

Environmental taxes

A statistical guide

2013 edition

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Preface

To address environmental problems, profound changes to existing production and consumption patterns are needed. These changes can involve substantial economic costs. The search for instruments capable of producing behavioural changes across all sectors at minimal cost makes policy-makers pay closer attention to market based instruments. Therefore, market based instruments for pollution control and natural resource management are an increasingly important part of environmental policy tools in the European Union (EU) and there is considerable interest in their use and effectiveness.

This statistical guide focuses on the development of statistics on environmentally related taxes (for convenience referred to simply as environmental taxes) as this is an area where basic data is generally readily available and comparable across countries. This guide is an update of Eurostat's 2001 Statistical guide on environmental taxes and includes definitions and concepts, data sources and estimation methods. The guidelines are based on a harmonised statistical framework originally developed in 1997 jointly by Eurostat, the European Commission's Directorate General Environment and Directorate General Taxation and Customs Union (DG TAXUD), the Organisation of Economic Co-operation and Development (OECD) and the International Energy Agency (IEA). The update reflects the experience Eurostat gathered in collecting data from Member States and EFTA countries. By updating the 2001 guide, Eurostat together with DG TAXUD is improving the methodological foundation for harmonised data on environmental taxes across Europe. This guide is also a basis for implementing Regulation (EU) No 691/2011 of the European Parliament and of the Council of 6 July 2011 on European environmental economic accounts. This Regulation requires detailed data on environmental taxes to be submitted to Eurostat on an annual basis.

The guide provides a step-by-step procedure for compiling data on environmental taxes. Its purpose is to facilitate the production of harmonised data and to enable more rigorous cross-country comparison of data. Full implementation of the recommendations in this guide will help to ensure that data are compiled on a consistent basis in all Member States of the European Statistical System (ESS).

Due to its clear focus on the practical implementation, the guide complements international references such as the United Nations System of Environmental-Economic Accounting ([SEEA 2012](#)). For national compilers the guide may serve as a compilation manual. Interested data users may also benefit from this publication as a source of background information and clarification.

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1. Introduction

The environment is affected by the existing production and consumption patterns. To address environmental problems, behavioural changes are needed some of which involve substantial economic costs and affecting labour, product and capital markets.

Environmental policy aims to reach environmental and sustainable development goals. Policy-makers use incentive-based tools to ensure that environmental solutions are found at least cost, for correcting externalities and/or for raising revenues for specific purposes.

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

The EU has increasingly favoured such instruments because they provide a flexible and cost-effective means for reinforcing the polluter-pays principle and for reaching environmental policy objectives. The more intensive use of economic instruments has been promoted in the EU 6th Environment Action Programme ⁽¹⁾ and in the renewed EU Sustainable Development Strategy ⁽²⁾ as well as in the Europe 2020 Strategy. ⁽³⁾

Europe 2020 is the European Union's ten-year growth strategy and aims at smart, sustainable and inclusive growth. The strategy stresses the importance of using economic instruments for achieving resource efficiency and climate protection. The strategy includes seven flagship initiatives. The flagship initiative related to resource efficiency includes as a milestone that 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 public revenues. ⁽⁴⁾

The Commission's proposal for an Environmental Action Programme to 2020 ⁽⁵⁾ calls for applying the polluter-pays principle more systematically, through phasing out environmentally harmful subsidies and shifting taxation away from labour towards pollution.

Environmental taxes can serve to discourage behaviour that is potentially damaging for the environment and can provide incentives to lessen the burden on the environment and to preserve it by 'getting the prices right'. The economic rationale for their use comes from their ability to influence markets in a cost-effective way, unlike regulatory or administrative approaches.

Information about environmental taxes is important for areas such as environmental policy and environmental fiscal reform, as well as for analytical purposes. A policy issue that has been of particular interest in recent years is green tax reform, which involves increasing taxes on the use of the environment and reducing taxes on other tax bases, in particular labour.

For environmental fiscal reform, revenue data, in the form of an aggregate overview of the structure and changes in structure of the taxation system, is important. This includes environmental tax revenue as a share of all revenue from taxes and social contributions, and the distribution of revenue among aggregate tax bases.

Examples of analysis of environmental taxes are estimates of the environmental impact of a certain tax, such as the reduction in pollution resulting from introducing a new tax or from increasing the rates of an existing tax. For these purposes, physical data on the tax bases (e.g. emissions, waste and energy products) and data on market prices of the products involved are needed. Detailed descriptions of the tax rules are also important for tax analysis. Estimating the effect of a tax also requires information about

⁽¹⁾ Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme of 10 September 2002.

⁽²⁾ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0400:FIN:EN:HTML>.

⁽³⁾ http://ec.europa.eu/europe2020/index_en.htm.

⁽⁴⁾ http://ec.europa.eu/resource-efficient-europe/pdf/resource_efficient_europe_en.pdf.

⁽⁵⁾ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0710:FIN:EN:PDF>. The Programme is expected to be adopted by the European Parliament and Council before the end of 2013.

pricing behaviour, i.e. how much of the tax is being passed on to buyers, and about the price elasticity of demand for the products involved. Price elasticity and pricing behaviour are outside the scope of environmental tax statistics, however.

Scope of the update of the statistical guide for environmental tax statistics

This statistical guide describes the concepts and methods for environmental tax statistics and offers a framework for data collection. The guide is an update of the 2001 version of Eurostat's statistical guide for environmental taxes.⁽⁶⁾ The main aspects that were updated include:

- Presentation of the legal requirements concerning environmental taxes introduced by Regulation (EU) No 691/2011 on European environmental economic accounts
- Update of the national accounts references to the new ESA 2010
- Clarification of the definition of environmental taxes and clearer criteria for dealing with new taxes
- An update of the list of environmental tax bases
- Suggestions for the treatment of particular boundary cases in the European countries
- More detail on the sources and methods for the distribution of environmental taxes by economic activities (the payers of the taxes)

This statistical guide comprises 4 main chapters. Chapter 2 presents legislation, concepts and definitions, categories of environmental taxes and the treatment of borderline cases. Chapter 3 introduces the main classifications. Chapter 4 outlines a framework for data collection and describes data sources and methods as well as the compilation process. Chapter 5 provides a set of example tables, indicators and analyses for presenting information about environmental taxes.

⁽⁶⁾ http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-39-01-077.

2. Definition, categories and borderline cases

This chapter presents the concepts, definitions and categories used for environmental tax statistics. It also presents how specific borderline cases are to be treated.

Environmental tax statistics are part of environmental economic accounts which constitute satellite accounts to the national accounts. The national accounts are the general statistical framework for measuring the economy from which indicators such as GDP are derived. Satellite accounts complement this framework with information on selected areas of specific concern, such as the environment (European System of Accounts (ESA 2010) ⁽⁷⁾, paragraphs 1.40 – 1.49).

Environmental accounts serve to provide data for the analysis of the interaction between the environment and the economy. An important feature of satellite accounts is that the basic concepts and classifications of the standard national accounts framework are retained.

2.1 Legal acts

At European level, statistics on environmental taxes use as a basis the legislation in the area of environmental accounts and in the area of national accounts.

[Regulation \(EU\) No 691/2011](#) of the European Parliament and of the Council of 6 July 2011 on European environmental economic accounts provides a framework for the development of various types of environmental accounts (also referred to as modules). Environmental taxes by economic activity are one of the three modules currently included in the Regulation. The other two modules are air emissions accounts and economy-wide material flow accounts. The statistics on environmental taxes by economic activity present data from the perspective of the entities paying the taxes in a way that is fully compatible with the ESA.

The delivery of national accounts data to Eurostat is regulated in the national accounts transmission programme ⁽⁸⁾. The transmission programme includes table 9 — Detailed tax and social contribution receipts by type of tax and social contribution and receiving sub-sector. In addition, the full detail of the national classification of taxes and social contributions, with corresponding amounts and ESA codes, must be provided (the so-called national tax list). In the national tax list, the taxes are also classified by economic function codes. The main functions are consumption, labour and capital. In addition to these main groups, also environmental taxes are identified in the national tax lists.

2.2 Definition of environmental taxes

The statistical framework uses the following definition of an environmental tax, in line with Regulation (EU) No 691/2011:

A tax whose tax base is a physical unit (or a proxy of a physical unit) of something that has a proven, specific negative impact on the environment, and which is identified in ESA as a tax.

The definition puts emphasis on the **effect** of a given tax in terms of its impact on the cost of activities and the prices of products that have a negative effect on the environment. The environmental effect of a tax comes primarily through the impact it has on the relative prices of products and on the level of activities, in combination with the relevant price elasticities.

Furthermore, the definition puts emphasis on the **tax base**. An environmental tax is a tax on a tax base which has a specific negative impact on the environment. The tax base was seen as the only objective

⁽⁷⁾ The ESA 2010 is set out in [Regulation \(EU\) No 549/2013](#) of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union. All data submitted to Eurostat from 1 September 2014 onwards shall be based on ESA 2010. The ESA 2010 replaces the ESA 1995 as defined in Council Regulation (EC) No 2223/96 of 25 June 1996 on the European system of national and regional accounts in the Community (ESA 1995).

⁽⁸⁾ Annex B of [Regulation \(EU\) No 549/2013](#) of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union.

basis for identifying environmental taxes for the purpose of international comparisons. Other possible criteria, such as the purpose stated by the tax legislator, the name of the tax or the earmarking of the revenue for environmental purposes are less suitable and more difficult to use in practice.

Many taxes are introduced with several purposes in mind, e.g. both to influence behaviour by making a product more expensive to use and to generate revenue. Since the environmental impact of the tax comes mainly from its effect on relative prices, a tax on e.g. petrol introduced for fiscal reasons will have the same effect as one that is introduced with the stated purpose of reducing emissions.

To identify environmental taxes, a **list of tax bases** was established. All taxes levied on these tax bases are considered environmental taxes. In some cases the tax base is the measured or estimated amount of emissions of a polluting substance, such as NO_x. However, it is often difficult and expensive to measure emissions directly, so many taxes are based on proxies for emissions, for example the use of fuel oil.

The definition refers to the tax definition of the **national accounts**. This is done to ensure international comparability and reflects that environmental tax statistics are a satellite account to the national accounts.

The term ‘environmental taxes’ can be interpreted as referring to taxes with an environmental, rather than a fiscal, motivation. Since motivation is not part of the definition used for environmental tax statistics, it can be argued that the term ‘environmentally related taxes’ is more appropriate. This is the term used in Regulation (EU) No 691/2011 and is preferred e.g. by the OECD. As the more convenient term ‘environmental taxes’ is in common use, it is used in these guidelines. This term is also used in the United Nations System of Environmental-Economic Accounting (SEEA 2012) which was adopted as an international statistical standard in 2012.

Experience over the years has shown that several interpretations of the concept of environmental tax may exist. It is useful for compilers to be aware of these interpretations which are described below.

National accounts tax definition versus legal tax definition

The environmental tax statistics framework uses the tax definition of the national accounts as a reference. The national accounts definition improves international comparability of the statistics, and allows integration of the tax data with the national accounts and with systems of integrated environmental and economic accounting.

