

# Environmental taxes — A statistical guide



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# Preface

Economic instruments for pollution control and natural resource management are an increasingly important part of environmental policy in the EU and there is considerable interest in information about these topics. The economic instruments include taxes, fees, state aid, pollution charges, deposit-refund systems, etc. Eurostat has focused on developing statistics on taxes, since this is an area where basic data is generally readily available and comparable between countries.

This publication presents guidelines for compiling statistics on environmental taxes, including definitions and concepts, data sources and estimation methods. The guidelines are based on a harmonised statistical framework developed in 1997, jointly 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).

As a contribution to the development and practical testing of the statistical framework, Eurostat and the Directorate General Environment have initiated various national studies of environmental taxes, and such studies are now available for virtually all Member States. Some Member States already regularly publish data on environmental taxes nationally. Environmental tax revenue data are regularly published, in an aggregate form, by Eurostat and Directorate General Taxation and Customs Union in the publication "Structures of the taxation systems in the European Union".

Thanks are due to the many experts who contributed to the development and testing of the statistical framework on environmental taxes, and to those who provided comments on a draft version of the guidelines. The test studies benefited from substantial financial support provided by the Directorate General Environment.

This publication is one of the outputs of Eurostat's Environmental Accounting work. It contributes to various EU-wide and international activities in the context of national accounts and environmental accounting, including the implementation of the European System of Accounts (ESA 1995). The publication was prepared by Mr Steinar Todsén and Mr Anton Steurer of Eurostat B1.

The work on environmental tax statistics is continuing at Eurostat. The focus is on establishing regular statistics on revenue from environmental taxes in the EU, based on the tax data reported to Eurostat in the ESA 1995 transmission programme.

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# 1 Introduction

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

These guidelines focus on the development of statistics for environmental taxes. This is an area where basic data is generally readily available and comparable across countries. The statistics cover revenue data and information on tax rules and regulations.

The environmental tax statistics guidelines are based on a harmonised statistical framework (see OECD 1997) developed in 1997, jointly 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). The objectives were to prepare a statistical framework that would serve as the base for regular collection and publication of data on the use of environmental taxes in EU and OECD countries. The international comparability of the data was considered to be of particular importance, in order to facilitate cross-country analyses of environmental taxation. Another important consideration during the development of the framework was that the basic data required should be readily available.

Information about environmental taxes is important for areas such as environmental policy and fiscal policy and 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 fiscal policy and 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. International comparability of the data is important, since this type of analysis often involves comparing policies in different countries. However, comparisons between countries are sometimes complicated by structural differences. A payment that is treated as a tax in one country may be organised differently and therefore classified as a fee in another country, for example.

For both fiscal and environmental policy, a catalogue describing the different environmental taxes is important. This includes information on tax rates, exemptions, refunds, recipients of the tax revenue etc.

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 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 elasticities and pricing behaviour are outside the scope of environmental tax statistics, however.

These guidelines are organised as follows:

Section 2 discusses the definition and classification of environmental taxes and of taxes, fees and charges levied by government in general. Section 3 gives an overview of the type of information that may be included in environmental tax statistics. Data sources and estimation methods are discussed in section 4. In section 5, a set of tables and indicators for presenting information about environmental taxes is suggested. Annex 1 is a glossary of terms related to environmental taxes. Annex 2 provides descriptions of three environmental taxes. Finally, Annex 3 gives an overview of information on environmental taxes that is published by international institutions.

## 2 Definitions and concepts

### 2.1 Definition of environmental taxes

The environmental effect of a tax comes primarily through the impact it has on the relative prices of environmentally related products and activities, in combination with the relevant price elasticities (OECD 2000, p.8). With this in mind, the definition of environmental taxes used in the statistical framework puts emphasis on the potential effect of a given tax in terms of its impact on costs and prices. Instead of trying to elaborate a formal definition of environmental taxes, it was decided to focus on the tax bases that have a particular environmental relevance, and to consider all taxes levied on these tax bases as environmental.

In some cases the tax base is the measured or estimated amount of emissions of a polluting substance, such as NO<sub>x</sub> or SO<sub>2</sub>. 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 petrol or fuel oil.

The tax base was seen as the only objective basis for identifying environmental taxes for the purpose of international comparisons. Other possible criteria, such as the name of the tax, the purpose stated by the tax legislator or the earmarking of the revenue for environmental purposes have proved to be 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 through 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.

The statistical framework uses the following definition of an environmental tax:

A tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment.

It was decided to include all taxes on energy and transport in the definition of environmental taxes. Value added tax taxes are excluded from the definition (the reasons for this are discussed below).

Based on the definition above, it can be argued that the term 'environmental taxes' is not a good description of the taxes involved, since it can be interpreted as referring to taxes with an environmental, rather than a fiscal, motivation. Since motivation is not part of the definition, the term 'environmentally related taxes' is more precise, and this is preferred e.g. by the OECD. However, the more convenient term 'environmental taxes' is in common use, and will be used in these guidelines.

It should be noted that although criteria like the name and stated purpose of a tax are not a good basis for defining environmental taxes, they may still be useful for identifying possible environmental taxes.

The general definition of taxes used in the statistical framework is that of the national accounts, which is discussed in some detail in section 2.3 and 2.4. The main point is that taxes are compulsory payments to the government, where the benefits provided to the taxpayer are not directly linked to the payment. Other compulsory payments to the government where the benefits are more directly linked to the payments are usually called fees or charges. In the national accounts they are seen as payments for services.

To supplement the definition of environmental taxes given above, a list of environmentally relevant tax bases was agreed upon. The focus is on pollution related tax bases, but in some applications the use or extraction of natural resources, such as water and minerals, is included as well.

The main categories of environmentally relevant tax bases are listed in Table 1, based on OECD (1997).

**Table 1: Tax bases included in the environmental tax statistics framework**

**Measured or estimated emissions to air**

- Measured or estimated NO<sub>x</sub> emissions
- SO<sub>2</sub> content of fossil fuels
- Other measured or estimated emissions to air

**Ozone depleting substances (e.g. CFC or halon)**

**Measured or estimated effluents to water**

- Measured or estimated effluents of oxydizeable matters (BOD, COD)
- Other measured or estimated effluents to water
- Effluent collection and treatment, fixed annual taxes

**Certain non-point sources of water pollution**

- Pesticides (Based on e.g. chemical content, price or volume)
- Artificial fertilisers (Based e.g. on phosphorus or nitrogen content or price)
- Manure

**Waste management**

- Waste management in general (e.g. collection or treatment taxes)
- Waste management, individual products (e.g. packaging, beverage containers)

**Noise (e.g. aircraft take-off and landings)**

**Energy products**

- Energy products used for transport purposes
  - Unleaded petrol
  - Leaded petrol
  - Diesel
  - Other energy products for transport purposes (e.g. LPG or natural gas)
- Energy products used for stationary purposes
  - Light fuel oil
  - Heavy fuel oil
  - Natural gas
  - Coal
  - Coke
  - Biofuels
  - Other fuels for stationary use
  - Electricity consumption
  - Electricity production
  - District heat consumption
  - District heat production

**Transport**

- Motor vehicles, one-off import or sales taxes
- Registration or use of motor vehicles, recurrent (e.g. yearly) taxes

**Resources**

- Water abstraction
- Extraction of raw materials (except oil and gas)
- Other resources (e.g. forests)

The relationship between taxes and tax bases is sometimes one-to-one, but there may be several taxes on one base. One tax can also be levied on several tax bases. In the Netherlands for example, there are three different taxes levied on the tax base unleaded petrol: the duty on petrol, the fuel tax payable under the Environment Protection Act and the tax in connection with petroleum stocks. The duty on petrol is levied on two tax bases: leaded and unleaded petrol.

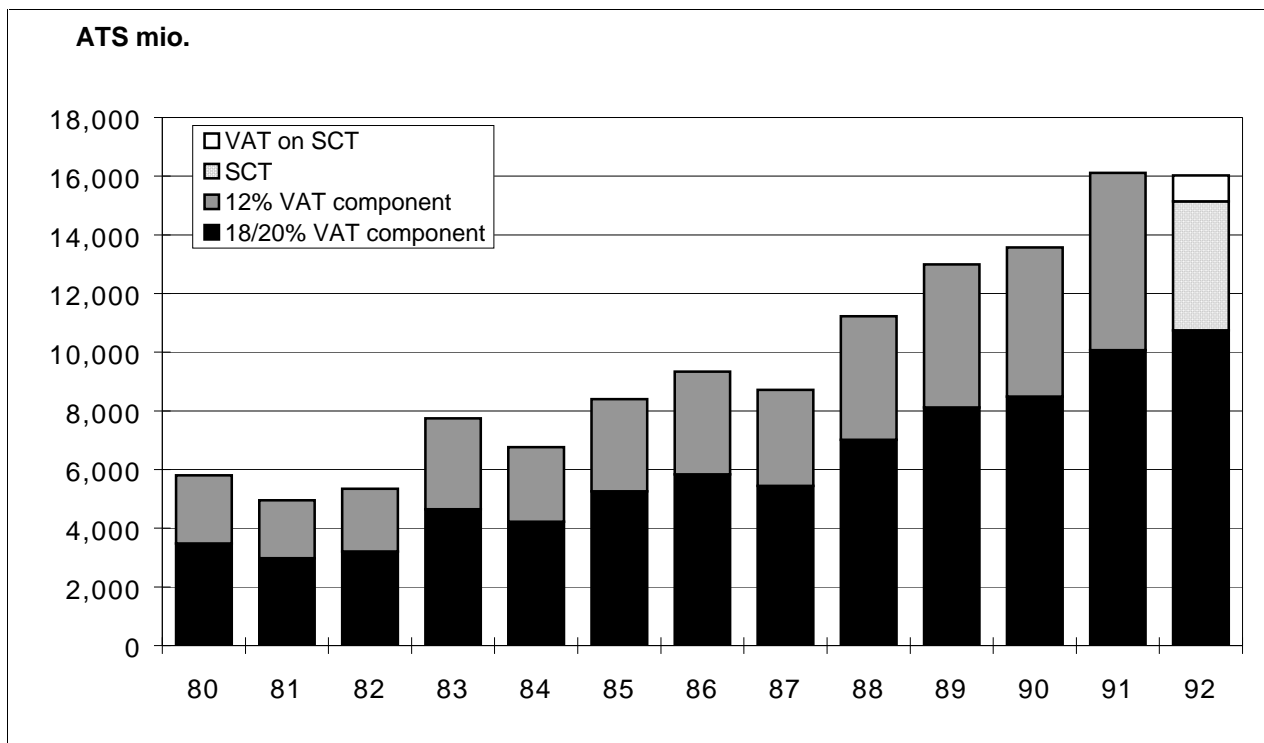
### Value added tax

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 environmentally related tax bases do.

