

# **Use of Environmental Tax Statistics for Monitoring of Environmental Tax Reform in Estonia**

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## **Introduction**

Pollution control and natural resource management has become more and more important in EU and OECD countries and also in Estonia. Statistics of environmental taxes is useful and important for environmental policy and fiscal policy as well as for analytical purposes. Up to now environmental tax account was not compiled in Estonia. The need for the environmental tax statistics became with the implementation of the ecological tax reform (ETR) in 2005 then the need to monitor the effectiveness and impacts of this reform became apparent. One of the bases for the proposed monitoring was considered to be the environmental tax statistics account module.

The every year routinely produced “Report of the state tax revenues” in principal contains all environmental tax revenues, but only in the aggregated form mixed with other types of taxes. So, there is no possibility to easily distinguish total environmental tax revenues in State Budget in Estonia. Only revenues of fuel excise duty, packaging excise duty, heavy goods vehicle tax are shown separately in “Report of the state tax revenues”. All other environmental tax revenues are allocated under other different revenue types. The absence of all the basic data is the reason, why the pilot study of environmental taxes was carried out.

## **Pilot study on environmental taxes**

Pilot study was carried out in Statistics Estonia and focused on the environmental taxes in Estonia for the year 2007. Scope of the pilot project was to: give an overview on environmental taxes in Estonia; elaborate the methodology for the compilation of the environmental tax statistics account; produce statistics on environmental taxes by economic activities and propose the ways to measure the implementation of ecological tax reform.

In the first phase of the project data sources for the compilation of environmental taxes were investigated. The definition of environmental taxes given in the Eurostat’s statistical framework (2001) was used. Different data sources were used: administrative data of Ministry of Environment, Ministry of the Finance and Environmental Inspectorate; report of State Treasury, data of Estonian Traffic Register, data of Estonian Ship Registers, data of Estonian Aircraft Register and database of survey carried out in Statistics Estonia.

For each environmental tax the description with the overview of existing data was generated. For the first time methodology for the compilation of the statistics on environmental taxes in Estonia was developed and the Eurostat’s standard tables of environmental tax account were filled.

The main purpose of environmental accounting and environmental taxes account in particular is to give a tool for decision makers (politicians) in order to help them to make right decisions. This means that filled standard tables should be not only mathematically correct but also politically relevant (useful for decision makers).

As it was said earlier, one purpose of this project was that ETR started in 2005 in Estonia needed the monitoring tool and it was supposed that the environmental tax account is one possible tool for ETR monitoring. But in fact, it is the two way process: monitoring the ETR using the environmental tax accounting, we are testing the usefulness and limits of environmental tax accounting at the same time.

## **Ecological Tax Reform in Estonia**

The key principle of an ecological tax reform concept is a partial re-orientation of taxes from taxation of income to taxation of the use of natural resources and pollution of nature. The broader goal of the tax reform concept is to improve the competitiveness, support the economic development and reduce unemployment.

The principles of ecological tax reform in Estonia were approved at government cabinet meeting in 2005). The ecological tax reform concept states that the reform has to be planned like a package of different tax and other measures (for example subsidies) in order to maximize its impact. The reform does not take place overnight; it is a long process and has several stages. The rise of environmental taxes and charges must be done gradually so that reform measures will not damage the competitiveness of Estonia and will not result in a socio-economical disturbance. According to the document approved by government the implementation of the first stage of ecological tax reform is planned for 2005-2008, in 2006-2008 the effectiveness of the first stage is to be assessed and the second stage will be planned. The second stage of reform will be implemented in 2009-2013.

One of the aims of Estonian ecological tax reform is also that the overall tax burden (ratio to GDP) would not increase. Until the year 2004 income tax rate was 26%, in 2005 it was lowered to 24% and since then it has been decreasing 1% till 2008. The plan was to decrease the income tax to 18% up to the year 2011. Income tax reduction was stopped due to State budget cuts by Estonian government and global economic crisis in 2008. But the fuel excise duty has been further raised from 01.01.2008 onwards.

