"The EU raised € 299.9 billion from environmental taxes in 2020."

"Energy taxes represented more than three-quarters of EU environmental tax revenue in 2020."

This article presents the results of a detailed analysis of data on environmental taxes in the European Union (EU), complementing the article on Environmental tax statistics. It provides information on evolution, drivers and payers of environmental tax revenue. An environmental tax is a tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment and which is defined in the European System of Accounts (ESA 2010) as a tax.

General overview

In 2020, EU environmental tax revenue amounted to € 299.9 billion, accounting for 5.6 % of total government revenue from taxes and social contributions (TSC).1

Figure 1 presents the level, structure and evolution of the EU environmental tax revenue.

In 2020, the EU environmental tax revenue amounted to € 299.9 billion, accounting for 5.4 % of total government revenue from taxes and social contributions and 2.2 % of the EU gross domestic product (GDP).

In 2020, the EU environmental tax revenue decreased by – 9.1 % (- 29.9 billion) compared with 2019. Since 2002, EU environmental taxes were on an upward trend with an average annual growth of 4.2 % up to 2019. This large decrease results from significant decreases in environmental taxes for a vast majority of Member States: in 2020, compared with 2019, the median decrease of environmental taxes is -9.8 %. The largest decrease is recorded in Estonia with -26.1 %, followed by Luxembourg with -18.4 % and Slovenia (-14.4 %). Increases in environmental taxes between 2019 and 2020 occurred in three EU Member States: Lithuania (+ 3.6 %), Latvia (+1.6 %) and Bulgaria (+1.1 %).

In 2020, environmental tax revenue-to-GDP ratio for the EU amounted to 2.24 %, having fallen slightly by 0.11 percentage points since 2019 and by 0.31 percentage points from his highest value of 2.55 % in 2002. In 2020, the share of environmental tax revenue in total government revenue from taxes and social contributions (TSC) equals 5.6 % and decreased by 0.3 percentage points compared with 2019 and by 1.1 percentage points compared with its highest value in 2003 (6.7 %).

1 excluding imputed social contributions
The European Green Deal acknowledges the crucial role of taxation in the transition towards a greener and more sustainable European growth and the need to better align our taxation systems with EU climate objectives. Well-designed tax reforms can indeed boost economic growth, help reduce greenhouse gas emissions by ensuring an effective carbon pricing and contribute to a fair transition.

The Roadmap to a Resource Efficient Europe (European Commission, 2011) included the following milestone: by 2020, a major shift from taxation of labour towards environmental taxation will lead to a substantial increase in the share of environmental taxes in government revenue, in line with the best practice of EU countries.

With the downward trend observable for the ratio of the environmental taxes to total tax revenue, no major progress has been made in the implementation of the resource efficiency policy objective. Even though the equivalent ratio for labour taxes started to fall already during the financial crisis (2009), both shares declined from 2011 to 2015. With labour taxation remaining rather stable in recent years, and environmental taxes significantly decreasing since 2016, both shares reached in 2018 a similar level as recorded in 2008 (for details, see Figure 2). Environmental taxes-to-total taxes and social contributions ratio, however, continued its downward path in 2019, whereas the ratio for labour taxes retained the level from the previous year. The downward path stopped in 2020 as one can observe a stagnation of the share of environmental taxes similarly to the share of labour taxes in total taxes and social contributions. However the share of labour taxes equals 53.5 % of total taxation in 2020, almost ten times the share of environmental taxes (5.4 % of total taxation).
Energy taxes stand out as the major source of EU environmental tax revenue

Energy taxes represent more than three quarters of EU environmental tax revenue in 2020

Environmental tax revenue is broken down into four main categories: (i) energy taxes, (ii) transport taxes, (iii) pollution taxes and (iv) resource taxes. Given the small share of pollution and resource taxes in total environmental tax revenue and the problems in assigning some minor national taxes to one of the tax categories, these two types of taxes have been grouped together in this article when presenting the structure of the environmental taxes.