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

However, VAT rates may vary according to environmental factors. As an example, Austria and Spain used to have special high VAT rates on vehicles. The rates were reduced to the standard VAT rate following EU tax harmonisation, and the revenue loss was compensated by the creation of new taxes on vehicle sales or registration, classified as transport taxes in the environmental taxes framework. This causes a break in the time series for transport taxes in these countries. For national purposes it may be considered to estimate the revenue from such special VAT rates (as was done in the Austrian and Spanish country studies, see Eurostat 1999b). Figure 1 shows an estimate of the revenue that was raised by the higher rate of VAT (12% higher than the standard VAT rate) on motor vehicles in Austria for the years 1980 to 1991, and the revenue from the standard-consumption tax (SCT) that replaced it from 1992. The normal rate of VAT was 18% until 1983 and 20% afterwards.

**Figure 1: Estimated revenue raised by the special VAT on motor vehicles in Austria, million ATS, 1980 to 1992**



Source: Steurer (1993).

Another issue is that the tax system may be designed so that VAT is levied on an environmental tax. One example is given in Figure 1, where VAT is levied on the standard-consumption tax on vehicles that was introduced in 1992. Another example is the VAT on transport fuels, which is often calculated on top of the mineral oil tax so that there is VAT levied on the mineral oil tax. It can be argued that the revenue from this kind of VAT-on-tax should be included in the environmental tax estimates, but it is not part of the definition used in these guidelines. This is mainly for practical reasons, since this type of revenue can be difficult to estimate.



### Specific taxes

The 1994 SERIEE manual (European Commission 1994) defines a category of taxes called specific taxes. They are taxes whose revenues are earmarked for environmental protection purposes. To focus on earmarked taxes is useful for analysing the funding mechanisms of environmental activities, for example. The definition of specific taxes overlaps with the definition of environmental taxes based on the tax base, but they are not identical. Some, but not all, taxes on environmentally related tax bases are earmarked for environmental protection purposes, and earmarked taxes may be related to other tax bases than those used in the definition of environmental taxes.

## 2.2 Main categories of environmental taxes

For analytical purposes, the environmental taxes can be divided into four main categories:

- Energy taxes (including CO<sub>2</sub>-taxes)
- Transport taxes
- Pollution taxes
- Resource taxes (excluding taxes on oil and gas)

### Energy taxes

This group includes taxes 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. The CO<sub>2</sub>-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 CO<sub>2</sub>-taxes separately in tax statistics, because they are integrated with energy taxes, e.g. via differentiation of mineral oil tax rates. In addition, they are partly introduced as a substitute for other energy taxes and the revenue from these taxes is often large compared to the revenue from the pollution taxes. This means that including CO<sub>2</sub>-taxes with pollution taxes rather than energy taxes would distort international comparisons. If they are identifiable, CO<sub>2</sub>-taxes should be reported as a separate category next to energy taxes. SO<sub>2</sub>-taxes may be subject to the same problem as CO<sub>2</sub>-taxes.

### Transport taxes

This group mainly includes taxes related to the ownership and use of motor vehicles. Taxes on other transport equipment (e.g. planes), and related transport services (e.g. duty 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. Taxes on petrol, diesel and other transport fuels are included under energy taxes.

### Pollution taxes

This group includes taxes on measured or estimated emission to air and water, management of solid waste and noise. An exception is the CO<sub>2</sub>-taxes, which are included under energy taxes as discussed above.

### Resource taxes

Taxes on resources pose some particular problems. There are differences in opinion on whether resource extraction is environmentally harmful in itself, although there is broad agreement that it can lead to environmental problems, such as pollution and soil erosion.

In addition, taxes on extraction of minerals and petroleum are often designed to capture the resource rent, and do not influence prices in the way that other environmental taxes, e.g. product taxes, do. 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 (see e.g. European Commission 2000a). A tax on the resource rent does not introduce a difference between the price received by the extractor and the price paid by the users in the way that a product tax does, and the market price will be affected only if supply of the product changes because of the tax on the resource rent. For petroleum and minerals where prices are determined on the world market, the effect on prices of a tax on the resource rent in a single country should be small.

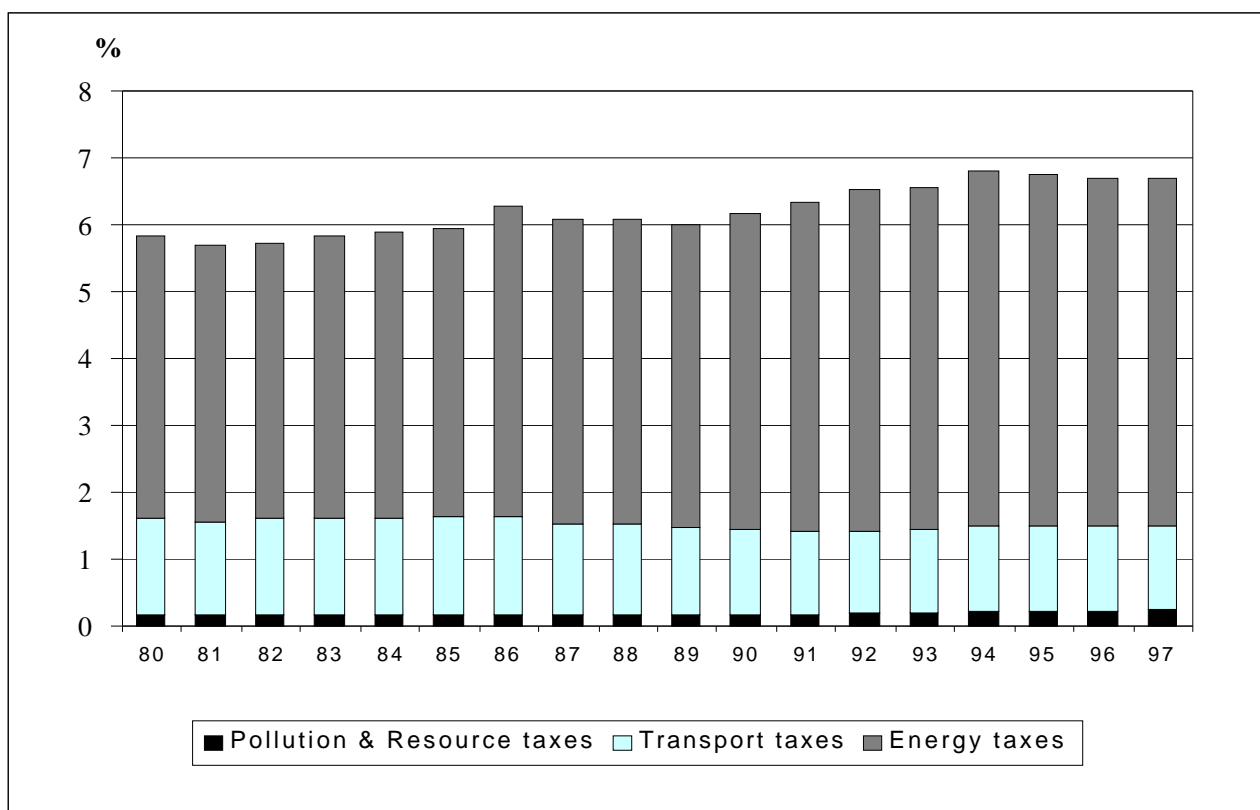
Taxes on oil and gas extraction are excluded from the definition of environmental taxes. In addition to the argument mentioned above about the taxes being designed to capture the resource rent, the main reasons to exclude them are related to comparability between countries and over time. The revenue from these taxes is important in only a few EU/OECD countries. The tax systems also differ between countries, with different combinations of royalties, exploitation fees, special corporate tax rates and direct government ownership of extraction companies. This means that including these taxes in the definition would make comparisons of environmental and resource tax revenue very difficult. The tax revenue from oil and gas is also highly volatile, reflecting fluctuations in the prices of oil and gas. This will distort the time series of revenue from resource taxes. Taxes on oil and gas extraction are discussed in more detail in European Commission (2000a), in particular in section 5.2 and Annex 3, based on the situation in the Netherlands.