## **Monitoring of Ecological Tax Reform**

Effective monitoring is an important aspect of any tax reform. The monitoring of the Ecological Tax Reform should be able to provide decision makers with information for assessing the level of achievement of the reform goals, set by the Government. It is important that the monitoring of the Ecological Tax Reform covers all the charges and taxes that are stated by the Ecological Tax Reform proposal —energy taxes (fuel excise duty, electricity excise duty), transport taxes (on motor vehicles, heavy good vehicles, road use) as well as pollution and resource use charge (waste, water and air pollution, natural resources). It is often the case, that when discussing the environmental taxes, only emission charges and natural resource charges are included, but in reality these form only a marginal share of the environmentally related taxes revenue.

There is certain international experience in the field of applying environmental economic instruments like Estonian ETR. According to (OECD 2006) the main general issues to be monitored and evaluate are:

- **Environmental effectiveness** – the aim is to cause changes in consumption and/or production patterns. Relevant issues are who should change their behavior, by how

much and within which timeframe. The issue of tax exemptions and revenue mobilization are related to effectiveness as well.

- **Sectoral competitiveness** – what economic sectors and firms are affected negatively or positively from ETR. Here the impact is very wide within and between the countries and also market conditions in globalized world play crucial role. EU directives on harmonizing taxes on energy products as well as directives affecting environmental quality aim at leveling the playing field, but important differences and competitiveness concerns remain.
- **Income distribution** – direct effects of environmentally related taxes, and especially energy taxes, can have a regressive impact on income distribution of households, as shown by many studies. Studies also show that the degree of regressivity decreases once the indirect distributional effects and the environmental effects of the tax are taken into account. Furthermore, regressive impacts can be softened or removed by mitigation or compensation measures so, that net effect of the environmental policy can be even progressive.
- **Administrative costs** – administrative cost of environmental taxes can be very different depending on the number of tax payers, tax bases and additional non-environmental reasons, to address competitiveness or income distribution concerns.
- **Political acceptance** – is depending on the awareness of the environmental problem the instrument is designed to address and perceived fairness of the instruments towards competitiveness impacts and/or impacts on low-income households. It is also key to remind that sectors or stakeholders facing the negative effect are more effective in mobilizing against tax changes than wider group (economic sectors and poorer households) of beneficiaries from planned measures.
- **Combined impact with other instruments** – in addition to taxes and charges many other environmental policy instruments are used in parallel and in combination, as tradable permits, regulations, standards, labeling systems, subsidy programs for improving insulation of buildings, government support programs for environmental technologies, etc. Thus, monitoring the combined impact of those instruments is important.

According to the Ecological Tax Reform proposal, the main aim of the ecological tax reform in Estonia is to shift tax burden from labour to the use of natural resources and pollution, so it is crucial that the monitoring system reports on the state level the revenue from and the share of labour taxes and environmentally related taxes in total budget tax revenue. Such information is also necessary to mark the trend of the general tax burden.

Measuring the achievement of the Ecological Tax Reform goals on the household level, the analysis should be done, whether the importance of the environmentally related taxes has increased compared to income tax. The indicators should show whether the consumption has moved towards more environmentally friendly or less resources wasting.

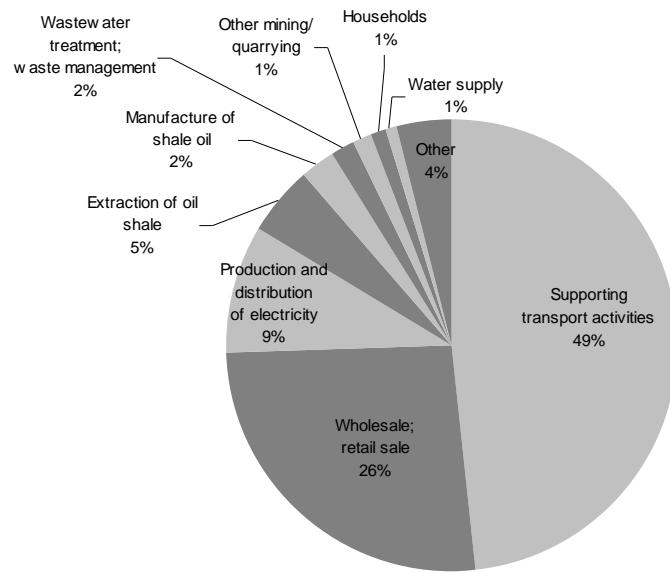
As a general principle, it was advised that the Ecological Tax Reform monitoring system fits the already existing economic and environmental monitoring or indicator system so that no extra monitoring burden is added.