The legal definition of taxes may differ across countries, and may be different from the definition used in the national accounts. In many countries the constitution or other major law defines the kind of taxes and charges a government can levy.

The legal definition can be relevant for users as it has an influence on how policy makers can use taxes as instruments for environmental protection. For national purposes countries may choose to describe environmental taxes both from the legal perspective and the national accounts perspective. For international comparability purposes and for reporting under Regulation (EU) No 691/2011, the environmental tax statistics must be based on the national accounts tax definition.

Pigovian taxes and Ramsey taxes

The term ‘environmental taxes’ is sometimes interpreted to mean Pigovian taxes.⁽⁹⁾ A Pigovian tax is a tax levied on a market activity that generates negative externalities. The environmental economic theory describes the concept of externality as a cost or benefit, not transmitted through prices. The benefit corresponds to a positive externality and the cost corresponds to a negative externality. Negative externalities or ‘social costs’ are related to the environmental consequences of production and consumption.

In the presence of negative externalities, the social cost of a market activity is not covered by the private cost of the activity. In such a case, the market outcome is not efficient and may lead to over-consumption of the product. A Pigovian tax is a tax levied on the negative externality at a tax rate that is equal to the marginal damage costs and is considered to correct the market outcome back to efficiency. In practice, the application of Pigovian tax theory faces the difficulty of calculating what level of tax will counterbalance

⁽⁹⁾ After Arthur Cecil Pigou, a British economist. Pigou, A. C. *The Economics of Welfare*, 1920.

the negative externality i.e. what tax rate equals the marginal social costs. Furthermore, Pigovian taxes should be levied directly on the negative externality or on tax bases that are very close proxies of the social costs such as emissions.

Given the difficulties with estimating Pigovian tax rates, environmental taxes as defined in this guide include more than the Pigovian taxes as described in economic theory. As an example, the rate of a tax on energy products may be set with fiscal motives in mind and may be higher than the marginal damage from the production and use of the energy products.

In advanced research ⁽¹⁰⁾ it is shown that for polluting goods the tax rate should not only vary according to the social costs but also according to the elasticity of demand. According to the rule of Ramsey ⁽¹¹⁾ the tax rate of an optimal fiscal tax is set inversely proportional to the price elasticity of demand for the tax base, i.e. the more inelastic the demand, the higher the tax rate. This minimises the so-called 'dead-weight costs' of taxes, i.e. the distortion of economic activities by taxation. The relative weight that should be given to the Pigovian and Ramsey components is determined by the marginal costs of public funds.

It may be useful to alert users of environmental tax statistics that they cannot assume that the actually observed environmental tax rates and tax revenues correspond to these theoretical models.

Taxes whose revenues are earmarked or hypothecated for environmental purposes

Another possible interpretation of the term 'environmental taxes' is that these are taxes whose revenue is earmarked for environmental purposes. The hypothecation or ear marking of a tax is the dedication of the revenue from a specific tax for a particular expenditure purpose. Taxes earmarked for environmental purposes ⁽¹²⁾ are taxes whose revenues must be used for environmental purposes, usually via fiscal bodies, agencies, etc. which collect the tax revenue and provide specific transfers to other units or directly use the funds for financing environmental activities. Data about earmarked taxes can be used for example for analysing the funding mechanisms of environmental activities.

The definition of taxes earmarked for environmental purposes focuses only on the use of the tax revenue and is different from the definition of environmental taxes based on the tax base. Therefore, some of these earmarked taxes may be levied on tax bases other than those used in the definition of environmental taxes. However, in practice it is often environmental taxes whose revenue is earmarked for environmental purposes so that the earmarked taxes de facto represent a sub-set of environmental taxes.

An example of an earmarked tax which satisfies the definition of environmental taxes is the Dutch water pollution tax, which is used to finance e.g. activities of sanitation and purification of wastewater.

2.3 Tax bases

To supplement the definition of environmental taxes given in section 2.2, a list of environmental relevant tax bases was agreed in 1997 by Eurostat, the European Commission's Directorate General Environment and Directorate General Taxation and Customs Union, the Organisation of Economic Co-operation and Development (OECD) and the International Energy Agency (IEA). This list has been slightly updated in 2011 and 2012 with the help of a Eurostat task force based on the practical experience since 2001. The list of tax bases is presented in Table 1. The tax bases are grouped by four main categories (energy, transport, pollution and resources). The aim of this list is to help compilers in their analysis of individual taxes and to provide guidance on which taxes to include in the framework of environmental taxes.

The list of tax bases is the only objective basis for identifying environmental taxes for the purpose of international comparisons. All taxes levied on tax bases as described in Table 1 are considered to be environmental taxes.

Other possible criteria, such as the name of the tax, the purpose stated by the tax legislator or the

⁽¹⁰⁾ See e.g. A. Bruvoll 2009: On the measurement of environmental taxes, discussion papers 599, Statistics Norway research department

⁽¹¹⁾ F. Ramsey 1927: A contribution to the theory of taxation

⁽¹²⁾ The SERIEE manual (European Commission, 1994) defines a category of taxes called 'specific taxes' to mean these earmarked taxes. These are taxes that help finance environmental protection expenditure.

earmarking of the revenue for environmental purposes are not a good basis for defining environmental taxes. However, such supplementary information may still provide useful hints for determining e.g. whether a newly introduced tax could be an environmental tax or not. This supplementary information may also be useful for classifying environmental taxes into different categories (e.g. in deciding whether a tax is a pollution tax or a transport tax).

Table 1: List of environmental tax bases

Energy (including fuel for transport)

- Energy products for transport purposes
 - Unleaded petrol
 - Leaded petrol
 - Diesel
 - Other energy products for transport purposes (e.g. LPG, natural gas, kerosene or fuel oil)
- Energy products for stationary purposes
 - Light fuel oil
 - Heavy fuel oil
 - Natural gas
 - Coal
 - Coke
 - Biofuels
 - Electricity consumption and production
 - District heat consumption and production
 - Other energy products for stationary use
- Greenhouse gases
 - carbon content of fuels
 - emissions of greenhouse gases (including proceeds from emission permits recorded as taxes in the national accounts)

Transport (excluding fuel for transport)

- Motor vehicles import or sale (one off taxes)
- Registration or use of motor vehicles, recurrent (e.g. yearly taxes)
- Road use (e.g. motorway taxes)
- Congestion charges and city tolls (if taxes in national accounts)
- Other means of transport (ships, airplanes, railways, etc.)
- Flights and flight tickets
- Vehicle insurance (excludes general insurance taxes)

Pollution

- Measured or estimated emissions to air
 - Measured or estimated NO_x emissions
 - Measured or estimated SO_x emissions
 - Other measured or estimated emissions to air (excluding CO₂)
- Ozone depleting substances (e.g. CFCs or halons)
- Measured or estimated effluents to water
 - Measured or estimated effluents of oxydisable matter (BOD, COD)
 - Other measured or estimated effluents to water
 - Effluent collection and treatment, fixed annual taxes
- Non-point sources of water pollution
 - Pesticides (based on e.g. chemical content, price or volume)

- Artificial fertilisers (based on e.g. phosphorus or nitrogen content or price)
- Manure
- Waste management
 - Collection, treatment or disposal
 - Individual products (e.g. packaging, beverage containers, batteries, tyres, lubricants)
- Noise (e.g. aircraft take-off and landings)

Resources

- Water abstraction
- Harvesting of biological resources (e.g. timber, hunted and fished species)
- Extraction of raw materials (e.g. minerals, oil and gas)
- Landscape changes and cutting of trees

2.4 Main categories of environmental taxes and borderline cases

For analytical purposes, the environmental taxes are classified into four main categories which correspond to the four categories of tax bases as shown in Table 1:

- Energy taxes (including fuel for transport)
 - of which: CO₂ taxes
- Transport taxes (excluding fuel for transport)
- Pollution taxes
- Resource taxes

In most countries the first two categories (energy and transport) are by far the most important in terms of revenue. This section provides further detail on the kinds of tax bases and taxes that should be included under the different categories. Some taxes constitute borderline cases and require a case by case judgement within the statistical office whether they are environmental taxes and under which tax category they belong. The case by case judgement should be based on the analysis of the tax base(s) and tax rules.

Energy taxes (including fuel for transport)

This category includes taxes on energy production and on energy products used for both transport and stationary purposes. The most important energy products for transport purposes are petrol and diesel. Energy products for stationary use include fuel oils, natural gas, coal and electricity. Taxes on biofuels and on any other form of energy from renewable sources are included.⁽¹³⁾ Taxes on stocks of energy products are also included.

Carbon dioxide (CO₂) taxes are included under energy taxes rather than under pollution taxes. There are several reasons for this. First of all, it is often not possible to identify CO₂ taxes separately in tax statistics, because they are integrated with energy taxes, e.g. via differentiation of mineral oil tax rates according to the carbon content of the fuel. In addition, they are partly introduced as a substitute for other energy taxes and the revenue from these taxes can be very large compared to the revenue from pollution taxes. This means that including CO₂ taxes with pollution taxes rather than energy taxes would distort both the time series at national level and international comparisons. If CO₂ taxes are identifiable, these taxes should be reported as a separate category next to the total energy taxes. Taxes on greenhouse gas emissions other than CO₂ should also be included here.

A new area is emissions permits. Government revenues from the auctioning of emissions permits are treated as tax receipts in the national accounts — for details see the next section. The most important such scheme is the EU Emissions Trading Scheme (EU ETS) related to emissions of greenhouse gases. The revenues from such schemes as shown in the national accounts should also be included in this category. Section 2.5 provides further detail on emission permits.

⁽¹³⁾ For national purposes, countries may wish to separately identify the revenues from taxing energy from renewable sources where this is feasible.

SO₂ taxes may be subject to the same issues as CO₂ taxes, i.e. SO₂ taxes may in reality consist of a differentiation of e.g. mineral oil tax rates based on the sulphur content of fuels and may not be separately identifiable taxes. In this case they should be included under energy taxes.

Transport taxes (excluding fuel for transport)

This category mainly includes taxes related to the ownership and use of motor vehicles. Taxes on other transport equipment (e.g. planes, ships or railway stocks), and related transport services (e.g. duties on charter or scheduled flights) are also included here, when they conform to the general definition of environmental taxes. The transport taxes may be ‘one-off’ taxes related to imports or sales of the equipment or recurrent taxes such as an annual road tax.

All taxes on means of transport should be included, even taxes on means of transport that are considered to be relatively more environmentally friendly such as railway rolling stock and public transport in general. Also taxes on electric cars should be included. Taxes on vehicle insurance should also be included provided they are specific taxes on the insurance of vehicles and not general insurance taxes levied on all kinds of insurance contracts.

Taxes on petrol, diesel and other transport fuels are included under energy taxes.

In a number of countries taxes on the specific CO₂ emissions of vehicles have been introduced which are one-off registration or import taxes or annual vehicle taxes. These taxes are not related to the actual use of the vehicles or to the actual emissions generated. The tax base is a technical property of the vehicle such as the average CO₂ emissions per 100 km or the average fuel consumption per 100 km, often combined with other similar technical properties such as vehicle weight or engine power. These taxes are to be considered as transport taxes and not as energy taxes.