The revenue from resource taxes (excluding oil and gas) is only a small share of the total revenue from environmental taxes. In EU-15 in 1997, the share was estimated to just 0.17%, see Eurostat (2000a). The resource tax bases in EU countries include water consumption (Denmark, France), forestry (Sweden) and mining (France).

### Revenues from environmental taxes in the EU, by main categories

From a revenue perspective, energy taxes are the most important environmental taxes for EU countries. In 1997, they accounted for more than 77% of the total revenue from environmental taxes in EU-15. Transport taxes was the second largest group, with a share of almost 19%. Pollution taxes had a revenue share of 3.7%, while resource taxes accounted for less than 0.2%. (Source: Eurostat 2000a). Environmental taxes accounted for 6.7% of total revenue from taxes and social contributions in EU-15 in the same year. Since 1980, the importance of environmental taxes in the EU taxation system has increased by 0.9 percentage points, presenting a rather slow but regular upward trend. As Figure 2 shows, the overall increase in revenues was mostly due to increases in energy taxation.

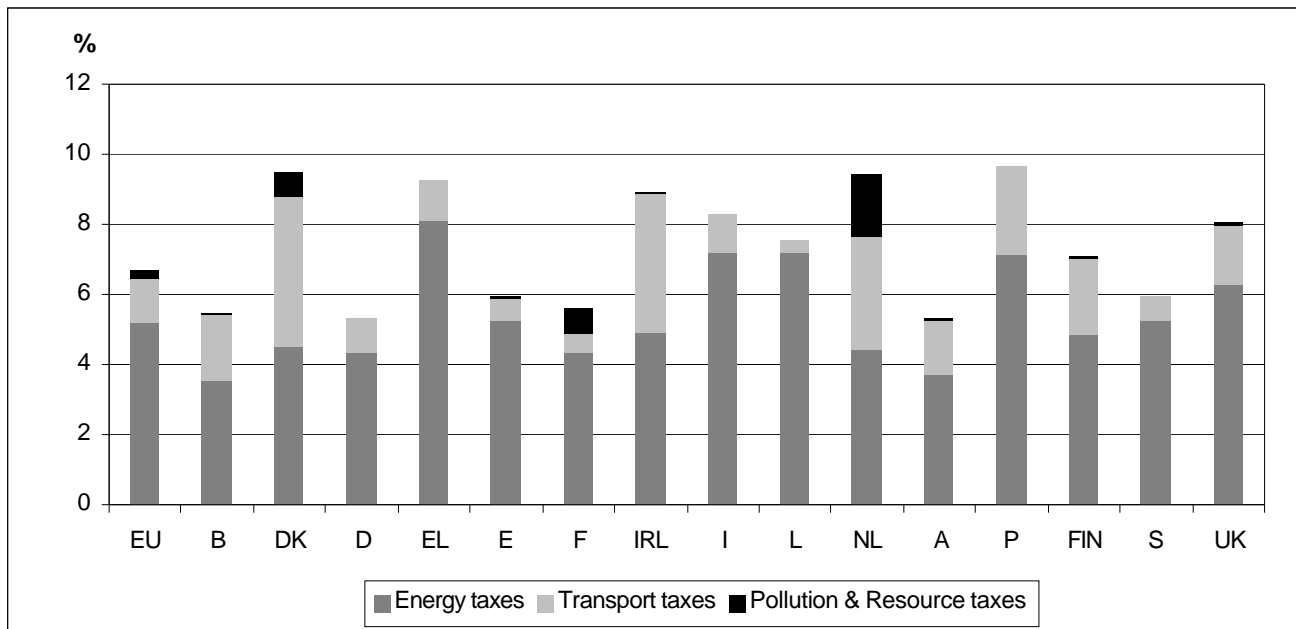
**Figure 2: Revenues from environmental taxes in percent of total revenues from taxes and social contributions, EU-15, 1980-1997**



Source: Eurostat (2000a)

The importance of environmental taxes varies significantly across Member states (see Figure 3). In 1997, the lowest contributions from environmental taxes were observed in Austria (5.30%), Germany (5.33%), Belgium (5.49%), France (5.57%), Sweden (5.92%) and Spain (5.97%). The highest ratios were observed in Portugal, Denmark, the Netherlands and Greece, all of them having a ratio above 9%. Ireland, Italy and the United Kingdom formed another group of countries with a relatively high contribution of environmental taxes to total revenue from taxes and social contributions, more than 8%.

**Figure 3: Structure of revenues from environmental taxes in 1997 by Member State, in percent of total revenues from taxes and social contributions**



Source: Eurostat (2000a)

In almost all EU countries, a strong concentration of environmental taxes in the field of energy can be observed. The Netherlands and Denmark were the only EU countries where energy taxes generated less than 50% of total revenues from environmental taxes. Denmark was the only EU country where revenues collected through transport taxes were close to those collected via energy taxes, representing more than 4% of the total revenues from taxes and social contributions. Significant contributions from transport taxes (more than 3%) were also observed in Ireland and the Netherlands.

The role of pollution taxes is marginal in most Member States. The Netherlands, France and Denmark were the only EU countries with a non-negligible contribution of pollution taxes to their total tax receipts: 1.76%, 0.7% and 0.69% respectively. This is because the financing of waste and wastewater treatment is partly or fully integrated into the taxation systems in these countries. In most EU countries the financing of these activities is either organised via fees or the management of waste and waste water is largely or completely privatised.

### Classification according to CEPA

The environmental taxes can also be classified according to the Classification of Environmental Protection Activities and Expenditure (CEPA 2000). The CEPA is a multi-purpose classification that is used in environmental protection expenditure statistics and accounts to classify activities, products and transactions. The 1-digit level is the CEPA classes. For the environmental taxes, CEPA classes 1 to 7, also called environmental domains, are the relevant ones.

#### CEPA 2000 classes

1. Protection of ambient air and climate
2. Waste water management
3. Waste management
4. Protection and remediation of soil, groundwater and surface water
5. Noise and vibration amendment
6. Protection of biodiversity and landscape
7. Protection against radiation
8. Research and development
9. Other environmental protection activities

The classification of pollution taxes should be relatively straightforward by looking at the tax bases in Table 1, where a classification similar to CEPA is used. The environmental taxes related to transport and energy are mainly in class 1 Protection of ambient air and climate. Taxes on hydroelectric power could also be related to class 6, and taxes on nuclear power to class 7. The resource taxes could be e.g. class 4 or 6, according to the tax base. Etwil (1999) provides a classification of environmental taxes in Denmark along similar lines.

Classifying the environmental taxes according to CEPA will allow the linking of the tax data to data from environmental protection expenditure statistics and accounts and to emissions data. Such a dataset can provide the basis for analysis and modelling of the effects of environmental taxes on protection expenditures and emissions.

## 2.3 Definition of taxes, fees and charges

The legal definition of taxes may differ between countries, and may also be different from the definition used in the national accounts. Both definitions are relevant for environmental tax statistics. The legal definition of taxes has an influence on how policy makers can use them as instruments for environmental protection. 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 environmental tax statistics framework uses the tax definition of the national accounts, but countries may choose to describe environmental taxes from both the legal and the national accounts perspective.

OECD (1999) gives the following definition of taxes:

'compulsory, unrequited payments to general government. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments.'

This definition is consistent with the definition of taxes in the European System of Accounts (ESA 95 – European Commission 1996), see section 2.4 below.

The terms charges and fees are often used interchangeably. As opposed to taxes, they are seen as payments for a service, i.e. required payments. The OECD defines charges and fees as:

'compulsory, requited payments to either general government or to bodies outside general government, such as for instance an environmental fund or a water management board.'

The term levy is sometimes used to cover all kinds of compulsory payments. Taxes on products are sometimes called duties or excise duties.

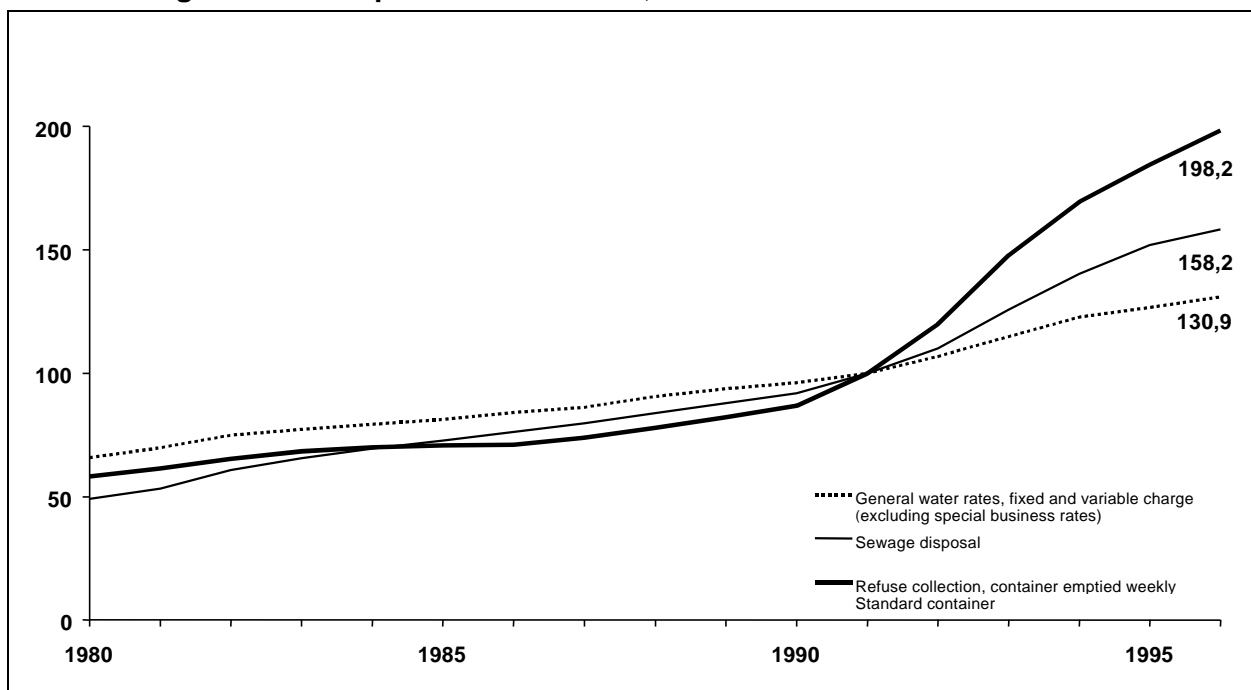
The main focus of the statistical framework is on taxes, rather than charges and fees. There are some borderline cases where it can be difficult to decide if an environmentally related payment to government should be classified as a tax or a fee. In this case, the definition used in the national accounts of the country in question should be used for the environmental tax statistics as well.