Using indicators already in place helps to avoid unnecessary administrative burden of state offices such as ministries and Statistical Office, and companies, and therefore making the monitoring more effective.

## Limits of environmental taxes statistics

One of the aims of the project was to clarify how the statistics on environmental taxes could be used for the monitoring of environmental tax reform. The second related aim was to observe if the “polluter pays” principle is in place also in Estonia.

Figure 1. illustrates the results of dividing the environmental taxes between the different economical activities according environmental tax accounting standard tables.



We can observe from the figure 1 that the biggest sums of the environmental taxes are paid by two activities: wholesale and retail trade (NACE-codes 50-52) and supporting transport and tourism agencies activities (NACE-code 63). This is how the environmental taxes look from the tax revenue side. This approach for environmental taxes is useful to those who assign the tax, or who collect the revenue or those who deal with the claiming of the debts.

We could wrongly conclude from the graph that the biggest polluters are the sector of supporting transport activities and sector of wholesale and retail trade who just import the fuel. But as those are just the firsthand tax payers, who do not pollute, we can conclude that this approach is not suitable for deeper analyses. Unfortunately this is also the way how this tax is treated in national accounts supply and use tables.

In order to use the environmental tax accounting standard tables in order to decide if polluters pay additional reallocations of some particular environmental taxes should be done first.

## Reallocation of fuel excise duty

The first environmental tax, which should be allocated differently, is fuel excise duty. This is important because:

- Fuel excise duty is the biggest environmental tax and proper allocation of this has the major influence on deciding about environmental tax burden of different economical branches;
- Importers of the fuel, who pay the fuel excise duty to state, do not consume the fuel by themselves but sell this to others and add the excise duty to the cost;
- Fuel excise duty is paid by all fuel consumers

So we brought in the “end-payer” concept on the bases of the energy balance, who pays fuel excise duty indirectly and for whom the fuel excise duty is the real cost or burden. Doing so we not only reallocated the fuel excise duty between economical branches, but also introduced a new payer – households – who consumes part of the fuels and pays part of the fuel excise duty. In fact, it turned out, that households paid the biggest part (40%) of the fuel excise duty.

#### Reallocation of the waste disposal and wastewater pollution charges of specialised producers of environmental services

We can divide and group environmental taxes on the bases of various principles. According to economic criteria we can divide them to fees, charges and excises. Eurostat’s methodology divides environmental taxes according to their environmental impact and/or the kind of the “source sector”: pollution taxes, resource taxes, energy taxes, transport taxes.

One way of dividing of the environmental taxes is to look on “cashier” bases: who receives the tax: local budget, state budget, or “no one”? The latter is a case for example packaging excise duty.

One possibility is to group the environmental taxes as:

- general environmental taxes —in other words these are “everyone pays” environmental taxes like we interpreted the fuel excise duty;
- enterprise specific environmental taxes — environmental taxes, which are appointed to and accredited from a specific enterprises (for example pollution charges, mineral resource extraction charge, heavy goods vehicle tax which is accrued only from the enterprises, which own that kind of motor vehicle).

The “biggest” polluters who pay the majority of pollution charges are treatment of wastewater (in Estonia they are registered mainly under NACE-code 41) and waste management (NACE-code 90). This conclusion is inconsiderate or even not true: these two economic activities are the kind of activities who are specialised on environmental protection. If in case of other economic activities they pay environmental taxes because they have created pollution as a result of their production processes than these activities are specialised on cleaning up the pollution created by others. So we concluded that the pollution taxes paid by specialized enterprises should be also divided according to the real pollution generators and hence also “the real end payers”.

Still the situation with pollution charges especially waste water pollution charge is more complicated than in case of fuel excise duty. Some enterprises pay waste water pollution charge for waste water generated by themselves during their economic activities. Another

enterprises are only service providers and do not generate waste water of their own. But there are also the cases then enterprises deal and pay the charge for both wastewater generated by them and wastewater of their clients. So we divided the waste disposal and wastewater pollution charges into two parts: general and enterprise specific as it was described above. Pollution taxes paid by specialized enterprises was considered as general tax and was divided to the real pollution generators (clients of environmental service providers) according to quantity of generated waste and waste water.

