

ENVIRONMENT AND ECONOMY: MAIN INDICATORS | YEARS 2020-2022

Pressure on the environment as well as environmental expenditure increase again.

In 2021 the main pressure indicators of the environmental accounts grow more than GDP (+ 8.3% in volume); in 2022 the dynamics are different.

Net energy consumption reaches 7.0 million terajoules (+8.8%) in 2021 (-5.0% in 2022); **Greenhouse gas emissions** rise to 428 million tonnes (Mt) of CO₂ equivalent (+8.7%) in 2021 (+0.1% in 2022); **Domestic material consumption** climbs to 505.5 Mt (+10.2%) in 2021 (+2.1% in 2022).

In 2021, the value of **goods and services** produced by the economy for environmental purposes rises to 181 billion (+54.1%), the **Expenditure on environmental protection** to 46.6 billion (+10.6%) and the **Environmental Tax Revenue** to 55 billion (+8.1%), followed by a contraction of 24.4% in 2022.

+5,9%

Growth of the Net Imports in weight in 2022

In 2022, approximately 292 tonnes of materials were consumed per million euros of GDP

54,2

The tons of CO₂ emitted per terajoule of energy consumed in 2022

After decreasing from 2012 to 2020, +2.5% in 2021 and +4.9% in 2022

+179%

The increase of value added of activities to improve energy efficiency in 2021

In 2021 the value added of environmental goods and services is 3.7% of GDP (2.7% in 2020)

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In 2022, energy consumption and environmental taxes decline

The effects of the reduction of environmental pressures, induced by the 2020 pandemic crisis and the measures undertaken to deal with it, were reabsorbed in 2021. The indicators provided by the environmental satellite accounts, in 2021 experienced in most cases a growth higher than the economy (measured by an increase in GDP volume of 8.3%).

In that year, the growth of production activities led to an increase in Domestic Material Consumption (+10.2%), as well as, also due to the increase in Households' travelling, in the Energy consumption of resident units and in the emissions of Greenhouse gases (respectively +8.8% and + 8.7%).

The provisional estimates available for 2022 (the year in which GDP in volume increased by 3.7%), record a 5.0% contraction in energy consumption and the stability of the overall greenhouse gas emissions (+0.1 %). This is the result in both cases of differentiated dynamics between production activities (-5.9% for consumption and +0.7% for emissions) and Households' ones (+8.1 for both consumption and emissions in the case of own-account transport; -10.0% and -12.4% respectively for consumption and emissions from domestic use). In the same year, the estimated growth for material consumption is 2.1%.

Regarding production activities, the different dynamics between energy use and emissions was mainly due to the change in the sources used to produce electricity (reduction of hydroelectric power and replacement of natural gas with more carbon-intensive products).

While in 2021 the 8.1% increase (at current prices) in the overall revenue from environmental taxes was mainly due to the increase in the consumption of energy products, its reduction in 2022 (equal to 24.4%) is mainly due to the introduction of measures to contain the growth of energy product prices, such as the reduction of excise duties on fuels and the elimination of system charges.

The growth in the value added of environmental goods and services in 2021 (+49.6%) was mainly caused by measures aimed at encouraging energy efficiency in buildings, such as tax incentives commonly known as Superbonus 110% and the entry into force of the rules according to which all new buildings should comply with the European standard Nzeb - *Nearly Zero Energy Building*.

In 2021, as regards National expenditure on environmental protection, the increase of 10.6%, which brings the incidence on GDP to 2.6% (compared to 2.5% of the previous year), is largely attributable to the growth of resources allocated by Corporations, Households, and General Government to waste management.

ENVIRONMENT AND ECONOMICS: MAIN INDICATORS. Years 2020-2022, absolute values, values per unit of GDP^(a) and percentage change

INDICATORS	Unit of measure	2020		2021			2022		
		Absolute values	Values/GDP (a)	Absolute values	Values/GDP (a)	% change on 2020	Absolute values	Values/GDP (a)	% change on 2021
Net domestic energy use – Ndeu	Thousands of terajoule	6,477	4.1	7,047	4,1	+8.8%	6,694	3.8	-5.0%
Greenhouse gases in CO2 equivalents	Million tons	394	250	428	251	+8.7%	429	243	+0.1%
Domestic material consumption	Million tons	458.7	291	505.5	297	+10.2%	516.2	292	+2.1%
Value added of environmental goods and services	Billion euros	44.6	2.7%	66.7	3.7%	+49.6%	n.d.	n.d.	n.d.
Revenue from environmental taxes	Billion euros	50.8	3.1%	54.9	3.0%	+8.1%	41,5	2.1%	-24.4%
Expenditure on environmental protection	Billion of euros	42.2	2.5%	46.6	2.6%	+10.6%	n.d.	n.d.	n.d.