As a general rule, a payment should be classified as a tax if no link between the payment and the service rendered can be established. This is the case for many pollution taxes, for example. If a link between payment and service exists, the transaction should be treated as a sale of a service, and classified as a fee (Eurostat 1999a).

If the revenue from a compulsory payment, even if required, is much higher than the costs of providing the service, it can be argued that it should be seen as a tax. However, based on the data that is usually available to statistics producers, it may be difficult to estimate the size of the cost.

Data availability for fees and charges is generally not as good as for taxes, partly because fees are often collected by local governments. In addition, differences in the organisation of some activities can make comparability over time and between countries difficult or meaningless. An example is waste and waste water collection and treatment, which in most EU countries is to a varying extent a government activity financed by fees (and some taxes), but has been completely privatised in some other countries. In many countries where government activities are still important there is a clear trend towards outsourcing and privatisation. For these reasons, compiling statistics on fees and charges is more difficult than for taxes. Statistics on fees and charges should be complemented by information on price developments of e.g. waste and waste water services and with data on activities undertaken by private companies. As an example, figure 4 shows the development in the price indices for sewage and waste charges in Germany.

**Figure 4: Trend in charges for selected housing costs in Germany (old *Länder*).  
Cost of living index for all private households, 1991 = 100.**



Source: Lauber (1998).

## 2.4 Definition of taxes in the national accounts

In the ESA95, there are three main categories of taxes:

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

Taxes on production and imports are sometimes called indirect taxes, while taxes on income, wealth and capital are called direct taxes. This terminology is no longer used in the current ESA, however.

Most environmental taxes are in the category taxes on production and imports. This category is defined in the following way in ESA95 § 4.14 and 4.15:

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. These taxes are payable whether or not profits are made.

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 import 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.

Environmental taxes are found mainly in the sub-categories D.2122 'taxes on imports excluding VAT and import duties', D.214 'taxes on products, except VAT and import taxes' and D.29 'other taxes on production'. In ESA95 § 4.23, taxes on pollution resulting from production activities are classified as other taxes on production.

Current taxes on income, wealth, etc. are defined in ESA95 § 4.77:

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 the income nor the wealth.

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

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

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 in D.29 'other taxes on production'.

The classification of environmental taxes to national accounts categories will depend on the precise nature of the taxes. In London Group (2001) the following classification is suggested:

## Classification of environmental taxes

Type of tax	Accounting classification
Energy products Import or sales of vehicles Agricultural inputs (fertiliser, pesticides) Individual products (packaging materials, batteries, tyres, lubricant oils, CFCs, halons, etc.)	Taxes on products (D.21)
Measured or estimated emissions to air or water, waste water discharges, waste Annual vehicle taxes Noise	Other taxes on production (D.29) when paid by enterprises  Other current taxes on income, wealth etc. (D.59) when paid by households

Source: London Group (2001).

## 2.5 Environmental subsidies

In the national accounts, subsidies are defined as current unrequited payments from government to producers, with the objective of influencing their levels of production, their prices or the remuneration of the factors of production (see ESA95 §4.30). Subsidies are outside the scope of the statistical framework on environmental taxes, and will not be further described in the following chapters of these guidelines. However, subsidies and taxes are treated symmetrically in the national accounts, and several studies focus on environmental subsidies as well as taxes. This is an interesting extension of the statistics on environmental taxes, and the main results from two recent studies for Eurostat in Denmark and Sweden are summarised in this section. See Eurostat (1999b) for some other studies that include environmental subsidies.

The Danish study (Hornum 2000) uses a definition of environmental subsidies that is similar to the definition of environmental taxes. A subsidy is defined as environmental if it reduces the use of something that has a proven, specific negative impact on the environment. In 1996, the environmental subsidies totalled DKK 10 billion, or about 20 percent of the total revenue from environmental taxes. About 80 percent of the subsidies are related to public transport, i.e. railways and buses. There are also environmental subsidies for electricity produced by windmills, as well as refuse disposal, forestry etc.

The estimates are made by disaggregating the national accounts data on subsidies from the supply and use tables. The basic data on subsidies are mainly from government accounts.

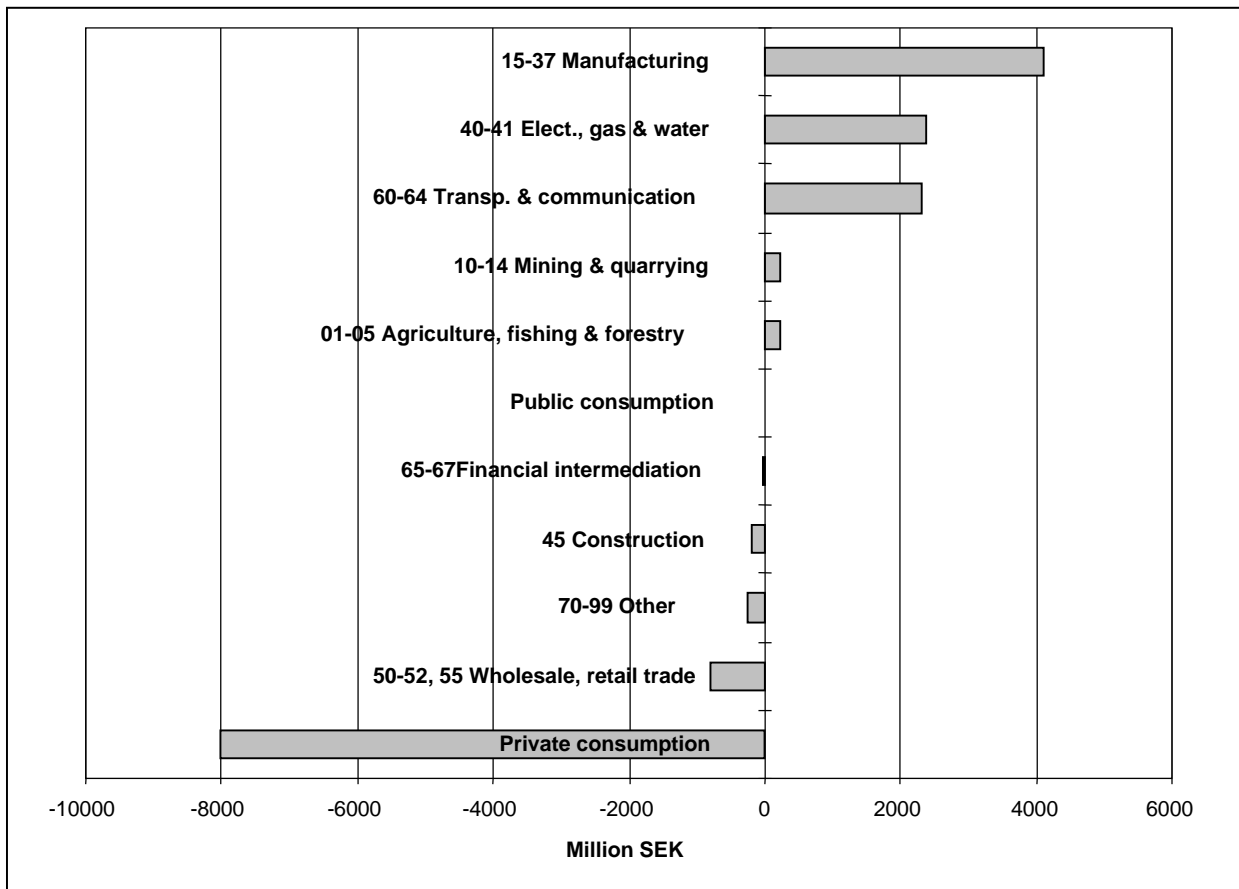
The Swedish study (Sjölin and Wadeskog 2000) focuses on environmentally **harmful** subsidies. The definition is from the Swedish Environmental Protection Agency and relates to subsidies that may be inconsistent with ecologically sustainable development. The report describes two groups of environmentally harmful subsidies, called direct subsidies and tax subsidies.