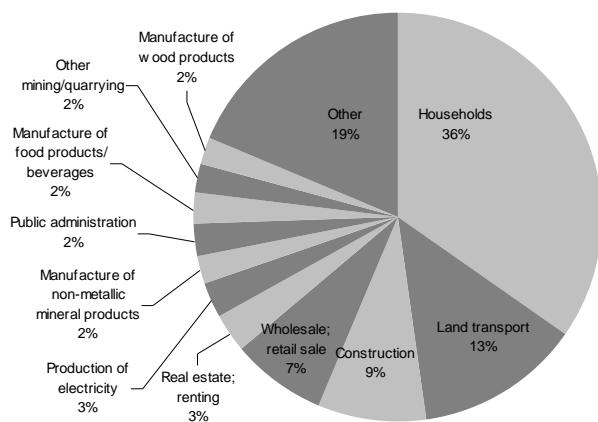
As it was in case of fuel excise duty also big share of pollution charges paid by specialized producers of environmental services was allocated to households.

#### Reallocation of the water abstraction charge of water supply service providers

Despite the fact that the water supply is not environmental protection activity according to CEPA (Classification of Environmental Protection Activities), we arrived on opinion that the water abstraction charge should be handled in the same manner as the as waste disposal and water pollution charges, apart and differently than other resource charges. So we reallocated the water abstraction charge according to the same logic as charges of other enterprises specialized on environmental protection.

Another reason for doing this was that water supply and wastewater treatment are quite often performed by same companies in Estonia. So, water abstraction charge was divided in two parts: into enterprise specific charge which is paid for self-supply and general charge paid for water supply to others. The general part of water abstraction charge was divided by clients according their water usage.

Figure 2 outlines payers of environmental taxes after the above described reallocation of some environmental taxes..



It is seen, that environmental tax burden is moved from the fuel importers mostly to the household sector, which paid 36% of environmental taxes, land transport sector (13%) and construction sector (9%).

## Special case of electricity production

The statistical guide of environmental taxes says “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.” (Eurostat 2001). In order to ensure the comparability of environmental taxes standard tables of different countries is important to follow the agreed scope of environmental tax statistics. But in order to use the environmental tax statistics for monitoring the Estonian environmental tax reform some country specific features should be considered.

After reallocation of fuel excise duty and waste disposal, wastewater pollution and water abstraction charges turned out that the highest share of the environmental taxes is paid by sector of production of electricity (NACE-code 40.1) and sector of extraction of oil shale (NACE-code 11), which together give 41% of all environmental taxes and 72% of the enterprise specific environmental taxes.

Both activities are connected to the electricity production from oil shale and one corporation is dominating in both of these activities. As this corporation is paying the majority of environmental taxes this corporation’s data should be handled separately. In Estonia 90% of electricity is produced from oil shale. Despite the fact that the production of electricity from oil shale is very polluting activity accompanied with the generation of huge quantity of waste (including 98% of hazardous waste generated in Estonia), the abstraction of the majority of groundwater (mining water) and the formation of lot of air emissions of various kinds, it is considered as an „unavoidable damage“, because there is no real alternative. Even more, production of electricity from oil shale has the political aspect also, as insures the energetically independence. From the one side production of electricity is more than economic activity of one corporation. From other side the corporation, which is a monopoly, is also in the position of dictating the price of products of this economic activity.

So, despite the fact, that pricing behaviour is outside the scope of environmental tax statistics, we transposed the environmental taxes from electricity producers to electricity users, because all environmental charges of monopolistic sector of electricity production are actually paid by the enterprises, households and other economic units, which use electricity. The energy balance of Estonia was used to allocate the environmental charges of energy production to respective economic activities proportionally to the use of electricity.

After reallocation of the environmental charges of energy production electricity production still contributes to the big share of environmental taxes connected to electricity production, but the biggest payers are trade sector (20%) and households (19%).

## **Problems occurred during compilation of environmental tax accounting standard tables**

Eurostat’s environmental tax definition is rather wide: “Environmental tax is a tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment” (Eurostat 2001). “Proven, specific negative impact of the environment” is a part of the tax description, which needs to be clarified broad. Otherwise even a value added tax can be considered as an environmental tax, because consumption can

be measured with physical units and consumption has a negative impact of the environment. Value added tax is excluded from environmental taxes according to the Eurostat's methodological guide. But unclear is how to handle the other similar taxes? For example land tax – is it an environmental resource tax?