Some cities have introduced charges for access to the city centre (congestion charges or city tolls). The charges seem to differ considerably in their characteristics across countries but also across different cities in individual countries. These charges are treated differently in the national accounts of the countries having such charges (e.g. some such charges are treated as fees paid for a service, others as taxes). If a city charge is treated as a tax in the national accounts, then it should be included as a transport tax.

Pollution taxes

This category includes taxes on measured or estimated emissions to air and water, management of solid waste and noise. An exception is the CO₂-taxes, which are included under energy taxes as discussed above.

Taxes on lubricating oils may require specific analysis. Lubricating oils are not used for energetic purposes and are probably best placed under pollution taxes. Major environmental impacts can include soil or water pollution if lubricating oil is spilled. However, where lubricating oils are included in the mineral oil tax it may not be possible to identify the tax revenue related to lubricating oils.

Resource taxes

This category includes taxes linked to the extraction or to the use of natural resources, such as water, forests, wild flora and fauna, etc., as these activities deplete natural resources. All taxes designed to capture the resource rent from the extraction of natural resources should be excluded (for detail see section 2.6).

Most taxes on land are property taxes and belong to the ESA category D.51 (taxes on income). This guide recommends excluding all taxes on land from scope (see section 2.6 for detail). However, in some countries there are specific taxes to be paid for the conversion of landscapes (e.g. deforestation) which should be included.

2.5 Tax revenue from emission permits under cap and trade schemes

In the national accounts, the payments for emission permits, issued by governments under cap and trade schemes, should be recorded at the time the emissions occur as other taxes on production (D.29), on an accrual basis. The timing difference between the payments received by government for the permits and the time the emission occurs gives rise to a financial liability (accounts payable) for government and a financial asset (accounts receivable) for the holder.

In other words, the treatment recommended foresees recording the issuance against payment of an emission permit as a pre-payment of tax at the time of issue, leading to a financial liability of government. This liability is then settled against the tax payment which is recorded when the permit becomes due to be handed back (surrendered) because the emission covered by the permit occurred. The time of recording of the tax payment is the time of the emission covered by the permit. Permits are often auctioned so that the prices of the permits may not be constant over time.

For purposes of environmental tax statistics, payments for emission permits that are recorded as taxes on production (D.29) in the national accounts are to be included.

In the EU, an emissions trading system (the EU ETS) ⁽¹⁴⁾ was established, which covers the EU Member States and the EEA-EFTA states Iceland, Liechtenstein and Norway. Launched in 2005, the EU ETS is now in its third phase, running from 2013 to 2020. The EU ETS is a cap and trade scheme that includes more than 11 000 power stations and industrial plants as well as airlines and covers approximately 45 % of the EU's greenhouse gas emissions. The scheme allows buying limited amounts of international credits from emission-saving projects around the world. A substantial part of all emissions permits is still freely allocated.

The EU ETS covers emissions of carbon dioxide (CO₂) from power plants, a wide range of energy-intensive industry sectors and commercial airlines. Nitrous oxide emissions from the production of certain acids and emissions of perfluorocarbons from aluminium production are also included.

For an international or EU scheme, the amount of permits issued by one country may differ from the amount surrendered to that country, due to international trading of permits. In theory, in this case, taxes on production (D.29) paid by non-residents to the national government or paid by residents to foreign governments would have to be recorded. For simplicity, the international guidance ⁽¹⁵⁾ allows ignoring this difference when the amount issued by a government is lower than the amount of permits surrendered to this government — this corresponds to the case where resident units pay taxes to foreign governments for the permits. Conversely, when the amount issued is higher than the amount surrendered, the difference should be written off. This approach will potentially result in some of the payments for permits not being recorded as tax payments.

The implementation of the international guidance in the EU is described in the Manual on Government Deficit and Debt (MGDD) ⁽¹⁶⁾. In the absence of precise information on each individual permit (original sale price and exact time and place of surrender), the MGDD allows some simplifying assumptions where tax revenue is determined based on the number of permits surrendered in a year, multiplied by the average auction price of the stock of permits issued. Some permits surrendered to the government may have been issued by foreign governments. The MGDD calculation of total tax revenue from permits effectively ignores cross border transactions through the average price calculation.

⁽¹⁴⁾ http://ec.europa.eu/clima/policies/ets/index_en.htm

⁽¹⁵⁾ <http://unstats.un.org/unsd/nationalaccount/sna/nn32-33-En.pdf>.

⁽¹⁶⁾ Manual on Government Deficit and Debt - 2013 edition.

2.6 Taxes that are excluded from environmental tax statistics

The following taxes should be excluded from environmental tax statistics for the reasons discussed in this section:

- Value added taxes
- Land taxes
- Taxes that should be treated as rents on sub-soil assets
- Alcohol, tobacco and similar consumption taxes, and taxes on income and on labour

Value added tax

Value added type taxes (VAT) are excluded from the definition of environmental taxes. This is mainly because of the special characteristics of this type of tax. VAT is a tax levied on all products (with few exceptions), and it is deductible for many producers, but not for households. Because of this, it does not influence relative prices in the same way that other taxes on environmental tax bases do.

Another reason for excluding VAT from the definition is that revenue data for VAT is often not available by product. Environmentally-related revenues would have to be estimated using information on VAT rates combined with estimates of the total sales of the products and taking into account exemptions and deductibility of the VAT.

However, the SEEA 2012 ⁽¹⁷⁾ proposes that the VAT which is levied on an environmental tax could be taken into account. An example is VAT levied on transport fuels to the extent that the VAT is on the mineral oil tax. The part of the VAT charged on the net price before mineral oil tax of the fuel is not to be included also according to the SEEA 2012.

In principle, many environmental taxes could be subject to VAT, e.g. mineral oil taxes, taxes on vehicle sales or taxes on specific harmful products (batteries, pesticides, packaging materials etc.). Only the part of this VAT on environmental taxes that cannot be deducted by the tax payer would be of relevance. Since it would be both difficult and labour intensive to estimate this VAT revenue and since the non-deductible part would be rather small compared to total revenue from environmental taxes, this statistical guide recommends that for international comparison purposes all VAT should be excluded, including this special case of VAT levied on environmental taxes.

For national purposes, countries can include some special components of VAT, e.g. the VAT on environmental taxes described above or other special VAT. For example, in Austria and Spain a special high VAT rate was levied on car sales which had to be abolished in the early 1990s due to EU tax harmonisation. The special high VAT was replaced by environmental taxes. Including an estimate of this special VAT revenue in national publications could improve the consistency of the time series. For reporting under Regulation (EU) No 691/2011 all VAT should be excluded.

Land taxes

Land taxes can constitute a borderline case. In many countries taxes on land are considered property taxes and the tax is levied on the value of the land or of the real estate. These are not environmental taxes. In some cases there can be land taxes specifically levied on the square meters of soil sealed, or taxes to limit urban sprawl, for example. For such taxes it is less clear whether they should be treated as environmental taxes or not.

Often land taxes are local taxes that generate little revenue and where information on the specific tax base used by each local government is not available. To ensure international comparability, this guide recommends that land taxes should be excluded from environmental taxes. Where a country considers a land tax as an environmental tax because it is levied on uses of land with a specific negative impact on the environment, it can be classified as a resource or pollution tax for national purposes.

⁽¹⁷⁾ See http://unstats.un.org/unsd/envaccounting/White_cover.pdf.

Taxes that should be treated as rents on sub-soil assets

According to the ESA, taxes are compulsory, unrequited payments levied by general government. Rents are not taxes but a part of a wider category called property income. Rents on sub-soil assets are the royalties that accrue to the owners of deposits of minerals or fossil fuels who grant leases to other institutional units permitting them to explore or extract such deposits.

In many countries, government is the owner of sub-soil assets. Government being at the same time the owner of the sub-soil assets and the tax legislator it is common that governments collect the resource rent in the form of taxes which are designed to capture the resource rent. Such payments by extractors should be shown as property income (D.45) of government in the national accounts even if these payments are legally described as taxes and treated as taxes in a government's own accounts (see SNA 2008, paragraph A3.76).

The resource rent can be defined as the value of output less all extraction costs, including a normal return to fixed capital, and represents a kind of 'pure profit' from extraction.

In principle all taxes designed to capture the resource rent should be classified as property income (D.45) rather than as taxes in the national accounts. To the extent that such taxes still remain in the national tax list, they should not be considered as environmental taxes when it is clear that these are taxes to capture the resource rent. By far the most important cases in monetary terms will be related to oil and gas extraction. This guide recommends that taxes on oil and gas extraction should be excluded from environmental tax statistics. Excluding taxes on oil and gas extraction makes environmental tax statistics more useful for cross-country analysis:

- i) the revenue from these taxes is important in very few EU countries so that the comparison of environmental tax revenues across countries (e.g. for benchmarking for fiscal reform purposes) would be distorted by including the large amounts that come from oil and gas extraction;
- ii) the systems to capture the resource rent differ across countries (e.g. due to government ownership in extraction companies) so that the amounts of taxes from oil and gas extraction are not comparable across countries;
- iii) tax revenue from oil and gas extraction can be highly volatile over time, reflecting fluctuations in the prices of oil and gas. This would distort time series analysis.

It should be noted that the exclusion of taxes on oil and gas extraction does not mean to exclude all taxes on the oil and gas extraction industry from the scope of environmental taxes. For example, taxes paid on vehicles or energy used by the oil and gas extraction industry or taxes on waste or emissions of this industry should of course not be excluded.

Other taxes on resource extraction (mining of minerals, extraction of water, forestry, etc.) should be included in the list of environmental taxes. It may be useful to check in the case of large revenue whether these taxes are indeed taxes or should be treated as property income (D.45).

Alcohol, tobacco and similar consumption taxes, taxes on income and on labour

Taxes on products or activities that are not considered to be specifically negative for the environment (compared to other similar products) should not be included in environmental tax statistics. This concerns in particular taxes on alcoholic beverages and on tobacco products and similar taxes that exist in some countries (e.g. taxes on coffee or taxes on pet animals).

Following from the considerations already presented for VAT, a tax should be specific to be counted as environmental. Therefore, general taxes on income or labour should be excluded.

2.7 Proxies of a physical unit

How to decide in practice whether a tax (e.g. a newly introduced tax) is an environmental tax when its tax base is not (yet) included in the list of environmental tax bases?

The main consideration should be the economic power of the tax to increase the costs of a polluting activity and thus discourage it. Therefore, taxes on the use of roads or taxes on the electricity grid would be included on the grounds that such taxes increase the costs of using vehicles or electricity and thus help reduce the use of energy and of associated pollution.

More generally, a tax that can be expected to increase (directly or indirectly) the cost of a product or activity deemed to be harmful to the environment relative to other (less harmful) activities or products should be considered to be environmental.