Energy taxes include taxes on energy products (e.g. coal, oil products, natural gas and electricity) used for both stationary purposes and transport purposes. In 2020, the vast majority of environmental tax revenue (77.2 %) came from energy taxes. By convention, CO2 taxes are also included in this tax category as they are usually levied on energy products.

It should be noted that the energy taxes for some countries do not include the levies imposed within the ring-fenced schemes to finance the transition to other renewable energy sources, e.g. the German Renewable Energy Sources Act (EEG).

Transport taxes mainly include taxes related to the ownership and use of motor vehicles. In 2020, transport taxes were the second largest source of environmental tax revenue in the EU, accounting for 19.1 % of the total.

Pollution and resource taxes cover different types of taxes: taxes on the extraction of raw materials; on measured or estimated emissions to air (e.g. NOx, SO2) and water; on noise and on the management of waste. Only 3.7 % of EU total environmental tax revenue was raised from pollution and resource taxes in 2020.

Since 2002, distribution of the tax categories has remained roughly the same, with no or very small changes (by less than 1 percentage point) in the share of energy taxes, transport taxes and pollution/resource taxes in total. As energy tax revenue accounts for around 78 % of environmental taxes, its development determines to a large extent the trend for the total revenue of environmental taxes. In 2020, EU revenue from energy taxes (in nominal terms) decreased by 9.4 % compared to its value in 2019. In the same period, the EU revenue from transport taxes decreased by 9.1 %, but the EU revenue from pollution and resource taxes decreased only by 0.3 %. In 2019 the contribution of households as tax payer remains equivalent to the contribution of corporations: the total environmental taxes fall on households for 48.0 % and on corporations for 47.7 %. However, among the different environmental taxes, corporations contribute for 51.4 % to the energy taxes, while households contribute for 65.4 % to the transport taxes.
Table 1: Total environmental tax revenue by type of tax and tax payer, EU, 2019 and 2020 Source: Eurostat (env_ac_tax) and (env_ac_taxind2)

CO₂ taxes as a distinct sub-category of energy taxes

CO₂ taxes or carbon taxes are levied on the carbon content of fossil fuels. While all energy taxes increase the price of energy products, CO₂ taxes must have a clear tax base (carbon content), which makes this type of tax distinct compared with other energy taxes. Consequently, a CO₂ tax provides an incentive to use a fuel with lower carbon content.

CO₂ taxes are regarded as a borderline case between energy and pollution taxes. However, they are recorded as energy taxes in EU statistics given that they are levied on energy products and have usually been introduced as a substitute for other energy taxes. The revenue from these taxes can be substantial compared with the revenue from pollution taxes, and the recording of CO₂ taxes with pollution taxes would distort both the time series at national level and an international comparison.

In recent years, several EU countries have introduced a carbon tax which ranges from less than € 1 per metric ton of carbon in Poland to over € 120 in Sweden. Such taxes are also levied in 15 other EU Member States and in the four European Free Trade Association (EFTA) countries. Apart from country-specific levies, the EU CO₂ taxes also cover government revenue from the auctions of emission permits under the EU Emissions Trading System (EU ETS), which is recorded by all EU Member States.

Emission permits

The payments collected by EU Member States for emission permits (emission allowances) are one example of CO₂ taxes. Under the European System of Accounts 2010 (ESA 2010), i.e. the accounting standards underpinning compilation of macro-economic statistics (National Accounts), the ETS auction revenues are recorded as taxes. Please note that ESA 2010 accounting rules are followed for compilation of all the taxation data presented in this article, including the ETS revenue described in this section.