(a) Ratios of physical indicators on GDP in millions of euros at chain-linked values with reference year 2015 (Tj/000 euros, Tonn./euros, Tonn./euros); ratios of monetary indicators on GDP in millions of euros at current prices Source: Istat, Environmental Accounts

Energy consumption recovering after the pandemic, declining in 2022

The overall energy requirement, measured in Energy consumption of resident units (*Net domestic energy use*, Ndeu), amounts to 7,047 thousand terajoules in 2021, a level below the pre-pandemic period one (-0.8% on 2019) despite a 8.8% growth between 2020 and 2021 (. The 5.0% decline between 2021 and 2022 (which brings it to 6,694 thousand terajoules) confirms the decreasing trend observed starting from 2017.

The energy consumption intensity of GDP, relatively stable in 2021 (+0.4%), recorded a sharp decline in 2022 (-8.4%), reaching 3.8 terajoules per million euros (the lowest value of the last fifteen years) due to the different trend between energy data, in decline, and economic data, on the rise by 3.7%.

The recovery after the pandemic shock of the previous year had a major impact on the overall growth of energy consumption in 2021, for both production activities, which increased their consumption by 366 thousand terajoules (+8.1%), and Households' travelling, with an increase of 121 thousand terajoules in transport (+16.9%); also the Households' energy consumption for heating and other purposes, recorded an increase of 6.5% (equal to +83 thousand terajoules).

Among production activities, the Industry sector (NACE B-F) is the one that mostly contributed to the increase in energy consumption, with 253 thousand terajoules more than the previous year (+8.9%), exceeding by 2.1% 2019 values. In absolute terms, Manufacturing (NACE C) is the industrial activity growing the most (+119 thousand terajoules; +7.0%). In the Services sector (NACE G-S; overall +6.3%, equal to +94 thousand terajoules), significant are the increase in energy consumption of 59 thousand terajoules (+18.8%) in land transport (NACE 49) and the reduction of 29 thousand terajoules in healthcare (NACE 86; -21.6%, almost returning to pre-pandemic values).

The Agriculture and Fishing production sector recorded the greatest growth of energy consumption in percentage terms (+12.2%, equal to +20 thousand terajoules).

The year 2022 is characterized by a contraction in energy consumption, mainly due to the reduction in demand for natural gas, for three main reasons: the price shock connected to the Russian-Ukrainian conflict, the policy measures to contain energy consumption, and the particularly mild climatic conditions in the second half of 2022.

The *Ndeu* of the whole economy stood at lower levels than those of 2019, confirming the downward trend of the previous five years. All production sectors recorded a reduction in energy consumption, which stood at 4,577 thousand terajoules (-5.9% overall, -5.5% Agriculture and Fishing, -7.8% Industry and -2.2% Services). In 2022, Households also reduced their energy consumption by 3.1%, albeit with opposite trends between domestic use, which decreases by 10.0% (standing at 1,213 thousand terajoules), and transport one, which increases by 8.1% returning to 2019 levels (904 thousand terajoules).

FIGURE 1. "NET DOMESTIC ENERGY USE" BY ECONOMIC SECTOR AND HOUSEHOLDS.

Years 2019-2022, thousands of terajoules and percentage change



Legend: 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; H49 – Transport; O - Public administration and defence; compulsory social insurance; Q86 - Health services activities Source: Istat, Environmental Accounts - Physical Energy Flow Accounts

Greenhouse gas emissions stable in 2022

After the significant increase recorded in 2021 compared to the year of the pandemic crisis (+8.7%), in 2022 the greenhouse gas emissions of the Italian economy were broadly stable (+0.1%), thereby mitigating the downward trend observed since 2008 (-27.0%).

The overall level of 2022 is the result of opposing dynamics between production activities and Households. Among production activities, in the context of an overall increase of 0.7%, the *production and supply of electricity, gas, steam, and air conditioning* sector stands out, emitting 6.4% more greenhouse gas compared to 2021 (also due to an increased use of energy products with greater carbon intensity due to the energy crisis). The return of mobility to pre-pandemic levels, in particular the restart of air and land traffic, is among the causes of the increase in emissions from the transport sector which, compared to the previous year, grew by 4.4%. With a few exceptions, neglectable due to the low incidence on the total, all other production activities reduced their emissions.