This logic would suggest that the following taxes should be booked as environmental taxes:

1. taxes on quantity of output or sale price of environmentally harmful products
2. taxes that increase specifically the variable costs of producing these environmentally harmful products
3. taxes that increase the fixed costs of inputs used specifically for an environmentally harmful activity (e.g. taxes on the electricity transmission grid or on assets used for producing energy)

In other words, if a product is identified in the list of tax bases (for example, electricity) then all taxes that increase the price of that product directly (e.g. taxes on electricity consumption) or indirectly (e.g. taxes on inputs for electricity production such as nuclear fuel or taxes on fixed assets used to produce or distribute electricity) should be considered environmental taxes provided that these taxes are specific to the activity concerned. General labour taxes, for example, could not be considered specific to environmentally harmful activities as they affect a large number of activities.

Profit taxes are a specific issue. Clearly, the general profit taxes that apply to all kinds of activities in an economy are out of scope. But should profit taxes that specifically target environmentally harmful activities be included as environmental taxes? Examples could be special profit taxes on electricity producers, on nuclear operators or on oil and gas extraction companies.

For any such specific profit taxes shown in the national accounts, one could find arguments for and against considering them as environmental. Under the simplifying assumptions of basic tax incidence theory, profit taxes may be deemed not to influence output at all, which would be an argument for not considering them environmental. Furthermore, such special profit taxes are often used to capture monopoly profits or resource rent (and in the latter case should not be treated as taxes in the national accounts) and will not influence sales prices. On the other hand, it could be argued that such taxes can increase the cost of capital for the companies concerned, which under real-life conditions may well have some indirect effect on sales prices. And in the long run, profit taxes might influence investment decisions and in the end indirectly also output. This guide recommends excluding all profit taxes from environmental tax statistics.

In conclusion, in order to decide about the classification of newly introduced taxes whose tax base is not currently included in the list, '*a proxy of a physical unit*' should be interpreted as including not only the quantity but also the price of any tax base included in the list, as well as any tax specifically levied on inputs of the activities that produce this tax base. These inputs comprise intermediate inputs as well as assets needed for production. Profit taxes should be *excluded* due to their distant and uncertain effect on the volume or price of the tax base listed.

A recent example is newly introduced taxes in some countries on nuclear fuels or on nuclear power stations, or on the profit of nuclear power operators. Another example is a tax on electric pylons. Following the guidance, as electricity is included in the list of tax bases, also taxes on nuclear fuels and on nuclear power stations and on electric pylons are environmental taxes. The profit taxes should be excluded.

2.8 Taxes in the ESA and SNA

National accounts framework

International statistical standards for national accounts are the world-level System of National Accounts — referred to as SNA — and its European version the ‘European System of National and Regional Accounts’ — referred to as ESA. They provide accounting principles and a framework for the systematic and detailed description of a national economy, its components and its relations with other economies.

The latest version of the SNA is the SNA 2008 which has been prepared under the auspices of the Inter-Secretariat Working Group on National Accounts which consists of five organisations: the International Monetary Fund, the Organisation for Economic Cooperation and Development, the United Nations Statistics Division and regional commissions, the World Bank and Eurostat. The European equivalent to the SNA 2008 is the ESA 2010 which applies to all national accounts data that EU Member States submit to Eurostat from 1 September 2014 onwards. Until then, the ESA in force is the ESA 1995. ⁽¹⁸⁾

The ESA constitutes the main reference for environmental tax statistics as far as national accounts principles are concerned.

The ESA framework provides for two generic ways of representing the national economy (ESA 1995 paragraph 1.02 and ESA 2010 paragraph 1.06):

- a) the institutional sector accounts distinguishing corporations, government, households and the rest of the world;
- b) the input-output framework, and the accounts by industries.

The sector accounts (by institutional sectors) are a sequence of T-accounts systematically describing the different stages of the economic process: production, generation of income, distribution of income, redistribution of income, use of income and financial and non-financial accumulation. Institutional units undertake a great number of economic actions which result in economic flows such as wages, taxes, fixed capital formation, etc. Transactions as described in the ESA 2010 (paragraph 1.66) can be of four main types: transactions in products, distributive transactions, financial transactions and other flows. Environmental taxes are distributive transactions. Taxes are described in detail in chapter 4 of the ESA.

The input-output framework portrays in detail the production and consumption activities by showing the flows of goods and services (output, imports, exports, final consumption, intermediate consumption and capital formation by product group and by industry). The framework comprises supply and use tables and symmetric input-output tables. An important feature of these tables is that the data are presented in a breakdown by industries according to NACE, for example the A*64 breakdown required by Regulation (EU) No 691/2011.

Taxes in the ESA and SNA

The SNA 2008 defines taxes as ‘compulsory, unrequited payments, in cash or in kind, made by institutional units to government units’ ⁽¹⁹⁾. The term ‘unrequited’ means in this context that government provides nothing directly in return to the individual unit making the payment, although government might use the funds to provide goods or services to other units or to the community as a whole. This definition is consistent with the definition of taxes in the ESA (paragraphs 4.14 and 4.77).

In the ESA, there are three main categories of taxes (the codes in the parenthesis refer to the ESA 2010 codes for distributive transactions):

1. Taxes on production and imports (D.2)
2. Current taxes on income, wealth, etc. (D.5)
3. Capital taxes (D.91)

⁽¹⁸⁾ From the perspective of environmental tax statistics there are no substantial differences between ESA 1995 and the new ESA 2010.

⁽¹⁹⁾ General government includes the following sub-sectors: central government (S.1311), state government (S.1312), local government (S.1313) and social security funds (S.1314).

1. *Taxes on production and imports* (D.2) consist of ‘compulsory, unrequited payments, in cash or in kind, which are levied by general government, or by the institutions of the European Union, in respect of the production and importation of goods and services, the employment of labour, the ownership or use of land, buildings or other assets used in production. Such taxes are payable irrespective of profits made.’ (ESA 2010 paragraph 4.14).

Taxes on production and imports are divided into:

- a) taxes on products (D.21):
 - 1) value added type taxes (VAT) (D.211);
 - 2) taxes and duties on imports excluding VAT (D.212):
 - import duties (D.2121);
 - taxes on imports excluding VAT and duties (D.2122);
 - 3) taxes on products, except VAT and import taxes (D.214);
- b) other taxes on production (D.29).

Taxes on products are directly related to the quantity or value of goods and services imported, produced or sold, while other taxes on production consist of all other taxes that enterprises incur as a result of engaging in production. Taxes on products are sometimes nationally called duties or excise duties (e.g. excises on fuels).

2. *Current taxes on income, wealth, etc.* (D.5) cover ‘all compulsory, unrequited payments, in cash or in kind, levied periodically by general government and by the rest of the world on the income and wealth of institutional units, and some periodic taxes which are assessed neither on that income nor that wealth’ (ESA 2010 paragraph 4.77).

Current taxes on income, wealth, etc. are divided into:

- a) taxes on income (D.51);
- b) other current taxes (D.59).

3. *Capital taxes* (D.91) consist of ‘taxes levied at irregular and very infrequent intervals on the values of the assets or net worth owned by institutional units or on the values of assets transferred between institutional units as a result of legacies, gifts between persons, or other transfers’ (ESA 2010 paragraph 4.148).

Environmental tax statistics uses the tax definition of the national accounts as a reference because this improves international comparability of the statistics and allows integration of the tax data with the national accounts and with systems of integrated environmental-economic accounting.

Most environmental taxes belong to national accounts category D.2 (taxes on production and imports), a few may belong to category D.59 (other current taxes) and very few may belong to category D.91 (capital taxes).

The legal definition of taxes may be different from the definition used in the national accounts and may differ across countries. Countries may choose, for national purposes only, to describe environmental taxes both from the legal and the national accounts perspective.

Borderline cases between taxes and other transactions in the national accounts

The focus of environmental tax statistics is on taxes, rather than on other payments related to the environment such as transactions in products (e.g. sales of services) or payments of rents on sub-soil assets. There are some borderline cases where it can be difficult to distinguish and decide if an environmentally related payment to government should be classified as a tax or not.

Government collects beside taxes and social contributions other types of receipts such as licence fees, tolls, administrative charges and royalties. These cover different types of transactions in national accounts and may be sales of services, taxes, sales of assets, rents on sub-soil assets or other transactions.

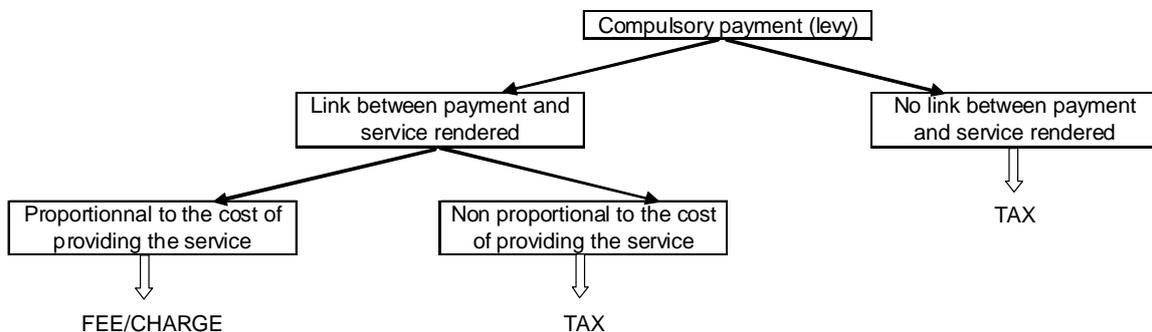
In principle, the definition used and categorisation made in the national accounts of a country should be used for the environmental tax statistics as well.

In practice, it is not always straightforward to assign a given transaction to a specific national accounts category. Borderline cases can occur, for example the case of financing local services with local taxes, in the case of payments for licenses or the payment of tolls or fees.

The distinction between sales of services and taxes is explained in the ESA 2010 in paragraphs 4.23e and 4.79d using the example of licences: if the licences are granted automatically on payment of the amounts due, their payment is treated as taxes. But if the government uses the issue of licences to exercise some proper regulatory function, for example, when the government carries out checks on the suitability or safety of the business premises, on the reliability or safety of the equipment employed, on the professional competence of the staff employed, or on the quality or standard of goods or services produced as a condition for granting such a licence or is checking the competence, or qualifications, of the person/entity concerned, the payments made are treated as purchases of services from government, unless the payments are clearly out of all proportion to the cost of providing the services.’

Therefore, the receipts of general government should be treated as sales of services if the government uses the issue of a licence to organise some proper regulatory function and if the payments are clearly in proportion to the cost of providing the services. Some examples are: driving or pilot licences, television or radio licences, and garbage disposal fees. The government receipts should be recorded as taxes if either of the two above conditions is not satisfied, examples being: licences for ownership or use of vehicles, licences to hunt, fish or shoot. These principles apply also to local services financed by local taxes and to fees, as illustrated in figure 1.

Figure 1: Distinguishing taxes from fees and charges according to the criteria mentioned above



In practice, it may happen that the detailed work of environmental accountants uncovers problems related to such borderline cases, e.g. that the national accounts categorisation is no longer up to date due to changes in relevant laws. In these cases, the environmental accountant is advised to discuss the issue with the national accountants.