Governments are increasingly using such emission trading systems, based on a cap and trade principle, to control total CO₂ emissions. The EU ETS was introduced in 2005. Up to 2012, governments allocated allowances for free. However, auctioning has been the default method for allocating allowances within phase 3 (2013-2020) of the EU ETS. In 2013, over 40 % of the allowances were auctioned; this proportion has been increasing over recent years, and is expected to further increase. In phase 4 of the EU ETS (2021-2030), the overall number of emission allowances will further decline. The system of free allocation will be re-focused on sectors at the highest risk of relocating their production outside of the EU. These sectors will receive 100 % of their emission permits for free. For less exposed sectors, free allocation is foreseen to be phased out after 2026. A considerable number of free allowances will be set aside for new and growing installations.

Under ESA 2010, governments should record the proceeds from an auction of emission trading allowances as other taxes on production (D.29) and on an accrual basis (i.e. at the time of CO₂ emissions covered by a permit, meaning only in the year when the permits are used (surrendered) and not when they are auctioned).
Total CO2 tax revenue relating to EU ETS allowances reported by EU countries amounted to €11.8 billion in 2020. In comparison, the value in the preceding years was significantly lower, ranging from €2.9 billion to €3.6 billion per year in the period 2014-2017, and €6.6 billion in 2018. For 2020, the value corresponds to a share of around 5.1% of the total revenue from energy taxes in the EU. The decreasing number of free-allocated emission trading allowances in the EU and EFTA countries explains to some extent the evolution of the ETS revenue in the recent years.

Germany recorded by far the largest tax revenue from emission permits in the EU (€3.1 billion in 2020), followed by Italy (€1.3 billion), Spain (€1.3 billion) and Poland (€1.1 billion) (see Figure 3).

Evolution of environmental tax revenue in Europe between 2010 and 2020

For all EU Member States (except Belgium, Greece, France, Croatia, Italy), the share of environmental taxes in total taxes and social contributions (TSC) decreased from 2010 to 2020 by -1.2% on average with the lowest value in Ireland (-2.8%).

Figure 4 compares the share of environmental taxes in TSC for 2010 and 2020. In 22 EU Member States the share decreased, whereas for five countries, it increased. The highest increase is observed in Greece with +1.4 percentage points, followed by Croatia, Italy and France (between +0.3 and +0.4 percentage points) and Belgium with +0.2 percentage points. Between the countries with a descending trend, Ireland recorded the highest decrease between 2010 and 2020 from 8.6% to 5.8% of TSC, i.e., by 2.8 percentage points, followed by Luxembourg, with a decrease of 2.6 percentage points (from 6.1% to 3.5%). For decreases, see the dots in blue and the right hand axis.
Environmental taxes as a share of total taxes and social contributions, 2010 and 2020 (% in TSC and change in percentage points)

Main drivers behind the evolution of environmental taxes

This section focuses on how environmental tax revenue and its main components - energy taxes and transport taxes - have evolved, compared with recent developments in the EU economy as a whole and the key related economic and fiscal indicators.

Figure 5 outlines the trend in GDP, total tax revenue, energy taxes, transport taxes and pollution/resource taxes from 2002 to 2020. The metrics are all indexed for comparability.

The Covid-19 pandemic reversed the upward trend observed for economic aggregates since 2009 and the recovery after the financial crisis of 2007-2008. All environmental taxes were affected except the pollution/resource tax. The level attained in 2020 went back to the level reached in 2014/2015 for the total environmental taxes and its components energy taxes and transport taxes. The sharp fall in 2020 compared with 2019 for energy and transport taxes is lessened when it comes to total tax revenue and GDP. In most of the years before 2007, transport taxes increased at a faster pace than GDP and the other taxes under examination. Following the financial crisis, the economy and the total tax revenue grew at a faster pace than environmental taxes in the EU.
Development of GDP, total tax revenue, energy-, transport- and pollution/resource tax revenue, EU, 2002 - 2020, (index 2002=100)