Fines and compensation of damages related to the violations of environmental law are considered as environmental taxes according to the Estonian Fee Act. Question remains on classification of this tax, whereas there are components which can not be divided into tax categories. Not easily classified components are for example fines on hindering environmental inspection, fines related to the violations of requirements of environmental impact assessment or environmental monitoring etc. Our proposal is to add a new tax category for environmental fines.

One problem aroused with the substitution of the of environment taxes with environmental investments. According to the reform on ecological taxes approved by the government of Estonia on 7<sup>th</sup> of July 2005 the obligation to pay environmental charges may be substituted by an obligation to finance environmental protection measures if payer of pollution charge applies measures, which ensure at least a 15 % decrease in the emission of pollutants into the ambient air, the water body, groundwater or soil, or in the disposing of waste during a period of three years and, in comparison to the situation of the year preceding the period of application of the measures. The substitution of the of environment taxes with environmental investments could hinder the NAMEA type of the analyses as respective amounts of pollutants are not directly than related to environmental charges.

The same problem arises with the tax exceptions than some activities like fishery are not a subject of the fuel excise duty on diesel.

The handling of the CO2 quota is not clear from the viewpoint of the environmental taxes. We did not consider the CO2 quota in pilot study.

Shift in the time allocation of the data. The revenues of the state budget have the shift of one quarter.

The cross checking of the data provided by local governments and those available in state budget do not quite often match. The additional analysis and clarification are needed. State budget allocates environmental taxes under various categories, which are usually difficult to discover.

The aggregation of the economic activities (and also the sample designs of the survey behind it) of the energy balance is different from the one applied in Environmental tax account.

Big corporations consisting from many enterprises with different economic activities are handled differently in financial and environment statistics.

## **Feasibility of use of environmental taxes statistics for monitoring ETR**

It is not possible to judge only on the bases of the environmental taxes data if the polluter pays or is the environmental tax fair. In one hand we have to look how big the absolute value of the environmental taxes is but in another hand it is also important to look at the share of environmental taxes in total taxes, expenses and profit of a given economic activity.

In some cases despite the fact that environmental tax could be low compared to other activities, it could form a big part in given activities total tax burden. The changes in environmental tax rates could influence one activity more than others and in different ways.

The distributional analysis of environmental tax burden cannot be carried out on the bases of statistics in Environment Taxes Account alone. In order to be able to analyze the impact on economic sectors concerning tax shift from human resources and labour (income tax) to pollution and resource use (environmental taxes) the statistics on income taxes (employment numbers) should be included also. As Environmental Tax account allocates all environment related taxes according to economic sectors, this account is one of the components. This information should further be linked with: a) statistics on physical outcomes of resource use and generation of waste and pollution by NACE-categories and b) more financial information of the same sectors.

The most suitable data for assessing these goals are to a great extent already collected – emission levels, data on natural resource use, production of renewable energy etc. Information on environmental impact of energy production can be obtained when existing data on energy production and environment use is merged. Energy and resource intensity should be viewed separately for each economic sector or in some cases even on product class level, therefore some information could be needed in more detail than it is available at the moment.

Given, that the Ecological Tax Reform is expected to support the economic development, reduce regional distinction and create jobs in Estonia, by promoting competitiveness and improving economic effectiveness, reducing unemployment, improving environmental quality and protecting human health, as well as enhancing technological transfer, the monitoring system can include several macro-level indicators. These indicators are again mostly produced already; however, they need to be connected to Ecological Tax Reform.

But there are two fundamental problems connected with usage of existing statistics.

One problem is connected with the process of producing the basic statistics. Each statistical survey asks the data of previous year. It is so in case of data collection on environmental emissions, natural resources usage, survey on environmental expenditures and taxes, and also in the case of economical and social indicators. After end of data collection the period of data validation follows. The producing the macroeconomic parameters, formation of input-output and supply-use tables and calculation of value added by economic branches can start after basic data are collected and validated. Formation, validation and analysis of macro economical indicators needs some time also. As the result, there is the time shift at least 2-3 years between “events in real life” and their “reflection” in macroeconomical reliable statistical indicators.

Another problem is connected with economical operation of enterprises. One aim of the ETR was to force the enterprises to use the less polluting technologies. But the production processes of the economical branches can't be changed overnight or during the one year. Especially in cases of big companies with complex complicated technological schemes, the changes of technological processes needs longer period of investments and reorganization of production processes. The ETR gives the impulses for starting the process of environmental friendly changes, but the results of these changes (that is the reduction in pollutant emissions,

waste generation or usage of natural resources) will be seen in future. This creates the additional time delay before the influence of ETR will be seen in the statistical surveys.