An example in the environmental tax statistics is the resource taxes, e.g. taxes on the extraction of minerals. To the extent that these taxes are designed to capture the resource rent they should be classified in the national accounts as resource rents (D.45) rather than taxes.

An example for a shift from taxes to sales of services is when changes in the legal framework move a tax related to sewage across the border between taxes and sales of services so that the transaction should be reclassified.

Payments similar to taxes but not recorded as taxes or as sales of services

Government regulation may force a number of transactions between institutional units in the economy, which otherwise would not take place or would not take place at that price or volume. An example of this is the different ways governments use to promote electricity production from renewable sources.

Some countries use schemes whereby the main electricity suppliers and grid operators are simply obliged by law to buy a given proportion of their electricity from renewable generators, possibly at a higher price set by law. Other countries have introduced a tax on electricity, the proceeds of which are earmarked to provide subsidies to the producers of electricity from renewable sources directly. Yet other countries use special contributions paid by consumers which are obligatory but are not payments to government.

It may be that the electricity price for consumers, the revenues of producers and the effect for the environment are identical under these different schemes. At the same time, there will be an environmental tax (combined with a subsidy) recorded in the case where a tax on electricity is introduced but not in the other cases.

Conceptually one could consider that when a law results in higher prices than would otherwise be paid, the resulting transaction could be partitioned into a 'normal payment', an imputed tax paid by the buyer and an imputed subsidy received by the seller. However, in practice it might be difficult to do this for each and every impact that government regulation has on the economy. This guide recommends being very restrictive about imputing taxes.

It is important for compilers of environmental tax statistics to be aware of the effects of the choice of policy instruments. It may be possible, for national purposes, to provide users with information not just on environmental taxes but also on related instruments such as fees and charges or obligatory contributions to finance renewable energy which are not taxes.

3. Classifications

In environmental tax statistics, the main ways to present data on environmental taxes are:

- according to the four categories of environmental taxes already described in section 2.3 (energy, transport, pollution and resource taxes),
- by the economic activities paying the taxes according to the statistical classification of economic activities in the European Community (NACE), plus resident households as consumers and non-residents as foreseen in Regulation (EU) No 691/2011.

Data on environmental taxes could also be classified by the standard national accounts categories (D.2, D.5 and D.91) described in section 2.8 or even by environmental protection domain or natural resource management domain according to the Classification of Environmental Protection Activities and Expenditure (CEPA 2000) and the Classification of Resource Management Activities (CReMA).

This chapter presents the NACE, the CEPA and the CReMA classifications.

3.1 NACE

NACE is the statistical classification of economic activities in the European Community and is the subject of legislation at the European Union level, which imposes the use of the classification within all Member States. The currently applicable version is the NACE Rev. 2 as established by Regulation (EC) No 1893/2006 ⁽²⁰⁾. This classification provides the framework for collecting and presenting a range of statistical data according to economic activity in the fields of economic statistics (e.g. production, employment, national and environmental accounts) and in other statistical domains. The broad structure of NACE Rev. 2 ⁽²¹⁾ is presented below.

Table 2: Broad structure of NACE Rev. 2

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

⁽²⁰⁾ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:393:0001:0039:EN:PDF>.

⁽²¹⁾ http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC.

Environmental tax revenues have to be allocated according to NACE from the perspective of the tax payer. The obligatory breakdown according to Regulation (EU) No 691/2011 is the A*64 aggregation level as established by Commission Regulation (EU) No 715/2010 ⁽²²⁾ which is used in the ESA. The full A*64 aggregation level is provided in the Annex.

Who is the tax payer?

For purposes of environmental tax statistics, the tax payer is the unit using the tax base. Often the unit paying the tax is also the unit using the tax base (e.g. the user of the vehicle that is taxed) or is undertaking the activity that is taxed.

However, especially for some taxes on products, governments may for efficiency reasons collect taxes via e.g. importers or wholesalers rather than directly from the final purchasers of a product. For example, the mineral oil tax should be allocated to the companies or households that purchase the mineral oil for use and therefore are charged the tax. The mineral oil tax should not be allocated to the refinery or the distribution company which collects the tax from the final purchasers on behalf of the government.

Therefore, data about individual tax paying units received e.g. from the tax authorities need to be used with care. For some taxes the unit that hands over the tax revenue to the government is also the tax payer for purposes of environmental tax statistics. This is often the case for e.g. the annual vehicle tax, motorway taxes or for certain pollution taxes. For other taxes the units that hand over the tax revenue to the government are only collecting the revenue on behalf of the government. This is for example the case for many energy taxes.

Taxes levied on producers will often ultimately end up in the prices paid by consumers for other products. Such considerations of final tax incidence are not relevant for environmental tax statistics. For example, a tax on electricity networks should be allocated to the network operators and should not be assigned to the ultimate users of the electricity on the basis of assumptions about the way the tax may be incorporated in the price of electricity.

3.2 CEPA and CReMA

It may be possible to classify environmental taxes by more specific functions or environmental areas according to the CEPA and CReMA classifications.

The CEPA (European Commission, 2000) ⁽²³⁾ is a multi-purpose classification used for example in environmental protection expenditure statistics and accounts to classify activities, products and transactions. The table below presents the 1-digit level of CEPA. For the environmental taxes, CEPA classes 1 to 7, also called environmental domains, are the potentially most relevant ones.

⁽²²⁾ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:210:0001:0021:EN:PDF>

⁽²³⁾ http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=CEPA_2000&StrLanguageCode=EN&IntPckKey=&StrLayoutCode=HIERARCHIC

Table 3: CEPA 2000 classes

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 vibration abatement
6. Protection of biodiversity and landscapes
7. Protection against radiation
8. Research and development
9. Other environmental protection activities

The CReMA 2008 (or CReMA for short) is a classification for the management of natural resources developed originally for data collection on the Environmental Goods and Services Sector (EGSS), see Eurostat 2009 ⁽²⁴⁾. Although initially developed in the context of the EGSS, the CReMA is a generic, multi-purpose, functional classification for resource management. It can be used for classifying activities but also products, actual outlays (expenditure) and other transactions whose primary purpose is resource management. The CReMA categories are complementary with CEPA and the numbering of the CReMA classes follows the CEPA numbering. The table below shows the CReMA classes.

Table 4: CReMA 2008 classes

10 Management of water
11 Management of forest resources
12 Management of wild flora and fauna
13 Management of energy resources
14 Management of minerals
15 Research and development activities for natural resource management
16 Other natural resource management activities

It may be possible to classify environmental taxes according to CEPA and CReMA. For example, environmental taxes related to transport and energy could mainly be classified in CEPA class 1 ‘Protection of ambient air and climate’ as they help reduce the emission of greenhouse gases and other air pollutants. Taxes on hydroelectric power could be related to class 6, and taxes on nuclear power to class 7. Pollution taxes can be found theoretically in all CEPA classes, but in practice most of them would probably belong to CEPA classes 1, 2 and 3.

According to the tax base, many energy taxes and some transport taxes could also be classified in CReMA 13; the resource taxes could be classified using the CReMA classes, e.g. taxes related to water use as part of CReMA 10; taxes related to wild animals as part of CReMA 12; etc.

Cross-classifying environmental taxes according to CEPA and CRUMA would allow linking the tax data to data on environmental protection expenditure and on emissions. Such a dataset could provide the basis for the analysis and modelling of combined effects on emissions of environmental taxes, environmental protection expenditure and resource management expenditure.

⁽²⁴⁾ http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-RA-09-012.

4. Framework for data collection and reporting

This section offers a framework for the different steps that should be followed in the data collection and compilation in order to comply with the requirements of Regulation (EU) No 691/2011. Some suggestions for environmental tax statistics for national purposes are also made.

Environmental tax statistics should be prepared in close co-operation with the national accounts, both to ensure consistency and to reduce the amount of work involved.

4.1 Basic approach

Compiling environmental tax statistics follows a five-step approach. Once the system is established, some steps can be simplified for the purposes of the annual updating routines. The five steps are:

1. Identify environmental taxes and establish a list of environmental taxes.⁽²⁵⁾ This should be done by comparing the tax bases with the list provided in section 2.3.
2. Classify the environmental taxes into the 4 categories of environmental taxes. This should be easy based on the list of tax bases presented in section 2.3 and the further guidance in section 2.4. For the rare case of a tax with several tax bases that come under different tax categories, the tax may be allocated to more than one tax category when the source data allow this split to be made. Alternatively, the predominance principle should be used.
3. Collect revenue data on these taxes using sources such as tax statistics, government finance statistics and the national accounts.
4. Allocate the revenue data to the environmental tax categories. This is a straight-forward step except if some taxes have several tax bases which fall into different tax categories.
5. Allocate the revenues to the economic activities paying the taxes. For this, different sources and methods may be used, e.g.:
 - a. the supply–use tables from national accounts and other national accounts data
 - b. direct allocation of the revenues using data about the tax bases such as data on energy use, waste disposal data etc.
 - c. direct allocation based on micro data about the tax payers for each environmental tax (e.g. data from the government bodies collecting the taxes)

Further detail for steps 1, 3 and 5 are provided in the following sections.

4.2 Establishing a list of environmental taxes

The starting point for the work on environmental taxes would ideally be a complete list of all government levies no matter what legal name is given to these levies (tax, charge, fee, duty, levy, etc.). The first step is then to identify the base(s) of each levy. The main sources of information about bases are the relevant laws and regulations. These should be available from the institution responsible for administration of the levies, usually the ministry of finance or taxation and finance departments of regional and local authorities. If the base is included in the list given in section 2.3 (Table 1), the levy would come on a list of environmental levies.

From this list, only payments that are defined as taxes in the country's national accounts should be considered further for the environmental tax statistics. Other levies could be the starting point for data sets and analysis at national level, including statistics on the wider concept of 'environmental payments to

⁽²⁵⁾ Countries may produce a second list of environmental taxes for national purposes where they include taxes that for national purposes are considered environmental but which are not part of international environmental tax statistics (e.g. some components of VAT, taxes on land, etc.).

government' as described in the SEEA 2012.

A simpler but less complete approach is to directly analyse the list of taxes that is used for the national accounts compilation. Such a list can be obtained from the national accounts department. Most environmental taxes will be found in the ESA categories D.21 (taxes on products) and D.29 (other taxes on production), so these should be the main focus of the work.

At European level, an identification of environmental taxes is done for each Member State as part of the ESA transmission programme (table 9 and the national tax list). These national tax lists are published on DG TAXUD's [website](#) and on Eurostat's [website](#) and show for each tax the revenue and the economic function code. Environmental taxes have one of the following codes: E (for energy tax), T (for transport tax) or P (for pollution or resource tax). Results of this exercise are published annually in a joint Eurostat and DG TAXUD publication called [Taxation trends in the European Union](#).

A supplementary source that can be used by OECD member countries is the OECD/EEA [database](#) on instruments used for environmental policy and natural resource management. The database contains information on the rules of each environmental tax. It includes as well revenue data for each tax. The information in this database has been provided by ministries of finance and ministries of environment in each country and may not necessarily be aligned with the national accounts definitions.