Households recorded an overall reduction in greenhouse emissions of 1.3%, even though the transport and heating components contributed to this trend in different ways. On the one hand, emissions deriving from own account transport increased (+8.1%) due to the resumption of travelling, on the other, the mild temperatures that characterized 2022 contributed to the decline in emissions from heating (-12.4%).

Since in the same year the growth in GDP in real terms (+3.7%), was higher than that of emissions, the emission intensity per million euros of GDP fell to 243 tonnes of CO₂ equivalent, from 251 in 2021.

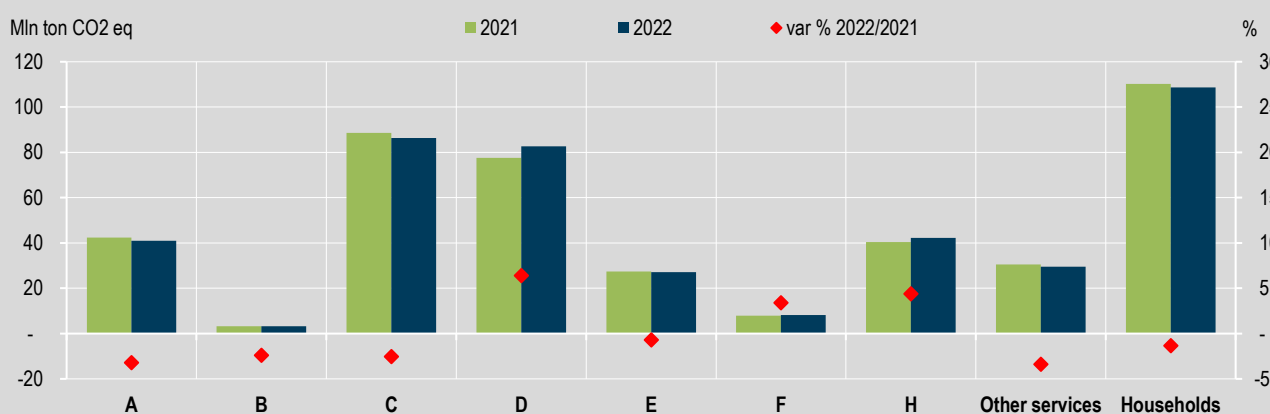
In the context of an overall gain in environmental efficiency, at a sectoral level, by contrast, the electricity production and supply industry in 2022 emitted 10.0% more than in 2021 for every million euros of value added, with a resulting worsening of its emission intensity.

The *CO₂ emission intensity of energy consumption* (calculated as the ratio between CO₂ emissions and the *Ndeu* for energy purposes), which had been decreasing since 2012 as evidence of the continuous transition towards forms of energy with a lower climate-change impact, stopped its reduction trend in 2021 (+2.5%), continuing to increase in 2022 (+4.9%).

The increase in 2022 is mainly due to the change in the energy mix used for electricity production in response to the energy crisis as well as to the significant drought during the year. In fact, there has been a sharp decline in hydroelectric energy production (-37.9%) in favor of traditional thermoelectric energy (+7.9%) and, for the latter, less use of natural gas (-3.8%) in favor of fossil fuels with a higher carbon content, such as coal, petroleum products and others (which together increase by 71.1%, contributing to 16.0% of total electricity production).

FIGURE 2. GREENHOUSE GAS EMISSIONS BY HOUSEHOLDS AND ECONOMIC SECTOR.

Years 2021-2022, million tons of CO₂ equivalent and percentage change



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

Source: Istat, Environmental Accounts – Air Emissions Accounts

Material flows back to growing

In 2021, *Domestic material consumption* (DMC) rose by more than 10%, with an increase of 46.8 million tons (Mt) compared to the previous year. The DMC thus exceeds again the half a billion tons, overcoming the pre-pandemic levels.

Contributions to the increase of DMC come from both its main components: Domestic extraction (DE) went from 319.5 Mt to 346.9 Mt (+8.6%), while Net flows from abroad (*Physical trade balance*, Ptb) reached 158.5 Mt / (+13.8%). Like for the reduction of the previous year, the Ptb turned out to be the DMC component most dependent from the GDP trend.