The largest environmentally harmful direct subsidies identified in the report are interest subsidies for housing construction, which is paid to the real estate industry. It leads to the construction of larger dwellings, and therefore increases the use of materials and energy. The amount paid out has decreased from over SEK 35 billion in 1993 to less than SEK 11 billion in 1998. The other large environmentally harmful direct subsidy is to agriculture, in the form of acreage and livestock support. It was introduced in 1995 and amounts to about SEK 4 billion per year. The environmental problems aggravated by this subsidy are ammonia emissions, nitrogen leakage and pesticide use. The main data source for the direct subsidies are the national accounts.

The tax subsidies are exceptions allowed by the tax legislation relative to a normal rate of taxation. This is not subsidies in a national accounts context, but they have a similar effect in practice. The estimated amounts of the tax subsidies vary greatly depending on how the normal tax rate is defined. This can be e.g. the average tax rate for all uses, the highest tax rate or an estimate of the external costs of the emissions. The report presents estimates for tax subsidies on energy taxes on fuels and electricity, as well as the CO<sub>2</sub> tax, based on the average tax rate.

Figure 5 shows the tax subsidies for the energy tax on fuels in 1995. Manufacturing industries received tax subsidies of about SEK 4 billion, because fuels used in manufacturing processes in these industries were exempt from energy tax. Private consumers paid tax sanctions (negative tax subsidies) of SEK 8 billion, i.e. they paid tax at a rate above the average. The average energy tax for each type of fuel was calculated as total energy tax paid divided by total fuel consumption converted to energy units (GWh). Fuel used for purposes other than energy generation was excluded. The average energy tax was multiplied by the energy consumption of each industry to estimate a hypothetical tax payment. The difference between the hypothetical and actual tax payment is the tax subsidy or sanction.

**Figure 5: Tax subsidies (compared to average tax rate) on the energy tax on fuels, by different industries and final demand, Sweden 1995. Million SEK.**



Source: Sjölin and Wadeskog (2000).



### 3 Environmental tax statistics

This section gives an overview of the type of information that may be included in environmental tax statistics, based on the user needs identified in the introduction (fiscal and environmental policy, tax analysis etc.) See Annex 2 for some examples of how information may be presented along these lines.

#### **The tax rules**

The OECD/EU 'Database on environmentally related taxes' (see Annex 3 for more information) includes the following information about the rules of each tax:

##### **Name of the tax**

The name used in the tax law.

##### **Administration of the tax**

Decision-makers for structure and rates may be the national parliament, a state parliament or a local elected body. The general administration of a tax is usually the responsibility of a ministry (finance, taxation or environment). Day-to-day administration, including the collection of tax payments, is performed by the national tax administration or another national or regional institution.

##### **Responsibility for proper payments**

The company or person responsible for payment may be the producer, the importer, the wholesale or retail trader, the buyer, the owner, etc.

##### **Frequency of payment**

The frequency of payment can be annual, quarterly or monthly, for example.

##### **Recipients of the revenue**

The recipients of the revenue may be national, state or local government, for example. If the revenues are shared between different recipients, information about the shares should be included.

##### **Earmarking of (parts of) the revenue**

For some taxes, the whole or part of the revenue may be earmarked for a specific purpose. An example can be revenue from an annual road tax that is earmarked for building and maintaining roads.

##### **General tax bases included under the tax**

This item lists the tax bases that are included under the tax, based on a list of tax bases such as the one in Table 1. This can be called the general tax base. As an example, the general tax bases for a mineral oil tax might include unleaded petrol, leaded petrol, diesel, and light fuel oil.

##### **Specific tax bases**

This item shows the exact definitions used by the tax authority for administrative purposes. Each of the general tax bases listed above might have to be divided into two or more specific tax bases. A mineral oil tax on leaded petrol might be differentiated according to lead content, for example.

##### **Nominal tax rates**

The nominal tax rate for each of the specific tax bases. It is possible that the nominal tax rates vary between industries or sectors of the economy, between parts of the country etc. This information should be supplied as well.

## Exemptions

A tax will often include a number of exemptions. The OECD uses this classification of exemptions:

- Exemptions for certain products or activities
- Exemptions for certain sectors of the economy
- Exemptions for certain parts of the country
- Exemptions for public services
- Exemptions for disabled persons
- Exemptions for diplomats
- Exemptions for exports
- Exemptions for navigation
- Exemptions for aviation
- Other exemptions

## Refund mechanisms

This item includes information on any refund mechanisms on the tax. As an example, refunds might be given for investments in certain types of equipment.

## Thresholds or ceilings for tax payments

In some countries, thresholds or ceilings for tax payments by certain industries have been introduced.

## Tax revenue

The revenue collected on the tax. The revenue can be cross-classified by aggregate tax type, CEPA class, industry (according to NACE Rev. 1) and tax base.

## Physical data on the tax bases

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 SO<sub>2</sub> emitted, litres of diesel or the number of cars sold, for example. If possible, the classification used should be the same as for the nominal tax rates, i.e. the specific tax bases used by the tax authority for administrative purposes. In addition, the data should be aggregated to the general tax bases, i.e. the most detailed level in the list in Table 1.

## Effective tax rates on the tax bases

The term effective tax rates refers 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 possible, the classification used should be the specific and general tax bases. If the tax base consists of 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 as weights. For some types of taxes the tax rates differ by type of industry or sector, so it will be useful to distinguish between a few major sectors of the economy.

## Market prices on the tax bases

The market price per unit traded of the different products. If possible, the classification used should be the same as for the physical data. For some tax bases, such as emissions and the use of motor vehicles, the market price will not be a relevant concept.

## 4 Sources and methods

The main sources of information about tax rules are the tax laws and regulations. Data on tax revenue can be found in tax statistics, in government finance statistics and in the national accounts. The 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.

For OECD member countries, an important source of information is the 'Database on environmentally related taxes', developed in co-operation between OECD and the European Commission. It contains detailed information on the rules of each environmental tax. There is also revenue data for each tax for the years 1994 to 1998. The information has been provided by ministries of finance and ministries of environment in each country. The database is available on the Internet at <http://www.oecd.org/env/policies/taxes/>. See Annex 3 for more details.

### 4.1 Listing the environmental taxes

The starting point for the work on environmental taxes should be a list of all government levies that are defined as taxes in the country's national accounts. As discussed in section 2.4, most environmental taxes will be found in the ESA95 categories D.21 taxes on products and D.29 other taxes on production, so these should be the main focus of the work.

The first step is to identify the tax-base(s) of each tax. The main sources for this type of information are the tax laws and regulations. These should be available from the institution responsible for administration of the taxes, usually the ministry of finance or taxation. For EU countries, descriptions of the tax rules for each tax can also be found in the publication 'Inventory of taxes – Levied in the Member States of the European Union' (European Commission 2000c). If the tax base is included in the list in Table 1, the tax is defined as an environmental tax.

### 4.2 The tax rules

The main sources of information about the rules of each environmental tax are tax laws and regulations. (See the 'Database on environmentally related taxes' and the 'Inventory of taxes' mentioned above.) Other possible sources include government reports on the taxation system, e.g. reports from 'green tax commissions'.

### 4.3 Tax revenue data

Tax statistics, the government finance statistics and the national accounts are the main sources of data on revenue for the different kinds of taxes. The government finance statistics and the national accounts also include data on fees. The environmental tax statistics can make use of the tax statistics and government finance statistics directly, but there are some advantages in using the tax data from the national accounts if this is possible.

The national accounts use the government finance statistics and tax statistics as data sources, but they are based on a different recording principle. The government finance statistics and tax statistics are usually recorded on a cash basis, i.e. taxes are recorded in the period they are paid. In the national accounts, taxes (and all other flows) are recorded in the period they accrue, whether or not they are actually paid in that period<sup>1</sup>.

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<sup>1</sup> In practice, it is often difficult to carry out exact transformations from cash basis to accrual basis, and approximations have to be used (ESA95 §1.57). 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.

Basing the environmental tax statistics on the accruals adjusted tax revenue from the national accounts will ensure consistency with the national accounts and improve international comparability. The accruals based data are also more consistent with the physical data on the tax bases, such as the acquisition or use of products with a negative impact on the environment. It should be noted that the detailed tax revenue data usually are not published, so access to the background material of the national accounts will be required.

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

Other taxes on production are distributed by industry in the generation of income account, as a part of the calculation of the operating surplus. The published tables will only show the sum of the taxes paid by each industry, so access to more detailed background data will be required.

The supply and use tables will usually provide information on taxes and subsidies on products classified by product and user category (intermediate consumption in industries and final uses such as final consumption expenditure, gross capital formation and exports). The supply and use tables described in chapter 9 of ESA95 contains a simple taxes less subsidies on products table (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 table. 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 are known to be different between users, however, some additional information is required in order to make the distribution. This information can be effective tax rates and physical data on the different tax bases involved. See below for a discussion on this kind of information.

#### **4.4 Physical data on tax bases**

Physical data on emissions to air and water, the use of energy products etc. may be available in tables based on the NAMEA framework (National Accounts Matrix including Environmental Accounts, see e.g. European Commission 1999c). The NAMEA divides the economy into industry and household categories and shows how each industry or the households contribute to a variety of environmental concerns like emissions of pollutants to air, waste water, and waste. It is further possible to include environmental protection expenditure, use of natural resources (e.g. energy and water use) and land use in the framework (Eurostat 2000b). NAMEA tables for air emissions are available for practically all EU Member States and for Norway. Several countries have also compiled NAMEA data on energy and resource use, water use, wastewater and solid waste.