The national tax lists do not necessarily identify all environmental taxes. The accuracy of the process of identifying environmental taxes relies heavily on the degree of disaggregation available in the source data. An issue with the national tax lists can be that environmental taxes, particularly those levied on pollution, may raise little revenue and may often be regional or local taxes. Small taxes tend to be aggregated into broader tax categories (for example 'other regional taxes'), in which case some environmental taxes could go undetected. Where the environmental accountants find a tax that is not properly labelled as environmental in the national tax list or that is not separately shown, they are advised to discuss this with their national accounts colleagues with the aim that the data reporting via the national tax list is coherent with the reporting of environmental tax statistics under Regulation (EU) No 691/2011.

For many years, Eurostat has collected data on environmental taxes in a breakdown by economic activity from the perspective of the entity paying the taxes. This data collection has been voluntary and not all Member States and EFTA countries have replied to the questionnaire. For some countries, data are available starting from 1995. Eurostat and the replying countries have been working on making the environmental taxes by economic activity fully coherent with the environmental tax revenue data based on the national tax lists. This already resulted in some countries in improvements to the national tax lists (e.g. adding more detail).

Regulation (EU) No 691/2011 on European environmental economic accounts makes annual reporting obligatory from September 2013 onwards, following a T+21 months reporting pattern, where T is the reference year. Time series, for which data are requested by this Regulation, start with reference year 2008.

For the purposes of Regulation (EU) No 691/2011, compilers are advised not to simply trust existing lists but to conduct a careful initial review, ideally by building up their own list of environmental taxes and cross-checking the results with the above mentioned sources.

In subsequent years, this step can be simplified. It is only necessary to verify:

- whether any new taxes have been introduced and whether any of these are environmental taxes.
- whether there have been changes to the tax rules for existing taxes, in particular whether tax bases have changed.

Occasionally, changes of international guidelines or of national user needs may also require attention.

4.3 Data sources for environmental tax revenues

Tax statistics, government finance statistics and the national accounts are the main sources of data on revenue for the different kinds of taxes.

Tax statistics are usually published by finance ministries and revenue offices. Often such statistics are available on a monthly basis and very shortly after the end of the reference period. These statistics give detailed information on taxes and social contribution, and other government revenues broken down by type of tax or revenue and level of government. These statistics also give information on tax bases and rates. Tax statistics are usually on a cash basis, i.e. taxes are recorded in the period they are paid. In the national accounts, taxes are recorded in the period they accrue, whether or not they are actually paid in that period ⁽²⁶⁾.

Government finance statistics (GFS) data include both the financial (borrowing and lending) and non-financial (income and expenditure) activities of government. European GFS are produced in accordance with the ESA. This means that data are based on the accruals principle. GFS also includes data on fees.

The published national accounts provide data on taxes in an aggregated form. The detailed revenue data for individual taxes usually are not published, so access to the data bases underlying the national accounts compilation will be required.

Environmental taxes are found mainly in the sub-categories D.2122 ‘taxes on imports excluding VAT and duties’, D.214 ‘taxes on products, except VAT and import taxes’ and D.29 ‘other taxes on production’. ESA 2010 paragraph 4.23f states that taxes on pollution resulting from production activities are classified as other taxes on production. A few environmental taxes are classified as D.59 ‘other current taxes’. An example is the part of the annual tax on ownership of motor vehicles that is paid by households. The part of this tax that is paid by enterprises is classified in D.29 ‘other taxes on production’.

The practice so far in the European countries (based on the taxes from table 9 of the ESA transmission programme which were identified as environmental) has revealed that environmental taxes can belong to several national accounts categories.

Energy taxes are mostly taxes on products (D.21), and only a few of them are other taxes on production (D.29). Transport taxes are usually taxes on products (D.21), other taxes on production (D.29) or other current taxes (D.59). There are also examples of transport taxes that are classified as taxes and duties on imports, excluding VAT (D.212) such as taxes on newly imported cars, vessels or aircrafts.

Pollution taxes are most often other taxes on production (D.29) or taxes on products (D.21) and rarely other current taxes (D.59). The latter can e.g. be taxes on waste or sewage produced by households. Resource taxes are usually other taxes on production (D.29), taxes on products (D.21) or other current taxes (D.59). Under D.59 several countries classify licences for e.g. hunting and fishing. A few countries classify licences for fishing and hunting in D.29 or D.21.

4.4 Allocating environmental tax revenues to tax categories

Allocating the revenue data to the environmental tax categories is generally a straight-forward step. Some taxes have several tax bases but revenue data are only available for the whole tax. This is not a problem as long as all tax bases belong to only one environmental tax category. In some cases the tax bases may belong to different environmental tax categories. There may also be cases where some tax bases are environmental and others are not. In such cases, additional information is needed to be able to split the revenue.

Information to estimate the revenue for each tax base separately may be data directly from the fiscal administration, data on the volumes of the tax bases combined with information on tax rates and exemptions, or expert estimates. When no allocation key is available, the predominance principle should be used. This principle foresees to classify the tax in the principal or predominant category. The predominance principle may also be used immediately when the revenues at stake are very small.

⁽²⁶⁾ In practice, it is often difficult to carry out exact transformations from cash basis to accrual basis, and approximations have to be used (ESA 2010 paragraphs 1.101 – 1.105). Many EU countries use time-adjusted cash tax receipts in their national accounts. This method uses information about the time difference between the activity that generates the tax liability and the payment of the tax.

4.5 Allocating environmental tax revenues to paying economic activities

According to Regulation (EU) No 691/2011, environmental tax revenues need to be allocated to 64 industries in the breakdown by NACE Rev. 2 A*64, resident households as consumers and non-residents. The following section describes the general principles.

Experience in countries has shown that good data quality is achieved by using the best source data available nationally which differs a lot across countries. Relevant country studies that provide ideas for possible sources and methods are available ⁽²⁷⁾.

There are two main approaches for the allocation of taxes by economic activities:

- based on the national accounts (mainly supply and use tables), and
- based on direct allocation of the revenues using data about the tax bases such as 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. Using a common identifier, the tax payers can be identified in the business register allowing allocation to the A*64 NACE breakdown. This method would be ideal but in many countries such data are not available. Furthermore, this method is not usable for the frequent situation where the unit submitting the collected tax revenue to government is not the final purchaser and user of the tax base. For example, governments collect mineral oil taxes from the wholesalers or retailers of energy products so that the fiscal administration's database about tax payers will show that all mineral oil taxes are collected from units in NACE Rev. 2 section G (wholesale and retail trade). Vehicle sales taxes may be collected by the retailers whereas the taxes have to be allocated to the users.

The best approach is probably to apply a mixed approach using both national accounts and environmental accounts or administrative data to allocate directly tax revenues to an economic activity.

National accounts data

The national accounts contain information about which industries and sectors are paying taxes. Information on taxes can be found in the institutional sector accounts for the government, in the supply and use tables and in the generation of income account.

The supply and use tables will usually provide information on taxes and subsidies on production. These taxes consist of two main categories, taxes on products and other taxes on production. The supply and use tables will show other taxes on production in a breakdown by industries. The taxes on products will be shown classified by product but not by industry. The supply and use tables will then show who uses these products but separate tables directly showing taxes on products by user category may not be available in all countries. The supply and use tables described in chapter 9 of ESA 2010 contain a simple 'taxes less subsidies on products' table (ESA 2010 -Table 9.8) in this format.

A potential problem when using this kind of information is that there may be several taxes on the same product in the supply and use tables not all of which are environmental. One option is to get access to the detailed calculations the national accountants have undertaken to estimate the taxes for each category. If this is not sufficient, the share of environmental tax revenues will have to be estimated. If the share of each tax can be assumed to be equal for all users, the revenue from each tax can be distributed in the same way as the total tax revenue on the product. If the shares differ across users, additional information is required to make the distribution, for example information can be physical data on the different tax bases involved combined with information on tax rates, tax exemptions etc.

Another potential problem is that the supply and use tables show the product detail for household final consumption expenditure and for imports and exports based on the domestic concept rather than the national concept (i.e. the basis is sales on the territory rather than purchases by resident units - see section 4.6 for more detail). This presentation is combined with adjustment items to move from the data based on

⁽²⁷⁾ See the catalogue of pilot studies related to environmental accounts available at http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/introduction

the domestic concept to the data based on the national concept but for these adjustment items the product breakdown is not obligatory.

Member States have to submit final supply and use tables at T+36 months according to the ESA transmission programme. Environmental tax statistics has to be submitted at T+21 months. It may therefore happen that when the allocation work for environmental taxes is done, the supply and use tables for the latest reference year are not yet available nationally. In this case a distribution key derived from the latest available supply and use tables can be used. The allocation of environmental taxes should be revised once the new supply and use tables become available.

Direct allocation based on data on the tax base

The method consists in estimating the use of the tax base for each industry and for households and using this information to allocate the tax revenue to payers. The method requires combining data on the tax base with data on tax rates and on tax exemptions.

Tax bases could be the volume of emissions for the emissions taxes and traded volumes of the different products for the product taxes. The units can be kg of SO₂ emitted, litres of diesel or the number of cars sold, for example. If possible, the classification of users should align with the tax rules (nominal tax rates, exemptions).

The tax authority is a possible source for physical data on the tax bases, since this type of information is often required to assess the tax payments.

Physical data on emissions to air and water, the use of energy products etc. may be available in tables based on the environmental accounts framework. For example, air emissions accounts in an industry breakdown are available for all EU Member States. Several countries have also compiled data on energy and resource use, water use, wastewater and solid waste in an industry breakdown.

Another source of physical data on the supply and use of energy products are energy balances. The sources of supply are primary production, imports and transformation output (from refineries, power plants etc.). The use side is divided into transformation inputs (to refineries, power plants etc.), final energy and non-energy consumption in different industries, final energy consumption in households and exports.

For the tax revenues from emission permits, because these are other taxes on production, the national accountants must allocate the payments to A*64 industries in the use table. A high quality allocation to industries can be very challenging as some industries received free permits and other permits are internationally traded so that the average amount paid per permit may differ significantly across industries. Countries could use the data held in their national emission permits registers and average prices to allocate the revenue by industry. The data held in the registers must be kept confidential for 5 years but some NSIs have managed to get aggregated data from their registers. Since 2013 there is a new EU register which could be a useful source.

Sometimes, each environmental tax will be related to only one tax base, but in other cases a tax will have several tax bases. As an example, the tax bases for the mineral oil tax might be different types of petrol, diesel and light fuel oil. In this case it is necessary to distribute the tax revenue across these various tax bases using additional information.

Effective tax rates can be a useful tool. The effective tax rates refer to the taxes actually paid per unit of the different products and activities and should reflect exemptions, reduced rates etc., in addition to the nominal tax rates. If the tax bases concern more than one product or activity, the effective tax rate should represent the weighted average tax rate of the different components, with the physical volumes of emissions or products traded as weights.

The market price per unit traded of some products can be relevant information for the estimation of the amounts of environmental taxes paid by a certain payer in two cases. The first case is when the tax is based on the value of a product (e.g. one off vehicle taxes may be based on the sales price).