As regards the composition by type of materials, the impact on Ptb mainly came from the increase in energy minerals and products derived from them (9.4%, equal to 10 Mt) and from metallic minerals and derivative products, which in relative terms increased markedly, going from 9.4 to 16.8 Mt (78.9%).

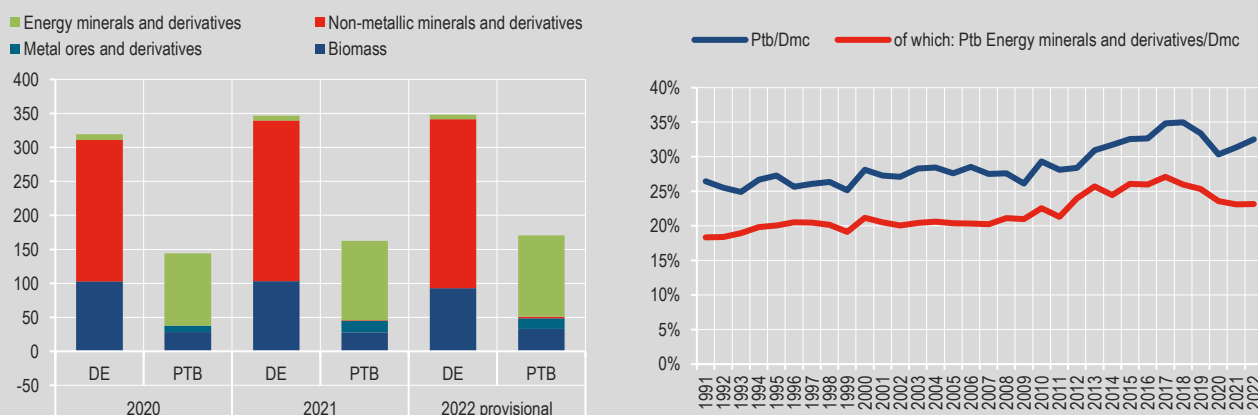
However, it is Domestic extraction that contributed the most to the growth of the DMC component relating to non-metallic minerals (from 208 to 237 Mt). Consequently, the share of biomass in the total weight of materials extracted internally and incorporated into products, decreased (from 32.2% to 29.7%), despite a slight increase in withdrawals (still stable at around 103 Mt). On the other hand, the direct extraction of energy minerals from nature is decreasing (from 2.7% to 2% of DE).

Material consumption per unit of GDP increased, in line with the trend of recent years, going from 291 to 297 tons per million euros.

In 2022, according to the first estimates (provisional especially for the "non-energy minerals" component of the DE), there has been a further increase in the Dmc of around 10 Mt, despite an equal decrease in the domestic production of biomass of products and used residues of crops. This decrease was partly offset by an increase in net biomass imports of approximately 5 Mt (+18.2%). Net imports of fossil fuels and derivatives also increased (by 2.8 Mt) as did those of non-metallic minerals and derivatives, which reached 2.5 Mt (Italy was a net exporter from 2012 to 2020), while the excess of imports over exports was reduced by 1.1 Mt for metal minerals and derivatives. Overall, the Ptb recorded a further growth of 5.9%, equal to 9.4 Mt.

The quantity and composition of the matter, from which the Italian socioeconomic system draws energy and material goods, generating new stocks and residues (atmospheric emissions, waste, wastewater), have changed considerably over the decades, corresponding to the structural changes in the economy. As regards the composition by supply source, from 2009 to 2018, the importance of the foreign one has grown significantly, with an incidence of the Ptb on the DMC of more than 30% since 2013. This shift is mainly due to the increase in incidence of imported fossil fuels and the decline of domestically extracted construction minerals and biomass.

FIGURE 3. DOMESTIC MATERIAL CONSUMPTION IN ITALY BY ORIGIN AND TYPE OF MATERIAL
(Years 2020-2022, million tons) AND INCIDENCE OF PTB ON DMC (Years 1991-2022)



Legend: DE Domestic extraction; Ptb: Physical trade balance; Dmc: Domestic material consumption
Source: Istat, Environmental Accounts – Economy Wide Material Flow Accounts

The revenue from environmental taxes on energy falls in 2022

Environmental tax revenue increased in 2021 (+8.1%), following the general recovery in energy consumption. By contrast, in 2022, the introduction of measures such as the cut in excise duties on fuel and elimination of system charges in response to the international crisis and the consequent impact on the final prices of energy products, caused a 24.4% reduction in the revenue from environmental taxes, down to 41.5 billion euros (-13.4 billion euros compared to 2021). This reduction was accompanied by a decline both in the share of environmental taxes on total taxes and social contributions, which fell from 7.1% in 2021 to 5%, and in the incidence on GDP (from 3% to 2.1%).

