

# Revenues from Environmental Taxes, with Emphasis on Pollution Taxes during the Corona Crisis

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## Abstract

Improving the quality of the environment and reducing its pollution should be a global priority. Many countries are developing their environmental policies and trying to achieve their objectives through a variety of instruments. This paper highlights the application of economic instruments of environmental policy. It focuses on the analysis of environmental tax revenues in the European Union and in Slovakia, with a focus on the period of the Covid-19 pandemic. It then focuses on the analysis of a specific pollution tax in Slovakia, highlighting the factors that influenced its level.

**Keywords:** environment taxes, stimulating effect, fiscal effect, pollution taxes, European Union, Slovakia, pandemic Covid-19

## Introduction

The environment is the basis for the existence of life, it is the space in which we live, which surrounds us and from which we get everything essential for our lives. Its quality affects not only entire ecosystems but also our health and well-being, which is why it is important to pay adequate attention to the quality of the environment.

Environmental policy and protection of the environment targeting the reduction of environmental burdens is therefore part of both national and transnational economic policies. European environmental economics aims to protect, preserve and enhance the EU's natural capital, to move towards a low-carbon, green and competitive resource-efficient economy, and to protect EU citizens from environmental impacts and risks to their health and well-being.

Economic instruments play an important role in its application. They serve to address the restoration and maintenance of a quality environment and are instrumental in addressing environmental problems. Their environmental effectiveness lies primarily in the reduction of negative environmental impacts and environmental damage. They can take the form of environmental payments, contributions, deposit refund schemes or coercive measures. The presented paper focuses on the analysis of environmental taxes that are part of environmental payments.

## 1. Environmental taxes and their effects

Environmental taxes are intended to influence the behaviour of individual actors in favour of the environment protection. According to Regulation (EU) No 691/2011, an environmental tax is a tax based on a physical unit (or a substitute for a physical unit) of something that has a proven negative impact on the environment.

According to Romančíková (2011, p. 55), environmental taxes are taxes related to the environment, which she divides into two categories: taxes with an embedded eco-regulator, which in their nature correspond to consumption taxes (they limit production and consumption, which is associated with a negative impact on the environment), and secondly, emission taxes, which tax emissions that arise as a by-product of the production process and worsen the quality of the air, water, soil.

To impose environmental tax, the objectives are (Al-Saadi, Rabia Attallah, 2011):

1. Ensure a healthy environment for every person in the community, being stipulated in various laws.
2. Motivate producers and consumers not to deal with pollutants or their pollutants.
3. Obtain financial resources that help in achieving development and reducing the public budget deficit.
4. Apply the principle of polluter paying to protect people from the manifestations of pollution.
5. Lead the taxpayer to work on decontamination, as legal procedures alone are not sufficient to deter violators.

The application of environmental taxes implements one of the basic principles of environmental policy "Polluter pays" and, as stated by Cech (2015), is charged for each unit of pollution. These taxes are applied with the intention to incentivise polluters to reduce environmental pollution, for example to reduce emissions, waste or wastewater. In order to act, in the sense of economic theory, as an incentive to polluters, their optimal level should be derived from the amount of marginal cost needed to reduce a unit of pollution (Floreková, Čuchranová, 2001).

Besides, as stated by (Tchórzewska et al., 2022) low levels of environmental taxation are not sufficient to incentivise the adoption of green technologies or the diffusion of green investments. Also, Csikosová et al. (2019) states that environmental taxes should primarily influence the behaviour of polluters in the direction of introducing eco-innovative activities and towards the implementation of eco-innovative practices that have a positive impact on the environment.

It is important to realize that if taxes are low, they will not be able to sufficiently influence the decision-making of economic subjects to reduce pollution and will rather become a source of public revenue (Pavel, Slavíková, Jílková, 2009). Ayes, Mohsen (2019) states that they

generate a "double dividend", on the one hand they absorb pollution externalities and improve environmental quality and on the other hand they increase budget revenues. This reflects their fiscal function. Environmental taxes are mostly in the nature of excise duties and their positive feature is also that they limit unwanted production and consumption, by making goods more expensive, which leads consumers to buy another product (substitute) that is more environmentally friendly (Hranaiova, 2004).

The term 'environmental taxes' can be interpreted as referring to taxes with an environmental rather than a fiscal motivation and therefore it is also appropriate to use the term 'environment-related taxes' (European Commission, 2013).

There is evidence of a positive effect of environmental taxes in terms of reducing environment pollution in economically developed countries; on the other hand, environmental taxes have been confirmed to reduce the performance of economic activity due to distorting effects on production and consumption (Miceikiene et al., 2018). Increasing environmental taxes must not exceed a certain economically feasible level that could mean stopping economic growth (Cech, 2015).

Environmental taxes are seen as a key tool to promote sustainable development and among their main benefits are that they internalise negative externalities, support energy conservation and the use of renewable resources, discourage non-environmental behaviour, motivate companies to innovate in sustainability, generate revenue for governments and help protect the environment.