Another source of physical data on the supply and use of energy products are energy balances, see e.g. European Commission (1999b). 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.

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

#### **4.5 Effective tax rates on the tax bases**

The term effective tax rates refers 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 (OECD 1997). If the tax base consists of 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. Providing exact estimates for effective tax rates will be difficult in many cases, requiring a lot of detailed information, so the ambition should be to calculate 'reasonably' reliable estimates.

For stationary sources of pollution such as emissions to air, effluents to water and use of energy products for stationary purposes, the effective tax rates will often differ across industries and sectors. It is therefore useful to distinguish between a few major sectors of the economy. The following classification may be used (based on the specification in the IEA's energy balances):

#### **Sector classification for stationary sources of pollution**

<b>Sector</b>	<b>Definition</b>
Households	The household sector
Electricity and heat generation	Electricity and district heating sold to a third party (NACE Rev. 1 division 40)
Heavy industry	Mining and quarrying (NACE Rev. 1 division 10 -14) Paper, pulp and printing (NACE Rev. 1 division 21 and 22) Chemical and petrochemical (NACE Rev. 1 division 23-25) Non-metallic minerals (NACE Rev. 1 division 26) Iron and steel, non-ferrous metals (NACE Rev. 1 division 27)
Other sectors	The rest of the economy

For non-stationary sources of pollution, such as vehicles and energy products used for transport purposes, there will normally be smaller differences in tax rates between sectors, so the sector classification will be less relevant for these tax bases. However, for some energy products such as diesel, there can be large tax differences between commercial and non-commercial use.

#### **4.6 Tax revenue on the tax bases**

The link between taxes and tax bases may be used to estimate tax revenue by tax base. 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 general tax bases for a mineral oil tax might be unleaded petrol, leaded petrol, diesel, and light fuel oil. In this case it is necessary to distribute the tax revenue using additional information. Sometimes, this information will be available from the tax authority. If this is not the case, estimates of effective tax rates and volume data on emissions and trade can be multiplied to give an estimate of the tax revenue for the tax base. As is the case for the effective tax rates, providing exact data for tax revenue by tax base will be difficult in many cases, so the ambition should be to calculate 'reasonably' reliable estimates.

#### **4.7 Market prices of environmentally related products**

The information on market prices is of most relevance for relatively homogenous products, such as energy products. For these products, price information can be found in energy price statistics. Another group of products where the average price can be relevant is disposable products such as batteries, tyres and light bulbs. It may be possible to find price information on these products in the background material of the Consumer Price Index, for example. 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.

## 5 Tables and indicators

This section suggests a set of tables and a few indicators for presenting information about environmental taxes. Most of the tables contain tax revenue data. There is also a table containing physical data, market prices and effective tax rates for the tax bases, intended as a basis for analysing the effects of environmental taxes.

### 5.1 Tax revenue by tax and tax category

This group of tables focuses on tax revenue by tax and tax category. They all contain time series, with data for at least ten years if possible.

#### Revenue from environmental taxes by tax and tax category

This is the basic tax revenue table. It shows time series of revenue from each environmental tax and for the four main categories of environmental taxes: energy, transport, pollution and resource taxes. As a supplement to the classification by tax category, the 1-digit CEPA classes can be used, see section 2.2. The table should also include total revenues from taxes and social contributions as well as GDP (gross domestic product), to facilitate comparisons over time and across countries. Table 2 provides an example for the EU (for the aggregates only).

**Table 2: European Union environmental tax revenue, 1987-1997, in million ECU**

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Energy taxes	75883	82398	89252	99469	114470	125557	126789	137752	142447	149706	157615
Transport taxes	22814	24441	26150	27316	29002	30355	31142	33304	34431	36355	38438
Pollution taxes	2832	2959	3172	3446	3919	4460	5021	5511	5929	6560	7479
Resource taxes	184	187	198	217	227	182	160	198	265	315	351
Total environmental taxes	101712	109985	118772	130448	147618	160556	163112	176765	183073	192936	203883
Total taxes and social contributions	1667673	1804553	1979269	2112828	2332029	2459574	2482215	2590470	2705141	2875553	3040155
GDP	4086995	4423563	4828755	5199780	5659159	5900520	5915677	6210731	6451378	6781095	7143931

Source: Eurostat (2000a)

The other three tables in this group are all derived from the first table. They are intended to make comparisons over time and across countries easier, and highlight the relative importance of the different variables.

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

This table shows the share that the four tax categories have of 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. Table 3 has been derived from Table 2, and shows that for the EU as a whole, about 3/4 of the revenue from environmental taxes are from energy taxes.

**Table 3: European Union environmental taxes by tax category, 1987-1997, as a percentage of total revenue from environmental taxes**

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Energy taxes	74.6	74.9	75.1	76.3	77.5	78.2	77.7	77.9	77.8	77.6	77.3
Transport taxes	22.4	22.2	22.0	20.9	19.6	18.9	19.1	18.8	18.8	18.8	18.9
Pollution taxes	2.8	2.7	2.7	2.6	2.7	2.8	3.1	3.1	3.2	3.4	3.7
Resource taxes	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2

Source: Based on Eurostat (2000a)

### Revenue from environmental taxes by tax category, in percent of total revenues from taxes and social contributions

This table shows the shares that total environmental taxes and the four tax categories have of the total revenues from all taxes and social contributions. These shares can be seen as indicators for the tax burden on the use of the environment and of the tax shift that is part of a green tax reform, see section 5.5. Table 4 shows that for the EU as a whole, the revenue share from environmental taxes has increased slowly over time, mainly due to increases in energy taxation. These are the same data as in Figure 2, see section 2.2.

**Table 4: European Union environmental taxes, 1987-1997, in percent of total revenues from taxes and social contributions**

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Energy taxes	4.55	4.57	4.51	4.71	4.91	5.10	5.11	5.32	5.27	5.21	5.18
Transport taxes	1.37	1.35	1.32	1.29	1.24	1.23	1.25	1.29	1.27	1.26	1.26
Pollution taxes	0.17	0.16	0.16	0.16	0.17	0.18	0.20	0.21	0.22	0.23	0.25
Resource taxes	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total environmental taxes	6.10	6.09	6.00	6.17	6.33	6.53	6.57	6.82	6.77	6.71	6.71

Source: Eurostat (2000a)

### Revenue from environmental taxes by aggregate tax category, in percent of GDP

This table shows revenue from total environmental taxes and the four tax categories in percent of GDP. Like the shares of total revenue from taxes and social contributions in Table 4, the percentages of GDP can be seen as indicators for the tax burden on the use of the environment. Unlike the data in table 4, they will not be affected by changes in the total tax level of the economy, i.e. total taxes and social contributions in percent of GDP. Table 5 shows the data for the EU.

**Table 5: European Union environmental tax revenue, 1987-1997, in percent of GDP**

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Energy taxes	1.86	1.86	1.85	1.91	2.02	2.13	2.14	2.22	2.21	2.21	2.21
Transport taxes	0.56	0.55	0.54	0.53	0.51	0.51	0.53	0.54	0.53	0.54	0.54
Pollution taxes	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.09	0.09	0.10	0.10
Resource taxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total environmental taxes	2.49	2.49	2.46	2.51	2.61	2.72	2.76	2.85	2.84	2.85	2.85

Source: Eurostat (2000a)

## 5.2 Tax revenue by tax category and industry/user

The tables in this group may be compiled by combining information on environmental taxes with the tax information in the government fiscal accounts and the national accounts, as discussed in section 4.3. The suggested tables show revenue data for a single year, but the data may of course be presented as time series as well.

The industry and user classification in these tables should be compatible with the classification used in other parts of the environmental accounts, in particular the NAMEA tables with physical data on emissions. This will simplify the linking of different data sets.

### Revenue from other environmental taxes on production by industry and type of tax

The rows show the industries that pay other environmental taxes on production. The different types of environmental taxes on production are shown in the columns.

### Revenue from environmental taxes on products by user and type of tax

The rows show the users that pay environmental taxes on products, based on information from the use table. The columns show the different types of environmental taxes on products.

### 5.3 Nominal tax rates and tax rules

#### Nominal tax rates by general and specific tax base

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.

The information about tax rules (administration, earmarking, refunds etc.) can be presented with a combination of text and a few small tables. See Annex 2 for some examples.

### 5.4 Effective tax rates, revenues, volumes and prices by tax base

As mentioned in the introduction, for the purpose of analysing the effects of environmental taxes, it will be useful to have access to a dataset that includes data on prices and volumes as well as the tax rates. The classifications to be used for this dataset are the aggregate and detailed tax bases from Table 1, further classified by sector for stationary sources of pollution, see section 4.5. For each general tax base (and aggregate sector) the dataset should include time series for the following variables:

- Volume of emissions or volume traded (the unit should be specified)
- Market price per unit traded
- Effective tax rate
- Estimated revenue

For the aggregate tax bases, the estimated revenue will usually be the only relevant variable, since the different components of the tax base will be too heterogeneous to provide meaningful totals and averages.

The information in this dataset can be presented in tables in several different ways. One way is to focus on a single year, and show the tax bases and sectors in the rows and the four variables in the columns.