Due to the nature of the measures adopted, the greatest recorded revenue reduction was for environmental taxes on energy (13.5 billion; -31%), which constitute the highest share of total environmental taxes (72% in 2022) thereby driving the overall dynamic. On the other hand, taxes on transport and pollution, representing 26% and 1.4% of the total respectively, proportionally mitigated the overall contraction, recording an increase of 1% and 8% respectively.

In 2022, 70.9% of the total reduction in environmental tax revenue is due to the lower outlay of production activities, estimated at 9.5 billion euros (-38.5%). The reduction for Households is more limited (-3.6 billion compared to 2021; -12.1%), due to the increase in the use of mineral oils used as fuel. This significantly alters the distribution of revenue per paying unit, accentuating in percentage terms the contribution of Households, which in 2022 correspond to 25.9 billion euros, equal to 62.4% of the total revenue (it was 53.7% in 2021) against 15.2 for economic activities.

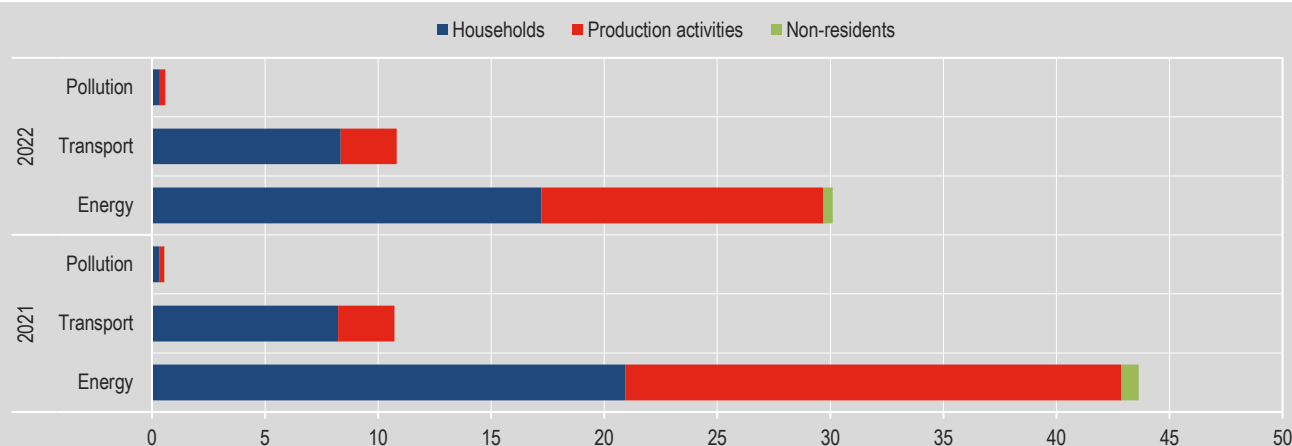
The revenue paid by non resident households and non resident transport companies operating in Italy for the purchase of fuels (tax on mineral oils) was significantly reduced: -43.2% in 2022.

In 2021, the revenue paid by economic activities (44.9% of the total) mainly came from Manufacturing (27% of the total), Services (20.8%), Transport (14.5%) and Commerce (12.8%). Compared to 2020, however, alongside the Energy sector, which stood out (+50.4%) mainly due to the increases in the auction prices of emission permits, high increases were recorded also by Construction (+26.3%) and Mining and quarrying (+26.2%), mainly caused by taxes on mineral oils.

Finally, it should be underlined that the elimination in 2022 of system charges, whose revenue is earmarked for the financing of renewable energy sources, reduced from 19% in 2021 to 4.2% the overall share of environmentally earmarked taxes, i.e. taxes whose revenue is used for natural resource management or environmental protection.