An environmental tax is said to be effective if it has the effect of improving the quality of the environment. In economic terms, this is the case if, at the same time as the polluter's production costs are reduced, emissions are also reduced. Also, Cech (2015) states that the effect of environmental charging is that entities then treat pollution as another input they use in production or consumption in order to achieve minimum costs. This leads to emission reductions by changing technology, materials, installing eco-technology, recycling and so on.

## **2. Objective and methods**

The objective of the paper is to analyse the evolution of environmental tax revenues in the EU and Slovakia, with the intention of drawing attention to their status during the Covid 19 pandemic. The paper focuses on the assessment of total environmental taxes and then on the individual types of environmental taxes, with the most attention being paid to pollution taxes.

For the purpose of the analysis, data from Eurostat and the Statistical Office of the Slovak Republic were summarised and subsequently analysed. In the statistics on environmental taxes, the ESA2010 definition of taxes is applied, i.e. that it is a tax based on a physical unit (or a substitute for a physical unit) of something that has a proven negative impact on the environment. For statistical purposes, the following groups of taxes are tracked and

evaluated (as defined in EU Regulation 691/2011) - energy taxes, transportation taxes, pollution taxes and resource taxes, which have also been the subject of the analysis in this paper.

The Statistical Office of the Slovak Republic provides the following definition in accordance with the European Commission Regulation:

*Energy taxes* include taxes on energy products used for transport purposes (petrol and diesel) and also used in stationary sources (fuel oils, natural gas, coal and electricity). It also includes taxes on biofuels and other forms of renewable energy and taxes on CO<sub>2</sub>. In Slovakia, these taxes include taxes on mineral oils, electricity, coal, natural gas, a green energy tax, a tax on electricity consumption intended for the decommissioning of nuclear installations, a tax on the location of nuclear installations, a tax on payments for the storage of gases and liquids, and emission allowances.

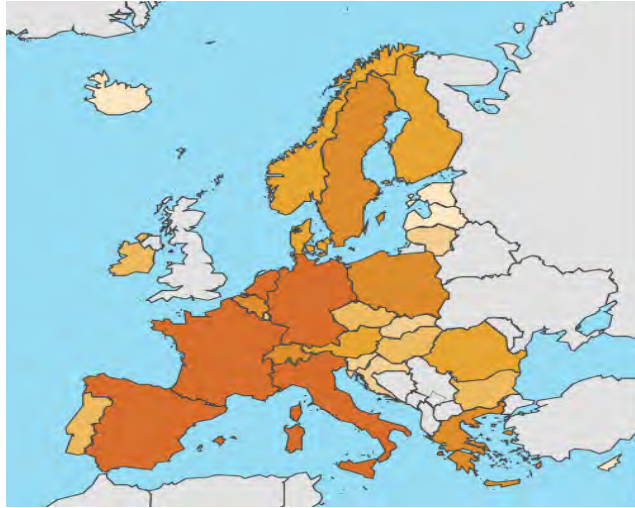
*Transport taxes* include taxes related to the ownership and use of motor vehicles, including taxes on other means of transport such as aircraft. In Slovakia, this includes road tax, motor vehicle registration fee and tax on the entry and stay of a motor vehicle in a historic district.

*Pollution taxes* include taxes on water and air emissions, waste management and noise. In Slovakia, this includes charges for the discharge of wastewater into surface waters, air pollution charges and a tax on the payment for quarrying space.

There is also a category of resource taxes, which include taxes related to the extraction or use of natural resources, but in Slovakia we do not include any taxes in this category.

### **3. Analysis of environmental tax revenues in the EU and Slovakia**

The analysis starts by showing the current situation of the level of environmental tax revenues in the individual countries of the European Union (Figure 1). Subsequently, attention is paid to the analysis of the development of total environmental tax revenues as well as the development of revenues from individual types of environmental taxes over the last 10 years in the European Union and in Slovakia.



**Figure 1: EU environmental taxes in 2022**  
Source : Eurostat

The map shows environmental tax revenues in 2022 in EU Member States. The darker the colour of the country, the higher the environmental tax revenue. Germany, Italy and France are also in the top three positions for the previous period. In contrast, the last positions have long been occupied by Liechtenstein, Malta and Iceland. If we look at the different types of taxes, the results of the comparison are shown in the following table.