### 5.5 Indicators

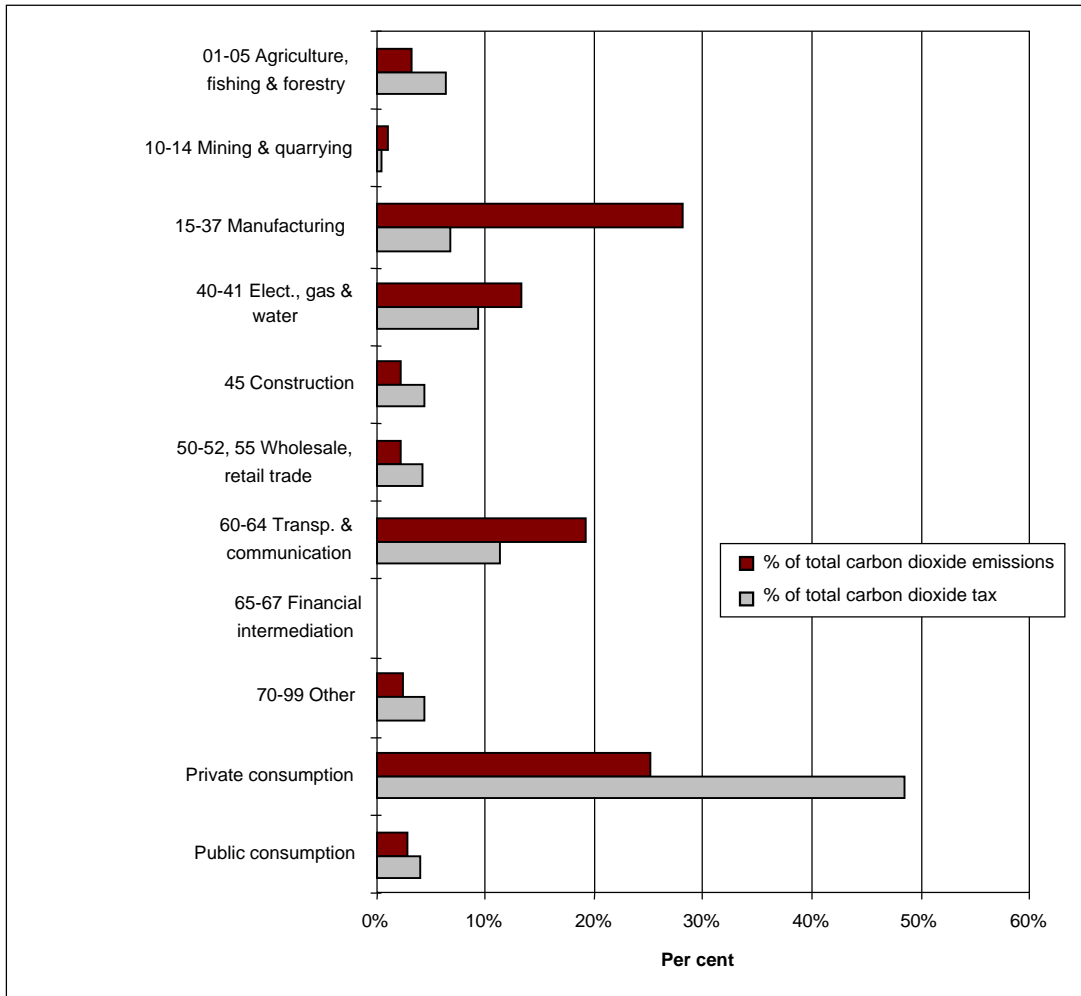
The shares that total environmental taxes and the four aggregates have in the total revenue from all taxes and social contributions can be seen as indicators for the tax burden on the use of the environment. They can also be seen as indicators for the tax shift that is part of a green tax reform. A green tax reform implies increasing the environmental taxes and using the increased revenues to reduce distortionary taxes on other tax bases, in particular labour.

High or increasing revenue from environmental taxes should not be interpreted as an indicator for the environmental 'friendliness' of the fiscal policies. An increase in revenue from environmental taxes may be caused by the introduction of new taxes or 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 changes in classifications of certain payments from taxes to fees, privatisation etc.

The effect of differentiated tax rates, exemptions, refunds etc. can be illustrated by comparing the environmental taxes paid by a sector with the emissions from the same sector. Figure 5 presents an example for CO<sub>2</sub> emissions in Sweden, from Sjölin and Wadeskog (2000). It shows how the CO<sub>2</sub> tax payments and the CO<sub>2</sub> emissions were distributed between industries and final demand categories. Manufacturing (NACE 15-37) was responsible for 28 per cent of all emissions but paid only 7 per cent of all carbon dioxide tax, reflecting a reduced tax rate for these industries. Private consumers paid the largest share of the tax (about 47 per cent) but caused only 25 per cent of all emissions. This is because this sector is a major consumer of fuels for motor vehicles, e.g. diesel and petrol, and the CO<sub>2</sub> tax is always charged at the full rate on these fuels.



**Figure 6: Percentage shares of CO<sub>2</sub> emissions and CO<sub>2</sub> tax, by industry and final demand categories, Sweden, 1995**



Source: Sjölin and Wadeskog (2000).

## Annex 1: Glossary of terms for environmental taxes

### **Charges**

The OECD defines charges as compulsory, required payments to either general government or to bodies outside general government, such as for instance an environmental fund or a water management board. Charges are seen as payments for services.

### **Direct taxes**

Another term for taxes on income, wealth etc.

### **Duties**

Another term for taxes on products (with the exception of VAT).

### **Effective tax rates**

The taxes actually paid per unit of the different products and activities. Should reflect exemptions, reduced rates etc, in addition to the nominal tax rates.

### **Environmental tax**

A tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment.

### **Excise duties**

Another term for taxes on products (with the exception of VAT), in particular taxes on the domestic consumption of certain goods.

### **Fees**

The same as charges (see definition above).

### **Indirect taxes**

Another term for taxes on production and imports.

### **Levies**

Compulsory payments, i.e. both taxes and fees/charges. Often also used in a narrower sense, for taxes on production.

### **Nominal tax rates**

The taxes per unit of the different products and activities, as described in the tax law.

### **Taxes**

In the national accounts, taxes are defined as compulsory, unrequited payments to general government. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not in proportion to their payments.

### **Tax base**

The product or activity that the tax is levied upon. For an environmental tax, the tax base can be e.g. emissions of NO<sub>x</sub> or the consumption of petrol.

## **Annex 2: Examples**

This section provides three examples of environmental taxes, one from each of the three main categories of taxes: pollution, energy and transport. The type of information included is based on the list in section 3. The source of the information is the OECD/EU Database on environmentally related taxes, see Annex 3. The OECD database currently does not include physical data, market prices, effective tax rates or tax revenue for the tax bases. For these items, possible data sources and estimation methods are suggested in this Annex.

## Example 1: Pollution tax, Denmark

### Name of the tax

Duty on waste water.

### Administration of the tax

Payments should be made to the Regional Tax and Customs Administration.

### Responsibility for proper payments

Responsibility	Other	Details
Other (please specify)	Sewage disposal plants or properties	These plants are required to register with the Tax and Customs Administration.

### Frequency of payment

Quarterly.

### Recipients of the revenue

National / Federal government, share 100%.

### Earmarking of (parts of) the revenue

No earmarking is reported for this tax.

### General tax bases included under the tax

Measured or estimated effluents of oxydizeable matters (BOD, COD)

### Specific tax bases

- Nitrate content in waste water
- Phosphate content in waste water
- Organic material content in waste water

### Nominal tax rates

Specific tax base	Tax rate
Nitrate content in waste water	20 DKK per kg
Phosphate content in waste water	110 DKK per kg
Organic material content in waste water	11 DKK per kg

### Exemptions

Exemption Type	Details
Product or Activity	Surface water, rain water, etc. separately discharged from sewage disposal plants.
Sector of the Economy	Waste water from fish farms.

### Refund mechanisms

Refund Criteria	Details
Fish processing, cellulose production, sugar production	Businesses registered for VAT can obtain a reimbursement of 97% of the duty exceeding 20,000 DKR a year if 80 % of the production is connected to processing of fish etc, production of cellulose or production of sugar.
Organic pigments, gelatine, vitamins	Businesses registered for VAT can obtain a reimbursement of 70% of the duty exceeding 20,000 DKR a year if 80 % of the production is connected to production of organic pigments, production of pectic substances, gelatine etc. and starch.

### Thresholds or ceilings for tax payments

No thresholds or ceilings are reported for this tax.

### Tax revenue

Year	Million US \$
1994	0
1995	0
1996	0
1997	24.8

### Physical data on the tax bases

Relevant physical data for this tax base could be the amounts emitted of the three specific tax bases (nitrate, phosphate and organic material). Ideally, emission from industries with exemptions and refunds should be reported separately. A possible source could be the authority that is responsible for the administration of the tax.

### Effective tax rates on the tax bases

Based on the nominal tax rates, the information about exemptions and refunds and the physical data suggested above, it should be possible to estimate effective tax rates. The industries with exemptions and refunds should be reported separately.

### Tax revenue on the tax bases

Tax revenue by tax base can be estimated from physical data and effective tax rates, if they are not available directly from the tax authority.

### Market prices on the tax bases

For this type of tax base, effluents to water, the market price will not be a relevant concept.

## Example 2: Energy tax, the Netherlands

### Name of the tax

Excise duty on mineral oil (other than petrol).

### Administration of the tax

Payments should be made to the *Belastingdienst*.

### Responsibility for proper payments

Responsibility	Other	Details
The importer/wholesaler provider of a product		The duty is payable on import and on release for consumption by the importer or a warehouse keeper. In other cases the duty has to be paid by the person who possesses the goods.
The manufacturer or producer of a product or service		
The owner of a product		
The retail provider of a product/service		

### Frequency of payment

Monthly.