The second case is when the tax base is a physical unit but information about the distribution of the use of this tax base is available in monetary terms. For example, information on the use of different energy

products by industries may be available in monetary terms. When the price of a product differs significantly across industries (as is the case for e.g. electricity or natural gas), the monetary data need to be converted into physical units using the relevant prices. Price information can be found in e.g. energy price statistics.

For cars and other vehicles, it should be relatively easy to find market prices. Calculating a weighted average price requires a lot of information, however. A possible solution is to use national accounts estimates of the expenditure on vehicles for household consumption and gross fixed capital formation, and divide them by the registration figures.

4.6 Taxes paid by non-residents

A part of the revenue of environmental taxes collected by the national government will be paid by non-residents. The category 'non-residents' in Annex 2 of Regulation (EU) No 691/2011 means 'non-resident households and other non-residents' so that this category comprises non-resident households, corporations and foreign governments (e.g. military bases or embassies).

The overall significance of taxes paid by non-residents may be relatively small for most countries. In practice, transport fuels are by far the most important issue, in particular taxes on petrol and diesel purchased by non-resident households (leisure tourists) or non-resident companies (e.g. truck drivers or business travellers). One way to separate residents and non-residents for transport fuels is to use the source data that are also used for the air emissions accounts, e.g. the COPERT ⁽²⁸⁾ model used for calculating air emissions from road transport. This will also ensure coherence between environmental taxes and air emissions accounts.

Other product taxes could also be paid by non-residents (taxes on batteries, plastic bags, etc.). There could also be some taxes in relation to transport where non-residents have to pay, e.g. airport landing taxes, harbour taxes or road taxes.

In the environmental tax statistics, the taxes on products (e.g. fuel taxes) are considered to be paid by the users of the taxed products. Several countries use supply and use tables as a source for allocating these taxes to payers. According to the ESA transmission programme, the product detail for household final consumption expenditure and for imports and exports in the supply and use tables is based on the domestic concept rather than the national concept (i.e. the basis is sales on the territory rather than purchases of resident units). The ESA transmission programme includes adjustment items to move from the data based on the domestic concept to the data based on the national concept. Imports, exports and household final consumption expenditure are adjusted to take into account the purchases of residents abroad and the purchases on the economic territory by non-residents. However, these adjustment items do not have to be provided in a product breakdown according to the ESA transmission programme. This lack of product detail makes the adjustment items less useful for purposes of allocating environmental taxes to payers. Determining for each taxed product the share of residents and non-residents may be possible based on the data sets underlying the national accounts supply and use tables. Alternatively, supplementary direct sources may have to be used.

In some countries, direct estimates of taxes paid by non-residents may be available from tax authorities. Environmental accounts can also provide information. For example, from the air emissions accounts or from the energy flows accounts the amounts of energy products purchased abroad and estimates of kilometres driven abroad may be available. Data for purchases made by non-residents in a country are available in the national accounts as these purchases have to be treated as exports. It may be possible to use this information directly. Administrative data sources may also be used (e.g. vehicle counts that would allow estimating road taxes paid by foreigners).

Environmental tax statistics does not require estimating the environmental taxes paid by resident units to foreign governments. Using the government revenue as the basis for allocating taxes to industries means using the territory principle for environmental taxes by economic activities. It also means that resident units do pay some environmental taxes which are not allocated to them in the environmental accounts.

⁽²⁸⁾ <http://www.eea.europa.eu/publications/copert-4-2014-estimating-emissions>.

For the implicit tax rate on energy there is no conceptual problem because both energy tax revenue (received by the national government) and energy consumption from energy statistics are based on the territory principle.

5. Presentation and interpretation of data — tables and indicators

This section provides a few examples of tables and indicators for presenting information about environmental taxes. The tables contain environmental tax revenue data by tax category, as a share in total environmental taxes, as a share in GDP and as a share in total revenue from taxes and social contributions. There is also a figure showing the shares of different tax payers and a figure presenting implicit tax rates. Finally, there is a figure that makes a first step towards analysing the effects of environmental taxes.

Further examples of the way data and indicators derived from environmental tax statistics can be presented can be found on the Eurostat website ⁽²⁹⁾ or in publications of national statistical offices. ⁽³⁰⁾

5.1 Environmental tax revenue by tax category

This group of tables focuses on presenting time series for the environmental tax revenue by tax category.

Revenue from environmental taxes by tax category

This is a basic tax revenue table. It shows time series of revenue from environmental taxes for the main categories energy, transport, pollution and resource taxes. Table 5 provides an example for the European Union.

Table 5: EU-27 environmental tax revenue, 2000-2011
(billion EUR)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total environmental taxes	247.9	251.0	259.3	266.2	275.6	280.9	289.4	296.8	290.1	281.2	292.0	302.9
Energy taxes	190.6	192.9	199.8	205.9	210.6	212.4	216.7	219.1	215.2	211.7	220.1	226.2
Transport taxes	49.3	49.6	50.2	50.9	55.4	58.7	62.0	66.7	63.9	57.8	60.2	63.3
Pollution and resource taxes	8.1	8.5	9.3	9.4	9.6	9.8	10.7	10.9	11.0	11.7	11.7	13.4

Source: Eurostat ([env_ac_tax](#))

Revenue from environmental taxes by tax category, as a percentage of total revenue from environmental taxes

The next table shows the share that the main tax categories have in the total revenue from environmental taxes. This may be called the structure of the environmental taxes, i.e. the relative importance of energy, transport, pollution and resource taxes. For the EU as a whole about 3/4 of the revenue from environmental taxes comes from energy taxes.

Table 6: EU-27 environmental tax revenue by tax category, 2000-2011
(percentage of total revenue from environmental taxes)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Energy taxes	76.9	76.9	77.1	77.4	76.4	75.6	74.9	73.8	74.2	75.3	75.4	74.7
Transport taxes	19.9	19.8	19.4	19.1	20.1	20.9	21.4	22.5	22.0	20.5	20.6	20.9
Pollution and resource taxes	3.3	3.4	3.6	3.5	3.5	3.5	3.7	3.7	3.8	4.2	4.0	4.4

Source: Eurostat (online data code: [env_ac_tax](#))

²⁹ See e.g. the Statistics Explained articles on [Environmental taxes](#) and on [Environmental taxes – detailed analysis](#).

³⁰ See for example the presentations of [Statistics Sweden](#) and [Statistics Netherlands](#).

Revenue from environmental taxes by tax category, in per cent of total revenues from taxes and social contributions

Shares of environmental taxes and of the main environmental tax categories in total revenues from taxes and social contributions can also be presented. The indicator ‘total revenue from taxes and social contributions’ includes all taxes (D.2, D.5 and D.91) as well as actual and imputed social contributions (D.611 and 6.12). The shares of environmental taxes can be seen as indicators for the tax burden on the use of the environment and in particular as indicators for the tax shift that is part of a green tax reform.

Table 7: EU-27 environmental tax revenue, 2000-2011
(percentage of total revenues from taxes and social contributions)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total environmental taxes	6.67	6.63	6.71	6.78	6.71	6.50	6.26	6.06	5.92	6.23	6.20	6.17
Energy taxes	5.13	5.10	5.17	5.25	5.13	4.92	4.69	4.48	4.39	4.69	4.67	4.60
Transport taxes	1.32	1.31	1.30	1.29	1.35	1.36	1.34	1.36	1.30	1.28	1.28	1.29
Pollution and resource taxes	0.22	0.22	0.24	0.24	0.23	0.23	0.23	0.22	0.22	0.26	0.25	0.27

Source: Eurostat (online data code: [env_ac_tax](#))

Revenue from environmental taxes by tax category, as a per cent of GDP

This table shows revenue from total environmental taxes and for the tax categories as per cent of GDP. Like the shares of total revenue from taxes and social contributions in Table 7, the percentages of GDP can be seen as an indicator for the tax burden on the use of the environment. Unlike the data in Table 7, they will not be affected by changes in the total tax level of the economy, i.e. total taxes and social contributions in per cent of GDP.

Table 8: EU-27 environmental tax revenue, 2000-2011
(percentage of GDP)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total environmental taxes	2.69	2.62	2.61	2.63	2.60	2.53	2.47	2.39	2.32	2.39	2.38	2.39
Energy taxes	2.07	2.01	2.01	2.04	1.98	1.92	1.85	1.76	1.72	1.80	1.79	1.79
Transport taxes	0.53	0.52	0.50	0.50	0.52	0.53	0.53	0.54	0.51	0.49	0.49	0.50
Taxes on Pollution/Resources	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.11

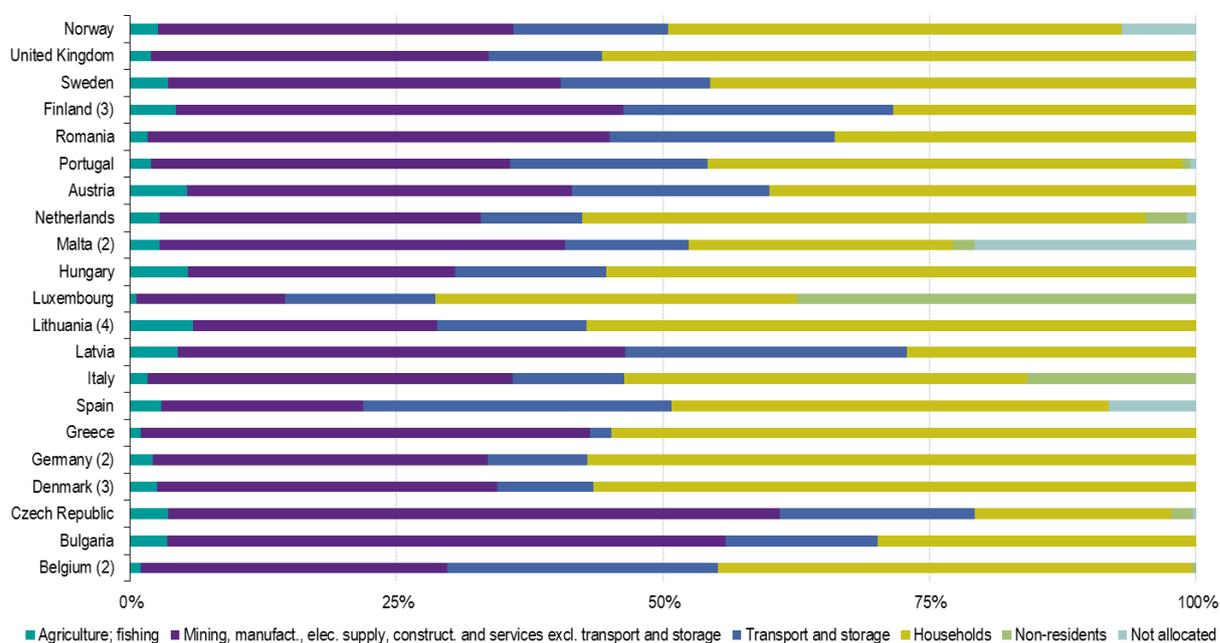
Source: Eurostat (online data code: [env_ac_tax](#))

5.2 Environmental tax revenue by tax category and by paying economic activity

Revenue from environmental taxes by paying economic activity and tax category

This figure shows the energy taxes paid by economic activities in some Member States. This type of figure can be drawn for each category of tax (energy, transport, pollution and resources). More detailed graphs by industrial sub-sector are also possible.