FIGURE 4. REVENUE FROM ENVIRONMENTAL TAXES BY CATEGORY AND PAYING UNIT

Years 2020-2021, billion euros



Source: Istat, Environmental accounts - Environmental taxes by economic activity

Significant recovery in the eco-industry sector

In 2021, output at basic prices of environmental goods and services (eco-industries) produced by all economic operators (*market* and *non-market*) and including own output of production sectors and Households, amounted to 180.6 billion euros (at current prices) and value added to 66.7 billion euros, with an increase of 54.1% and 49.6% respectively, compared to the previous year. The growth in value added was higher than that of GDP (+9.7% in current values), resulting in a growth in the incidence of the environmental goods and services sector on GDP (from 2.7% in 2020 to 3.7% in 2021).

The positive dynamic concerned all areas of the eco-industry sector, but the most significant increase was recorded for activities aimed at improving energy efficiency (+178.9%).

The extraordinary trend of this sector can be related to two main factors. Firstly, starting from 2021 (as established by the European Directive 2010/31/EU) all new buildings must be built in compliance with the requirements of “nearly zero energy buildings - Nzeb” (which belong to the environmental goods and services). This has led to a significant boost in the value of eco-industry construction activities sector, going from a Nzeb value based on the number of buildings classified as such in the Energy Performance Certificates (Ape) database, to the inclusion of the entire value of the construction activities of new buildings in the country in the estimates of the eco-industries sector. Secondly, in 2021, the effects of the tax incentives commonly known as the 110% Superbonus led to a strong increase in energy efficiency investments in buildings.

Still in the energy field, a significant increase in value added is recorded in the production of energy from renewable sources (+36.3%) due to the increase in the basic price, driven by the positive dynamics of the price of gas.

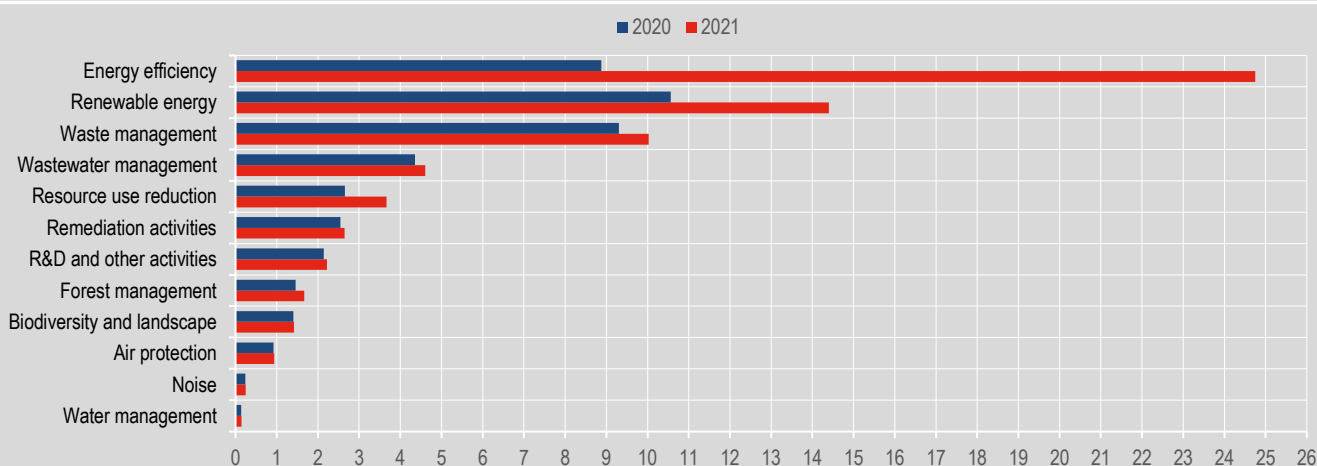
These phenomena confirm the primacy within the eco-industry sector of activities in the energy field, rising to 58.7% of total value in 2021, a far higher share than in the previous year (43.6%).

In 2021, the relevance of wastewater and waste management services is also confirmed, together covering a fifth of the value added of the eco-industry sector and recording a positive trend of +5.7% and +7.7% respectively.

A significant increase in value added is also recorded in activities aimed at reducing the use of resources (+38.3%) where material recovery activities are growing.

FIGURE 5. VALUE ADDED BY ENVIRONMENTAL PURPOSE

Years 2020-2021, billions of euros



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

The incidence of environmental protection expenditure on GDP increases.

In 2021, in Italy the expenditure for the prevention and reduction of pollution and any other form of environmental degradation was 46.6 billion euros, equal to 2.6% of GDP (compared to 2.5 % of the previous year), with an increase compared to 2020 of 10.6%.