This brings to the conclusion, that existing statistics may be used for monitoring the results of ETR in long time perspective and to analyse the influence of ETR on economy after its realisation. It is useful for deeper and comprehensive analysis how the ETR influenced on the economy some year after ETR implementation.

Existing statistics is suitable for looking up and analysis of longer period time series, but for the operational monitoring of the process of ETR the existing basic statistics is not suitable. For monitoring the process of ETR during its implementation and to quick evaluation of the current situation and having the bases for making the possible changes, the modelling has to be applied. These analyses need more advanced methodologies which of course should be supplemented with trustful and relevant statistical data.

We are also on an opinion that politicians need simpler and more easily “digestible” outcomes from statistics than the long tables of taxes by economic activities by tax types. The question also is, what matters in sense, what is relevant. We have to decide on which level and how operative information is needed and what is more important: the detailed comprehensive analysis of the situation with delay 3-4 years or quick rough analysis of present situation. Probably the both information should be available for decision makers.

## **Environmental tax burden of households**

Speaking about monitoring of the ETR usually the influences on economical branches are kept in mind. At the same time it is very important to analyse the influence of ETR on the households more deeply. As it was said, one principle of the ecological tax reform is re-orientation of taxes from taxation of income to taxation the use of natural resources and pollution of nature so that the overall tax burden remain the same – this means that the rise of environmental taxes and charges has to be balanced with decrease of income tax.

As we saw from the results of our pilot project, the households have the biggest burden of the environmental taxes. In order to measure the achievement of the Ecological Tax Reform goals on the household level, the analysis should be done, whether the importance of the environmentally related taxes has increased compared to income tax.

In Eurostat environmental taxes account standard tables the households are presented as one economical branch. Also in our pilot project we looked upon the households as on homogenous that is as if all households are similar and are influenced and acting in the same way. In fact the households vary differently from each other. More detailed analysis of influence of ETR on households where the groups with different income (deciles) inside the households have to be considered is needed. We suggest that more comprehensive investigation of influence of ETR on households should be the next step of monitoring of the ETR.

## **Conclusions**

Further development of monitoring system of ETR is important as the methodology to monitor ecological tax reform is still vague and the clear and well described methodology to monitor ecological tax reform is not available on international level also.

The integration between the statistics of economic factors and environmental pressures should be further developed. Up to now economic instruments and resource use and pollution generation are separate fields both in politics and statistics.

We are also on an opinion that politicians need simpler and more easily “digestible” outcomes from statistics than the long tables of taxes by economic activities by tax types.

The existing statistics may be used for monitoring the results of ETR in long time perspective and to analyse the influence of ETR on economy after its realisation. It is useful for deeper and comprehensive analysis how the ETR influenced on the economy some year after ETR implementation.

Further and more detailed analyses across longer time horizon are of course needed to understand the underlying reasons as well as to see whether increasing environmental taxes do have impact on environmental quality and resource management. The continuation of the compilation of this statistics is important, as time series are crucial to monitor the trends and evaluate whether the ecological tax reform policy is achieving the goals.

We think that the modelling have to be applied in order to monitoring the process of ETR and to make the prognoses for the future. These analyses need more advanced methodologies which of course should be supplemented with trustful and enough detailed and relevant statistical data.

Households' environmental tax burden from the viewpoint of ecological tax reform has to be analyzed in more details. Not only Estonian economy but also the export and import, analyzes of the share of environmental taxes in products of different economic activities etc. have to be taken into account.

The environmental tax account is useful tool for monitoring the ETR, but the scope of ETR is wider:

- At present we concluded that the Eurostat's standard tables on taxes are too simplistic and do not enough detailed bases for environmental economical tax analyses. In order to focus on sectors that really pay the tax the reallocate several of the taxes (fuel excise duty, environmental taxes on electricity production, and pollution charges of waste and wastewater treatment service providers) on those who really have to pay these taxes in the standard tables were proposed.
- Price elasticities and pricing behaviour are outside the scope of environmental tax statistics, but for purposes of monitoring the ETR the hidden taxes under the variety of the products prices and the elasticity of the products prices should be considered.

The revealing of the tax burden is complicated and asks for additional statistical methods to be elaborated.

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