activities (Crema).

The estimates released in this Report refer to the entire economy. They include: the component of production exchanged on the market (market component); the component of production carried out by non-market operators (General Government and non profit institutions serving households); own account production by economic operators (including households in their role as producers) and intended to be reused in the production process (for example recovery activities of materials to be reintroduced into the production process) or for their own final consumption (for example solar energy produced and consumed within households).

The **Environmental Protection Expenditure Accounts** (EPEA), measure the economic resources used for environmental protection purposes as defined by the Classification of Activities for Environmental Protection (CEPA). To date, the data available in Italy and the EU do not include expenditure incurred for the purposes of

² See Commission Implementing Regulation (EU) 2024/1769 of 26 June 2024 amending Implementing Regulation (EU) 2015/2174 as regards updating the indicative compendium of environmental goods and services and of economic activities.

managing natural resources, an area which is instead covered by output estimates. The Epea accounts describe the main phases of the environmental spending circuit, which include the formation of the supply and demand of the various environmental services, the investments for the creation of these services, as well as the transfers through which General Government and the Rest of the world finance the environmental expenditure of other institutional sectors. The transactions are divided according to the classes (or groupings of classes) of the Cepa Classification and also distinguish both the institutional sector that carries them out - General Government and non-profit social institutions, corporations, households - and the role it plays in the field of environmental protection: producer of environmental services, user of environmental goods and services, financing of environmental expenditure incurred by other operators (only for General Government and Rest of the world) or beneficiary of transfers related to environmental protection. From the Epea accounts we obtain the aggregate 'national expenditure for environmental protection' calculated in this Report and defined as the sum of: final consumption of environmental protection services of resident units, intermediate consumption of environmental protection services of resident units (with the exclusion of specialized producers), gross fixed capital formation for environmental protection activities, transfers for environmental protection which are not the counterpart of the previous aggregates, less financing by the Rest of world.

Fiscal instruments, through the effect they have on the cost of products, can direct consumers towards behaviors that are less harmful to the environment, regardless of the explicit environmental aims of the legislator. For this reason, environmental accounts measure, as part of the socio-economic system's responses to environmental challenges, the revenue paid by various economic subjects in relation to fiscal instruments having tax bases that are harmful to the environment. **Environmental taxes**, belonging to the more general set of taxes, constitute compulsory, unrequited payments, made by institutional units to government units.. According to international guidelines, a tax is environmental if its tax base is 'a physical unit (or a proxy) of something that has a proven and specific negative impact on the environment'. Tax bases include, for example, the use of energy products or emissions of pollutants. Since the objective of the tax expressed in the law introducing the tax instrument is not decisive in the identification of environmental taxes, the group of environmental taxes includes both taxes introduced with explicit environmental purposes and taxes in which such a purpose is not evident in the regulatory wording. The data released by Istat distinguishes the revenue from environmental taxes according to the economic entity paying it and the category of the tax (based on a classification defined in European guidelines). Economic entities include resident activities that produce goods and services (based on the classification of economic activities Nace Rev. 2), consumer households and non-resident units (which include non resident households and non-resident productive activities that operate on the Italian territory). Categories include energy, transport and pollution.

Energy taxes include all taxes on energy products used both for transport purposes (especially petrol and diesel) and for stationary uses (especially fuel oils, natural gas, coal and electricity). Transport taxes mainly include taxes related to the ownership and use of vehicles. Taxes relating to other means of transport and transport services (e.g. aircraft) are also included as long as they are consistent with the general definition of environmental taxes. Pollution taxes include taxes on air emissions or wastewater, waste management, and noise; the exception are CO₂ taxes which fall into the group of energy taxes. There are no environmental taxes in Italy for the fourth category contemplated by the European guidelines, which concerns taxes on the withdrawal of natural resources.

Reference population

Environmental accounts refer to production activities carried out by resident units defined, in coherence with the system of national accounts, as the units that have their main center of economic interest in the economic territory of the country - i.e. when they exercise for a long period (one year or more) economic activities on that territory. (Esa2010 § 1.61).

An exception to this principle are material flow accounts, where, for the aggregates relating to foreign trade, the transfer of economic ownership is not sufficient and the crossing of borders is necessary. Furthermore, these accounts adopt the so-called "harvest approach" for accounting for the harvested cultivated biomass, whereas a strict application of the Esa principles would involve accounting for the flows of substances entering and exiting cultivated plants, as these are part of the anthropic stocks.

Main information sources

Material flow accounts. The main sources used are: Estimate of the surfaces and production of agricultural crops; Survey of structure and output of agricultural companies; Structure and output of the main wooden crops; Farm Register surfaces ; specific parameters at provincial level derived from Enea and Ispra studies and from the aforementioned Istat surveys (for used crop residues); agricultural economic accounts; data on fishing from the Ministry of Agricultural and Forestry Policies; provincial data from the bee registry of the Ministry of Health; regional administrative data; Istat survey "Anthropic pressures and natural risks - Extraction activities from quarries and mines"; industrial production indices; Istat estimates on irregular employment; administrative data from the revenue agency relating to sector studies; administrative data from Mise General Directorate for mineral and energy resources; Enea regional energy balances; foreign trade microdata; freight transport microdata.

Physical energy flow accounts. The basic information for the construction of the Pefa comes mainly from two sources, used jointly: the National Energy Balance (BEN) and the IEA/UNECE/Eurostat Energy Questionnaires.