Even though the EU energy taxes consistently grew between 2002 and 2019 and dropped in 2020, EU energy tax revenue-to-GDP ratio continued its decreasing pace since 2016 up to 2020, dropping by 9.2 p.p. on that period. From 2016 to 2020, despite the drop in 2020, GDP grew at a faster pace than energy tax revenue, gaining 10 p.p.
Energy intensity is calculated as the ratio between the sum of inland consumption of solid fuels, oil, gas, nuclear and renewable energy sources and GDP. The indicator is expressed in chain linked volumes of GDP as it allows for a better comparison between different time periods (see Figure 7). Since 2002, energy intensity has been gradually decreasing, dropping by almost 27% by 2020, with the trend mainly driven by an overall rise in the GDP over this period, except after the financial crisis of 2007-2008 and the Covid-19 pandemic in 2020. The relation between the deflated revenue from energy taxes and final energy consumption illustrates the implicit tax rate (ITR) on energy. It should be noted that final energy consumption has remained at a rather constant level since 2002, with only minor fluctuations up to 2017 and a sharper decrease in 2020. Final energy consumption measures the total energy consumed by end users, such as households, industry and agriculture. It is the energy which reaches the final consumer’s door and excludes that which is used by the energy sector itself. Consequently, in the years under examination, the evolution of ITR is mainly driven by the development of energy taxes.

Figure 6: Energy taxes, GDP and final energy consumption, EU, 2002-2020 (index 2002=100) - Source: Eurostat (env_ac_tax), (nama_10_gdp) and (nrg_bal_s)
The consumption of solid fossil fuels dropped by 15% from 2010 to 2014 and after three rather stable years, significantly fell again from 2017 to 2020 by another 19%. On the other hand, consumption of renewable energy and biofuels increased by 32% between 2009 and 2020 and did not show any reversed trend in 2020. After a steady increase until 2019, energy taxes (deflated value) decreased sharply in 2020 by 13 p.p coming back to its level of 2010. The consumption of electricity and natural gas remained stable over the full time period, despite the Covid-19 pandemic.
Given the subdued growth of energy taxes in the period after 2009, the ITR on energy for the EU also increased between 2009 and 2020, from € 206 to € 231 per TOE (see Figure 9). The ITR and its changes vary significantly across the EU. The highest levels of ITR in 2020 were in Denmark, Greece, Italy (more than € 100 per TOE higher in 2020 than the EU average) and Netherlands; the lowest levels of ITR are in Lithuania, Romania, Poland and Hungary (in 2020 below the EU average by more than € 100 per TOE). The ITR increased in 2020 from 2002 levels in most of the EU countries (with the highest increase of € 205 per TOE in Greece, followed by € 168 per TOE in Cyprus and € 104 per TOE in Slovakia). By contrast, the tax rate significantly decreased in Denmark by € 106 per TOE, Luxembourg (-€ 54 per TOE), Germany (-€ 37 per TOE) and Austria (-€ 33 per TOE).

Transport taxes are levied mainly on vehicles when they are sold (e.g. sales taxes) and then for each year they are...
licensed for use on the road (e.g. circulation tax). As a result, the revenue from transport taxes tends to follow the
dynamics of vehicle sales and vehicle stocks. These two factors might then partly explain the reduction in transport
tax revenue observed after the two main economic crisis in the last two decades: the drop after 2007 and the drop
in 2020 due to the Covid-19 pandemic. The number of new vehicle registrations in the EU decreased between 2007
and 2013 (see Figure 10). In countries with high car sales taxes, the economic downturn following the financial
crisis impacted on car sales and therefore on revenue from such taxes. However, demand started to pick-up again
from 2014, surpassing pre-crisis levels by 12 % in 2018. But the economic downturn in 2020 impacted car sales
again and its revenue from taxes. In 2020, the demand is back at the level of 2014.

Transport tax revenue and new vehicle registrations (passenger cars),
EU 2002-2020, (index 2002=100)

Figure 10: Transport tax revenue and new vehicle registrations (passenger cars), EU, 2002-2020 (index
2002=100) - Source: Eurostat (env_ac_tax) and (road_eqr_carmot)

Overall, as illustrated in Figure 11, the stock of goods vehicles (+ 38 %), passenger cars (+ 29 %), and buses and
coaches (+ 12 %) increased in the period 2002-2020. An impact of the financial and economic crisis on the number
of vehicles in circulation is also visible over years 2007-2009, when the stock of some types of vehicles remain
nearly unchanged or decreased.
Environmental taxes by payer

Resident households and corporations with nearly equal contributions in the energy tax revenue

In the EU, corporations paid 50 % of all energy tax revenue collected by governments in 2019. The contribution of households was around 4 percentage points lower (46 %).