Figure 2: Energy taxes by paying economic activity in European countries, 2010 ⁽¹⁾
(percentage of total revenue from energy taxes)



⁽¹⁾ No information available for those Member States that are not shown.

⁽²⁾ 2007.

⁽³⁾ 2008.

⁽⁴⁾ 2009.

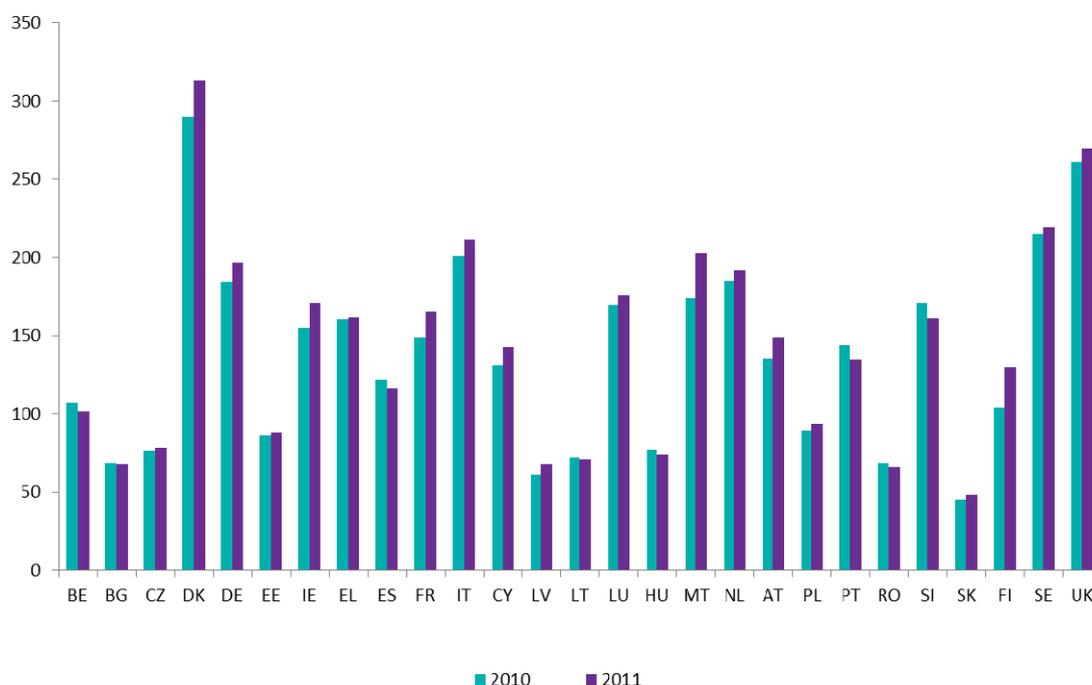
⁽⁵⁾ Data only for households, non-residents and not allocated.

Source: Eurostat (online data codes: [env_ac_taxind](#) and [env_ac_taxind2](#))

5.3 Implicit tax rate (ITR) on energy

The indicator expresses energy tax revenues deflated with the final demand deflator in relation to final energy consumption (euro per tonne of oil equivalent). This indicator is the ratio between energy tax revenues and final energy consumption calculated for a calendar year. Final energy consumption includes energy consumed in transport, industry, commerce, agriculture, public administration and households but exclude deliveries to the energy transformation sector and to the energy industries themselves. The different energy products are aggregated on the basis of their net calorific value, and expressed in tonnes of oil equivalent.

Figure 3: Implicit tax rate on energy in European countries, 2010 and 2011 (euro per tonne of oil equivalent)



Source: Eurostat (online data code: [tsdcc360](#))

5.4 Information about tax bases, tax rates and tax rules and interpretation of indicators

For the purpose of analysing the effects of environmental taxes, it could be useful to present data on prices and volumes of tax bases as well as the tax rates.

Simple examples of information about tax bases are data about final energy consumption or data about the stock of vehicles or sales of new vehicles.

Information about nominal tax rates for each tax can be presented in a table showing the general tax bases, the specific tax bases and the tax rates for each specific tax base at a certain point in time.

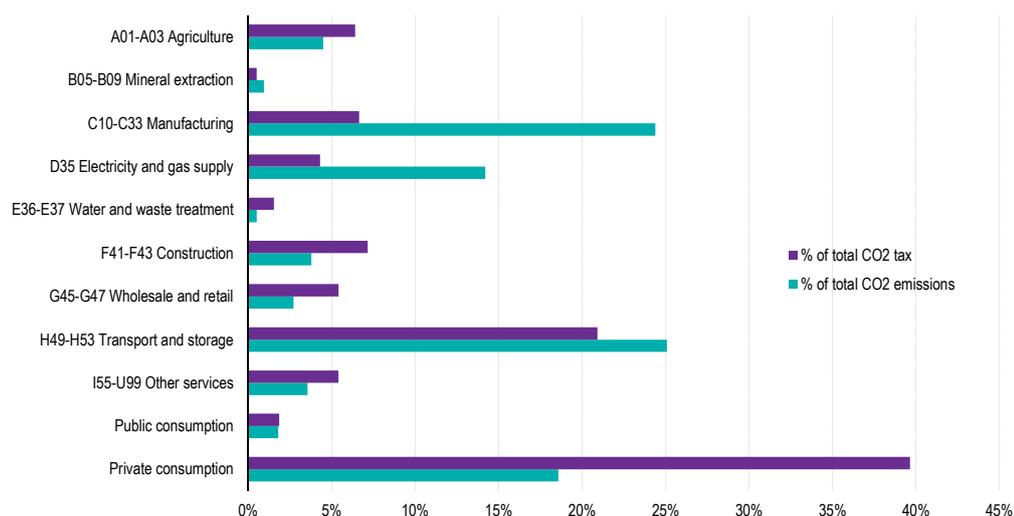
Information about tax rules (administration, earmarking, tax exemptions, refunds etc.) can be presented with a combination of text and a few small tables.

The shares that total environmental taxes and the four environmental tax categories have in the total revenue from all taxes and social contributions can be seen as indicators for the tax burden on the use of the environment. The evolution over time of these indicators can give information on the tax shift that is part of a green tax reform. A green tax reform implies increasing the share of environmental taxes and reducing the share of taxes on other tax bases, in particular labour.

High or increasing revenue from environmental taxes should not automatically be interpreted as an indicator for the environmental ‘friendliness’ of fiscal policies. An increase in revenue from environmental taxes may be caused by the introduction of new taxes or by an increase in tax rates, but also by an increase in the tax base, i.e. higher emissions or increased use of products with a negative impact on the environment. In a similar way, a reduction in revenue from environmental taxes may be caused by the impact of policies leading to a reduction in emissions or in the consumption of environmentally harmful products. Lower revenue may also come from changes in classifications of certain payments from taxes to fees, privatisation etc.

Changes in environmental tax revenue as a share of GDP can be explained by several factors, such as the erosion of the nominal value of environmental taxation. Environmental taxes are often levied per unit of physical consumption and fixed in nominal terms, hence, unlike ad valorem taxes which are levied on the value of the goods, their real value in relation to GDP tends to fall, unless they are adjusted for inflation or otherwise increased at regular intervals.

Figure 4: Shares of CO₂ emissions and CO₂ tax, by industry and final demand categories, Sweden, 2009 (%)



Source: [Statistics Sweden 2013](#)

The effect of differentiated tax rates, exemptions, refunds etc. can be illustrated by comparing the environmental taxes paid by a sector with data on the tax base for the same sector. Figure 4 presents an example for CO₂ emissions in Sweden. It shows how the CO₂ tax payments and the CO₂ emissions were distributed between industries and final demand categories.

Annex: A*64 aggregation level as in Commission Regulation (EU) No 715/2010 ⁽³¹⁾

Seq. No	NACE Rev. 2 divisions	Description
1	1	Crop and animal production, hunting and related service activities
2	2	Forestry and logging
3	3	Fishing and aquaculture
4	05-09	Mining and quarrying
5	10-12	Manufacture of food products, beverages and tobacco products
6	13-15	Manufacture of textiles, wearing apparel and leather products
7	16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
8	17	Manufacture of paper and paper products
9	18	Printing and reproduction of recorded media
10	19	Manufacture of coke and refined petroleum products
11	20	Manufacture of chemicals and chemical products
12	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
13	22	Manufacture of rubber and plastic products
14	23	Manufacture of other non-metallic mineral products
15	24	Manufacture of basic metals
16	25	Manufacture of fabricated metal products, except machinery and equipment
17	26	Manufacture of computer, electronic and optical products
18	27	Manufacture of electrical equipment
19	28	Manufacture of machinery and equipment n.e.c.
20	29	Manufacture of motor vehicles, trailers and semi-trailers
21	30	Manufacture of other transport equipment
22	31-32	Manufacture of furniture; other manufacturing
23	33	Repair and installation of machinery and equipment
24	35	Electricity, gas, steam and air conditioning supply
25	36	Water collection, treatment and supply
26	37-39	Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services
27	41-43	Construction
28	45	Wholesale and retail trade and repair of motor vehicles and motorcycles
29	46	Wholesale trade, except of motor vehicles and motorcycles
30	47	Retail trade, except of motor vehicles and motorcycles
31	49	Land transport and transport via pipelines
32	50	Water transport
33	51	Air transport
34	52	Warehousing and support activities for transportation
35	53	Postal and courier activities
36	55-56	Accommodation; food and beverage service activities
37	58	Publishing activities
38	59-60	Motion picture, video and television programme production, sound recording and music publishing activities; programming and broadcasting activities
39	61	Telecommunications
40	62-63	Computer programming, consultancy and related activities; information service activities
41	64	Financial service activities, except insurance and pension funding
42	65	Insurance, reinsurance and pension funding, except compulsory social security
43	66	Activities auxiliary to financial services and insurance activities
44	68	Real estate activities
44a		of which: imputed rents of owner-occupied dwellings
45	69-70	Legal and accounting activities; activities of head offices; management consultancy activities
46	71	Architectural and engineering activities; technical testing and analysis
47	72	Scientific research and development
48	73	Advertising and market research

⁽³¹⁾ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:210:0001:0021:EN:PDF>.

Seq. No	NACE Rev. 2 divisions	Description
49	74-75	Other professional, scientific and technical activities; veterinary activities
50	77	Rental and leasing activities
51	78	Employment activities
52	79	Travel agency, tour operator reservation service and related activities
53	80-82	Security and investigation activities; services to buildings and landscape activities; office administrative, office support and other business support activities
54	84	Public administration and defence; compulsory social security
55	85	Education
56	86	Human health activities
57	87-88	Social work activities
58	90-92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities
59	93	Sports activities and amusement and recreation activities
60	94	Activities of membership organisations
61	95	Repair of computers and personal and household goods
62	96	Other personal service activities
63	97-98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
64	99	Activities of extraterritorial organisations and bodies

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