### Recipients of the revenue

National / Federal government, share 100%.

### Earmarking of (parts of) the revenue

No earmarking is reported for this tax.

### General tax bases included under the tax

- Diesel
- Heavy fuel oil
- Light fuel oil

### Specific tax bases

General tax base	Specific tax base
Diesel	Diesel – used as a motor fuel
Diesel	Diesel – used for heating purposes
Heavy fuel oil	Heavy fuel oil
Light fuel oil	Light fuel oil

### Nominal tax rates

Specific tax base	Tax rate
Diesel – used as a motor fuel	0.7355 NLG per litre
Diesel – used for heating purposes	0.1026 NLG per litre
Heavy fuel oil	0.03424 NLG per kg
Light fuel oil	0.1026 NLG per litre

### Exemptions

Exemption Type	Details
Exemptions for Aviation	Mineral oils used for the propelling of airplanes (other than pleasure crafts).
Exemptions for Navigation	Mineral oils used for the propelling of ships (other than pleasure crafts).
Sector of the Economy	Mineral oils used in blast furnaces for chemical reduction.
Sector of the Economy	Mineral oils used for the production of non-excise goods or mineral oils.

### Refund mechanisms

Refund Criteria	Details
Diesel used in heavy lorries	A refund of 0.0511 NLG per litre is given on diesel oil used by lorries with a maximum safe load of over 12,000 kg.

### Thresholds or ceilings for tax payments

No thresholds or ceilings are reported for this tax.

### Tax revenue

Year	Million US \$
1994	1846.2
1995	2185.6
1996	2176.7
1997	2425.9

### Physical data on the tax bases

Relevant physical data for this tax base could be the amounts used of the different types of diesel and oil. Ideally, use in industries with exemptions and refunds should be reported separately. A possible data source are energy balances.

### Effective tax rates on the tax bases

Based on the nominal tax rates, the information about exemptions and refunds and the physical data suggested above, it should be possible to estimate effective tax rates. The industries with exemptions and refunds should be reported separately.

### Tax revenue on the tax bases

Tax revenue by tax base can be estimated from physical data and effective tax rates, if they are not available directly from the tax authority.

### Market prices on the tax bases

Energy price statistics is a data source for market prices on diesel and fuel oil.

### Example 3: Transport tax, Finland

#### Name of the tax

Excise on motor cars (Car tax).

#### Administration of the tax

Payments should be made to the customs authorities.

#### Responsibility for proper payments

Responsibility	Other	Details
The buyer of a product/service		
The importer/wholesaler provider of a product		
The manufacturer or producer of a product or service		
The owner of a product		

#### Frequency of payment

One-off, before the first registration of the vehicle.

#### Recipients of the revenue

National / Federal government, share 100%.

#### Earmarking of (parts of) the revenue

No earmarking is reported for this tax.

#### General tax bases included under the tax

Transport – Motor vehicles, one-off import or sales taxes.

#### Specific tax bases

- First registration of passenger cars
- First registration of vans
- First registration of motor cycles

#### Nominal tax rates

Specific tax base	Tax rate
First registration of passenger cars	100% of taxable value, minus 4,500 FIM
First registration of vans	35% of taxable value
First registration of motor cycles	20 -70% of taxable value, depend. on motor volume

#### Exemptions

Exemption Type	Details
Exemptions for Public Services	Ambulances
Product or Activity	Rescue vehicles
Product or Activity	Hearses
Product or Activity	Moving homes
Sector of the Economy	Vehicles used in veterinary services



### Refund mechanisms

No refund mechanisms are reported for this tax.

### Thresholds or ceilings for tax payments

No thresholds or ceilings are reported for this tax.

### Tax revenue

Year	Million US \$
1994	393.2
1995	614.8
1996	786.0
1997	811.6

### Physical data on the tax bases

Relevant physical data for this tax base is the number of vehicles registered in the different categories. Vehicle types with exemptions should be reported separately. A possible data source is the customs authority.

### Effective tax rates on the tax bases

Since the tax is based on the taxation value of the vehicles, some information about the pre-tax prices is needed to estimate effective tax rates. The structure of exemptions is relatively simple, concentrated on a few special vehicles (and those used in veterinary services). It is relatively straightforward to estimate the tax on a certain type of vehicle, but calculating a weighted average over all registered vehicles requires a lot of detailed information. If an estimate of tax revenue on each of the specific tax bases is available from the tax authority, an average tax rate can be estimated by dividing the tax revenue by the number of vehicles registered.

### Tax revenue on the tax bases

Tax revenue by tax base may be available directly from the tax authority. If not, it can be estimated from physical data and effective tax rates.

### Market prices on the tax bases

It should be relatively easy to find market prices of different types of vehicles from catalogues, Web sites etc. However, as is the case for the tax rate, calculating a weighted average requires a lot of information. 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.

## Annex 3: Published information on environmental taxes

The institutions involved in defining the statistical framework on environmental taxes (Eurostat, DG Environment, DG Taxation and Customs Union, the OECD and the IEA) all publish information related to the topic. Another source of information on environmental taxes is the European Environment Agency (EEA).

### Eurostat and Directorate General Taxation and Customs Union

Environmental tax revenue data are regularly published, in an aggregate form, by Eurostat and Directorate General Taxation and Customs Union, most recently in 'Structures of the taxation systems in the European Union – 1970-1997 – 2000 edition' (European Commission 2000b). A more detailed analysis was published by Eurostat as a Statistics in Focus 'Environmental taxes in the EU' in June 2000 (Eurostat 2000a).

Eurostat has initiated various national studies. Studies of environmental taxes are now available for virtually all Member States, see the Eurostat internal document 'Statistics on Environmental Taxes and other Economic Instruments for Environmental Protection in EU Member States – A collection of studies in 13 EU Member States and the Czech Republic' (Eurostat 1999b). Some Member States regularly publish data on environmental taxes nationally.

Eurostat also publishes data on prices and tax rates for energy products (see e.g. European Commission 1999a), as well as energy balances (e.g. European Commission 1999b).

DG Taxation publishes the 'Inventory of taxes – Levied in the Member States of the European Union' (see e.g. European Commission 2000c), with descriptions of the tax rules for all taxes, as well as "Excise Duty Tables" with detailed tax rates on mineral oils, alcoholic beverages and tobacco Union' (see e.g. European Commission 2000d).

### Directorate General Environment

Directorate General Environment's database on environmental taxes in the European Union Member States, plus Norway and Switzerland is available on the Internet at [http://europa.eu.int/comm/environment/enveco/env\\_database/database.htm](http://europa.eu.int/comm/environment/enveco/env_database/database.htm)

The database contains a table for each country, which lists the environmental taxes in use. For each environmental tax, the following information is provided:

#### Database on environmental taxes in the European Union Member States, plus Norway and Switzerland

Type of information	Contents
Instruments	The name of tax, general tax base
Motivation	Incentives, revenue-raising, cost-covering
Environmental themes	Climate change, acidification, air pollution/quality, inland waters, nature/biodiversity etc.
Sources/agents	The tax base
Tax Rate	The nominal tax rates
Total Revenue	Revenue data in national currency and ECU/Euro, mainly for 1997
Use of Revenue	General budget, earmarking for specific purpose etc.
Macroeconomic Socio-economic Environmental Outcomes	Other information about the tax, e.g. time of introduction, proposed changes, exemptions

## European Environment Agency

The EEA publishes reports on the use of environmental taxes in the EU (EEA 1996 and EEA 2000). A discussion of environmental taxes can be found at <http://themes.eea.eu.int/theme.php/improvement/policy>.

## Organisation for Economic Co-operation and Development

The OECD has published several reports and notes on environmental taxes, both descriptions of the statistical framework (e.g. OECD 1997) and analyses of the use of environmental taxes in OECD countries (e.g. OECD 1999 and OECD 2000).

The 'Database on environmentally related taxes' is available on the Web site of OECD Environment Directorate, at <http://www.oecd.org/env/policies/taxes/>

The Web page and database contains information on environmentally related taxes, fees and charges levied in OECD Member countries. The database has been developed in co-operation between OECD and the European Commission. The information has been provided by ministries of finance and ministries of environment in each country, and is available by predefined queries of the database. The queries are:

- Revenues generated by environmentally related taxes in a specific country
- Tax rates of environmentally related taxes in a specific country
- Exemptions for environmentally related taxes in a specific country
- Refund mechanisms in environmentally related taxes in a specific country
- Tax ceilings in environmentally related taxes in a specific country
- Recipients of revenue from environmentally related taxes in a specific country
- Responsibility for payment of environmentally related taxes in a specific country
- Frequency of payment of environmentally related taxes in a specific country
- Earmarked environmentally related taxes in a specific country
- Tax rates of specific tax-bases across countries
- Details concerning tax rates of specific tax bases across countries
- Exemptions concerning a given tax-base across countries
- Refund mechanisms concerning a given tax base across countries
- Earmarked elements of taxes levied on a given tax base across countries
- Sub-national recipients of taxes
- Taxes administered by the Ministry of the Environment

## International Energy Agency

The IEA publishes prices and taxes on energy products on a quarterly basis (IEA 2000) and reports on energy policy, including energy taxation, in IEA member countries. See <http://www.iea.org/public/index.htm> for a list of recent publications, and <http://www.iea.org/statist/index.htm> for statistical information.

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