Among the EU Member States, Luxembourg stands out with the largest share of the energy tax revenue (60 %) collected from non-residents, largely due to non-resident purchases of petrol and diesel. In Malta, this share is also substantial (35 %).

In 2019, households paid around 60 % or more of total energy taxes in Slovenia (65 %) and Denmark (60 %) (see Figure 12).

The services sector (including transportation and trade) accounted for 26 % of the EU energy tax revenue, with Croatia, Poland, Estonia and Czechia recording shares of over 40 %. Outside the EU, in Turkey, the service sector is paying circa 60 % of energy taxes.

Manufacturing, construction, mining and utilities generated 21 % of the EU energy tax revenue.
Households pay over two thirds of the EU transport taxes

On average, transport taxes paid by households accounted in 2019 for a larger share (67 %) of the EU transport taxes than those paid by corporations (33 %) (see Figure 13). This is because households are the main payer of the motor vehicle tax revenue (an important component of transport tax revenue) in the EU. However, in some Member States the structure of transport tax revenue by payer differs considerably, with households contributing only marginally to transport tax revenue, as in Czechia (4.8 %) and Slovakia (8.1 %).
Households pay slightly more than half of the EU taxes on pollution and resources

For the two combined tax categories, i.e. pollution and resource taxes, households pay a bit more than half of the tax revenue. This is because higher amounts are generated from taxes on household waste or sewage, wastewater, water abstraction, plastic bags, hunting and fishing taxes, etc. As already mentioned, pollution and resource taxes account for a very small share of the environmental tax revenue. For two countries, the taxes are levied on a small number of payers in some industries, and, as such, the data are subject to statistical confidentiality and related EU aggregates cannot be disclosed either. For this reason, for the EU, Estonia and Lithuania, the presentation of the breakdown by payer has been adjusted (see Figure 14). In the EU, on average, in 2019, 56 % of all revenue from pollution and resource taxes were levied on households. Large differences across EU Member States are, however, observed. In particular in the Netherlands, households are the main payers of these taxes (71 %). In Germany, Croatia, Lithuania nor Slovakia, no taxes existed in 2019 which would fit the definition of a pollution or resource tax. In Latvia, Spain and Estonia, these types of environmental taxes are collected, but only a negligible share is levied on households (less than 3 %). In Spain, corporations from the electricity, gas, steam and air conditioning supply sector pay about two thirds (65 %) of all pollution and resource taxes. In Romania and Cyprus, mining and quarrying activities contribute to 39 % of all pollution and resource taxes.
Pollution and resource taxes by economic activity, 2019
(% of pollution and resource tax revenue)

Source: Eurostat (env_ac_taxind2)

Figure 14: Pollution and resource taxes by paying economic activities, 2019 (% in total pollution and resource tax revenue) - Source: Eurostat (env_ac_taxind2)

Source data for tables and graphs

- Environmental tax statistics — figures and tables

Data sources

Legal basis and methodology Statistics on environmental taxes by economic activity are compiled and reported under Regulation 691/2011 of 6 July 2011 on European environmental economic accounts (Annex II), amended by the Commission Delegated Regulation (EU) 2022/125 of 19 November 2021, as well as on legal acts in the area of national accounts. Data transmission became obligatory in September 2013. Prior to this, Eurostat collected the data on a voluntary basis.

Eurostat uses table 9 from the ESA transmission programme to supplement its compilation of data on environmental tax revenue for four categories of environmental taxes (energy, transport, pollution and resources). A Eurostat publication titled 'Environmental taxes - a statistical guide' constitutes the methodological basis.