The Ben and the Questionnaires are integrated with other sources in order to guarantee consistency with the National Economic Accounts and to provide more accurate estimates of some aggregates, while ensuring compliance with the residence principle, as well as allowing the breakdown by sector of economic activity and type of use of energy flows measured by Pefa. In particular, these sources are as follows:

- Survey on import/export of goods and services (Coe), Survey on air transport, Supply and Use tables, Istat's Agriculture Economic Accounts;
- Survey on international tourism in Italy and Survey on international transport of goods, by the Bank of Italy;
- Survey on final consumption of energy products by companies (Coen), with reference year 2011;
- Electricity Balance, data on electricity consumption by product sector, provided by Terna ;
- Vehicle Fleet Register, provided by Aci (Automobile Club of Italy);
- Vehicle Inspection Register of the Ministry of Infrastructure and Transport;
- Vehicle Registration Register, provided by Unrae (National Union of foreign Motor Vehicle Representatives)
- publication "Economic, energy and oil statistics" of the Unione Petrolifera;
- national inventory of emissions from ISPRA Institute for Environmental Protection and Research).

Air emissions accounts (Aea), already known as Namea -type accounts, are compiled starting mainly from the national inventory of atmospheric emissions, carried out annually by the Italian Institute for Environmental Protection and Research (Ispra), and source of data communicated by Italy within the framework of the United Nations framework convention on climate change UNFCCC) and the Convention on long range transboundary air pollution (Cltap). The relationship between the emissions of the AEA and those calculated by Ispra within the scope of the two aforementioned agreements is illustrated in these notes and quantified in the 'Reconciliation between the Namea total and the Unfccc/Cltap total '. The remaining statistical discrepancies are mostly due to the use of the most recent data, kindly provided by Ispra, further updated after the latest official communications.

Further sources of data are represented by the annual information currently produced by Istat in the context of the national economic accounts and the environmental economic accounts, and in particular by the physical energy flows account (Pefa).

Environmental goods and services sector accounts. The main information sources used to estimate the aggregates of the environmental goods and services sector accounts are both statistical and administrative in nature:

- survey data: Prodcum, structural statistics on enterprises (investments and current expenditure for the protection of the environment collected by the surveys of enterprises economic accounts);
- administrative data: Vehicle Inspection Register, Aci vehicle fleet Register, Ispra Emas (Eco-management and audit scheme) Register;
- other statistical data: economic, financial and environmental balance sheets of specific companies; reports and statistical data for the renewable energy sector produced by the GSE (Energy Services Manager), trade associations and other bodies.

Further sources of data are represented by the annual information currently produced by Istat in the context of national economic accounts and the environmental economic accounts:

- investments by industry, agricultural economic accounts, exports by product, value added and employment by industry, supply and use tables;
- physical energy flow account (Pefa).

Environmental protection expenditure accounts. The main information sources used to estimate the aggregates of environmental protection expenditure accounts are:

- national economic accounts - mainly supply and use tables, General Government accounts by function (Cofog), gross fixed capital formation by branch;
- survey data: investments and current expenditure for environmental protection collected by surveys of enterprises economic accounts; for the estimation of some expenditure aggregates for environmental protection, ad hoc methodologies are implemented in order to guarantee the consistency of the survey data with the data of the national economic accounts.

Environmental taxes accounts. The data on environmental taxes are based on revenue data calculated within General Government accounts. In some cases the revenue from the single tax can be identified individually in the accounts, in others it is part of larger aggregates.

Dissemination and review policies

Environmental accounts data are released once per year (called year t) on IstatData database (with the exception of the environmental tax aggregates for which two releases are foreseen), according to the following calendar: in the month of February the environmental protection expenditure accounts (time series up to year t-3), in May environmental taxes and material flows (time series up to year t-2), in October/November physical energy flows and air emissions (time series up to year t-2) and the update of the series of environmental taxes released in May; in December the aggregates of the environmental goods and services sector (time series up to year t-2). The time series are updated annually to incorporate updated inputs and revised during methodological reviews, including general reviews of national accounts.

The environmental accounts indicators are consistent with the 2024 general revision of national accounts. For material flows, the update of the series is scheduled for May 2025.

Aggregations of economic activities used in the Report:

1. Aggregation A*3 (according to the transmission program of Sec2010) and connection with the sections of the Ateco classification (Nace Rev.2)

Name	Ateco Section	DESCRIPTION
Agriculture	A	Agriculture, forestry and fishing
Industry	B, C, D, E, F	Mining and quarrying; Manufacturing; Electricity, gas, steam and air conditioning supply; Water supply, sewerage, waste management and remediation activities; Construction
Services	G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U	Services

2. Aggregation A*21 (according to the transmission program of Sec2010): sections of the Ateco classification (Nace Rev.2) and connection with the divisions

Section	Divisions	DESCRIPTION
A	01-03	Agriculture, forestry and fishing
B	05-09	Mining and quarrying
C	10-33	Manufacturing
D	35	Electricity, gas, steam and air conditioning supply
E	36-39	Water supply, sewerage, waste management and remediation activities
F	41-43	Construction
G	45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	49-53	Transportation and storage
I	55-56	Accommodation and food service activities
J	58-63	Information and communication
K	64-66	Financial and insurance activities
L	68	Real estate activities
M	69-75	Professional, scientific and technical activities
N	77-82	Administrative and support service activities
O	84	Public administration and defence; compulsory social security
P	85	Education
Q	86-88	Human health and social work activities
R	90-93	Arts, entertainment and recreation
S	94-96	Other service activities
T	97-98	Activities of households as employers, undifferentiated goods- and services-producing activities of households for own use
U	99	Activities of extraterritorial organisations and bodies

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