Waste management activities, for the prevention of their production, collection, treatment, and disposal, absorbed, as in the previous year, more than half of the national expenditure for environmental protection, equal to 24 billion in 2021 (+10.1 % on 2020).

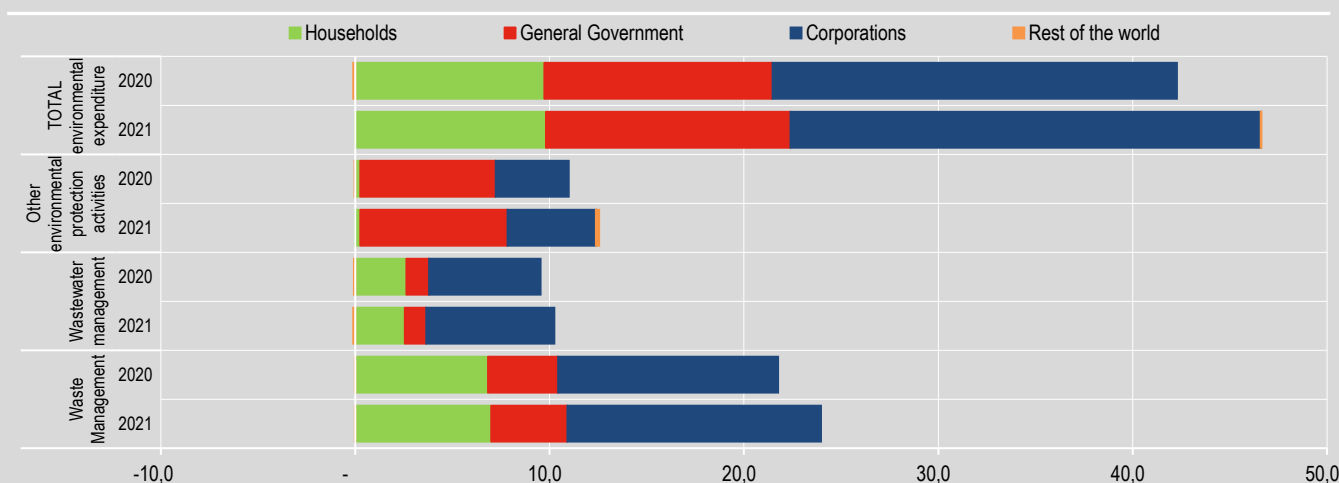
For wastewater management, like the reduction of discharges, the collection and treatment of wastewater, the Italian economy spent over 10 billion, equal to approximately 22% of the total resources for environmental protection (increasing by 7% on 2020). Expenditure for further environmental protection activities, which increased to 12.5 billion (+14.6% in the period), concerned respectively: 37% to the decontamination of polluted soil (+12%), 27% to the protection of biodiversity and the landscape (+12%), and, for the remaining part, to the protection of air and climate, noise reduction, Research and development and protection from radiation (overall +20%).

Corporations, as in the previous year, have been bearing most of the expenses in the wastewater management and waste management sectors, (65% and 54% of the 2021 total respectively), with investments and consumption for their own activities, while Households, by purchasing these services, cover 25% of the total expenditure in the case of wastewater management and 29% for waste.

The contribution of General Government to the national expenditure for the protection of the environment, made up of purchase of services, investments by public operators as well as collective consumption, is over 1 billion for wastewater management, 3.9 billion for the management of waste (11% and 16% of the total respectively) and 7.6 billion (60% of the total expenditure) for other environmental protection activities, especially for the protection of biodiversity and the landscape and for decontamination of polluted soil.

The balance among transfers to the Rest of the world, such as contributions to financial mechanisms connected to international agreements for the protection of the environment and the financing received, is always of a very limited amount and is positive only in the case of “Other environmental protection activities”.

FIGURE 6. NATIONAL EXPENDITURE FOR ENVIRONMENTAL PROTECTION BY ENVIRONMENTAL PURPOSE AND INSTITUTIONAL SECTOR. Years 2020-2021, 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 and by EU Delegated Regulation 2022/125 of the Commission of 19 November 2021), it is mandatory for the Statistical Institutes of the EU the production of six environmental accounts: 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). Istat regularly produces and disseminates the six mandatory accounts.

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 Ceca 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, Public administration, 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; expenses 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 expenses 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 expenses 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 expenses 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.

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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