Detailed breakdown and sources

Environmental tax revenue is allocated according to the different economic activities that pay the taxes. Eurostat collects data on environmental taxes using a breakdown by economic activity (NACE Rev. 2 classification) supplemented by information for households, non-residents and a category not allocated.

The main sources for the allocation of taxes by economic activity are: National Accounts (mainly supply and use tables), or data on energy use, waste disposal data etc. A third option can be direct allocation based on micro data from the fiscal administrations about tax payers for each environmental tax separately.

Data on environmental taxes can be used to analyse the revenue stream from such taxes, as well as to provide a relative measure of the importance of these taxes by calculating ratios relative to GDP or to the total revenue from all taxes and social contributions. In the first case, the comparison helps to provide an understanding of the tax burden. In the second case, the comparison helps assess whether or not there is a shift towards environmental taxes - in other words, shifting the tax burden from other taxes (for example those on labour income) towards
environmental taxes.

Rising revenue from environmental taxes should be interpreted with caution. The increases may be caused by new taxes or an increase in tax rates, or may also be linked to an increase in the tax base.

**Context**

Economic instruments for pollution control and natural resource management are an increasingly important part of environmental policy in EU countries. These include, among others, environmental taxes, fees and charges, tradable permits, deposit-refund systems and subsidies.

Environmental taxes have been increasingly used to influence the behaviour of economic operators, whether producers or consumers. The EU has increasingly favoured these instruments because they provide a flexible and cost-effective means for strengthening the ‘polluter-pays’ principle and for achieving environmental policy objectives.

Under the subject of ‘Greening national budgets and sending the right price signals’, the European Green Deal acknowledges that well-designed tax reforms can boost economic growth and resilience to climate shocks and help contribute to a fairer society and to a just transition. They play a direct role by sending the right price signals and providing the right incentives for sustainable behaviour by producers, users and consumers. At national level, the European Green Deal will create the context for broad-based tax reforms, removing subsidies for fossil fuels, shifting the tax burden from labour to pollution, and taking into account social considerations.

Environmental policy aims to achieve environmental and sustainable development goals. Policy makers use incentive-based tools to ensure that environmental solutions are found at the lowest cost, to correct externalities and/or raise revenue for specific purposes. The environmental tax revenue measured as share of all taxes and social contributions is an indicator to help assess progress towards ‘greening’ the taxation system.

**Other articles**

- Environmental tax statistics

**Tables**

- Environmental taxes (t_env_eta) , see:
  - Environmental tax revenues (t2020_rt320)
    - Energy taxes (t2020_rt300)
    - Energy taxes by paying sector (t2020_rt310)
    - Implicit tax rate on energy (ten00120)

**Database**

- Environmental taxes (env_eta) , see:
  - Environmental tax revenues (env_ac_tax)
Dedicated section

• Environmental taxes

Publications

• Tax revenue statistics
• Energy, transport and environment statistics - Eurostat Statistical books, 2019
• Key figures on Europe - 2019 edition - Eurostat Statistical books, 2019

Methodology

• Environmental taxes by economic activity (NACE Rev. 2) (env_ac_taxind2)
• Environmental tax revenue (ESMS metadata file — env_ac_tax_esms)
• Implicit tax rate on energy (ITR) (ESMS metadata file — ten00120_esmsip)

Legislation

• Regulation (EU) No 691/2011 of 6 July 2011 on European environmental economic accounts
• Summaries of EU legislation: European environmental economic accounts

External links

European Commission

• Environment - Policies
  • Mobility and Transport - Keeping Europe moving
Taxation and Customs Unit

• Taxation and Customs Union, Taxes in Europe database

Organisation for Economic Co-Operation and Development (OECD)

• OECD database on policy instruments for the environment
  • OECD Effective Carbon Rates - Pricing CO2through Taxes and Emissions Trading Systems

European Environment Agency (EEA)

• Environmental taxation and EU environmental policies