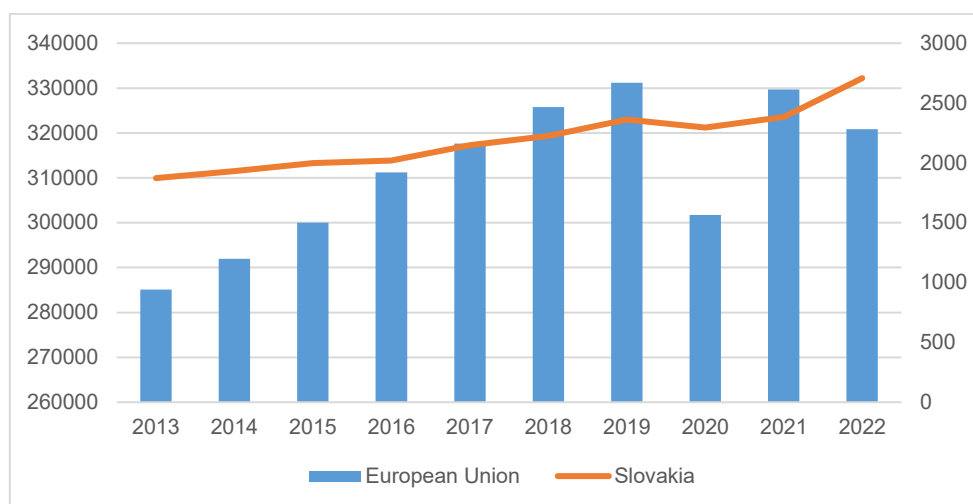
**Table 1: EU countries with the highest and lowest environmental tax revenues**

| Data type       | Countries with the highest environmental tax revenues | Countries with the lowest environmental tax revenues |
|-----------------|---|--|
| Energy taxes    | Germany<br>Italy<br>France                            | Iceland<br>Malta<br>Liechtenstein                    |
| Transport taxes | Italy<br>Germany<br>Netherlands                       | Czech Republic<br>Estonia<br>Liechtenstein           |
| Pollution taxes | Netherlands<br>France<br>Spain                        | Luxembourg<br>Germany<br>Liechtenstein               |

Source: based on Eurostat data

In the last ten years, Slovakia has been ranked 20th in total environmental tax revenues (only in 2022 it dropped to 21st place). Looking at individual tax types, for energy taxes the ranking is the same as for total environmental taxes, for transport taxes Slovakia is mostly in 21st place, with the exception of the so-called covid years, where there was a drop to 22nd place. Most changes can be observed in pollution taxes. In 2013 we were ranked 20 and in the last assessed year 2022 we were ranked 21. The years in between have been variable, mostly were 23rd ranked, except for the covid years where we dropped to 24th rank.

The following figure shows the evolution of environmental tax revenues over the last ten years in the European Union and Slovakia.



**Figure 2: Evolution of total environmental tax revenue in the EU and the SR**  
Source: based on Eurostat data

The figure shows that environmental taxes have been rising steadily in the EU, and at a much faster rate than in Slovakia. The change was recorded in the first year of the coronacrisis. In 2020, there was a decline of less than 9 per cent in the EU, and in Slovakia these revenues fell by less than 3 per cent. The following table provides a data overview of revenues from different types of environmental taxes. The data representing the highest values for each tax are highlighted and the first year of the corona crisis is marked in red.

**Table 2: Revenue from environmental taxes (Million euro)**

| EUROPEAN UNION                 | 2013       | 2015       | 2016       | 2017       | 2018       | 2019       | 2020       | 2021       | 2022       |
|--------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Energy Taxes                   | 221 477.2  | 232 330.51 | 241 869.13 | 246 626.77 | 252 784.04 | 257 571.26 | 233 255.12 | 258 670.64 | 248 386.16 |
| Transport Taxes                | 53 622.4   | 56 740.08  | 58 429.41  | 59 936.27  | 61 954.09  | 62 543.49  | 57 419     | 59 231.81  | 60 104.29  |
| Taxes on Pollution / Resources | 10 020.85  | 10 949.37  | 10 936.37  | 11 080.71  | 11 052.36  | 11 092.44  | 11 060.2   | 11 818.56  | 12 333.38  |
| Environment Taxes              | 285 120.45 | 300 019.96 | 311 234.91 | 317 643.75 | 325 790.48 | 331 207.19 | 301 734.32 | 329 721.01 | 320 823.83 |
| SLOVAKIA                       | 2013       | 2015       | 2016       | 2017       | 2018       | 2019       | 2020       | 2021       | 2022       |
| Energy Taxes                   | 1 642.28   | 1 762.18   | 1 773.7    | 1 897.15   | 1 965.02   | 2 099.75   | 2 068.22   | 2 153.4    | 2 472.86   |
| Transport Taxes                | 198.49     | 203.9      | 213.51     | 223.29     | 232.57     | 233.09     | 200.16     | 203.5      | 207.68     |
| Taxes on Pollution / Resources | 31.94      | 31.47      | 32.14      | 28.59      | 28.59      | 28.69      | 25.91      | 25.8       | 27.22      |
| Environment Taxes              | 1 872.7    | 1 997.55   | 2 019.35   | 2 149.02   | 2 226.18   | 2 361.53   | 2 294.29   | 2 382.69   | 2 707.77   |

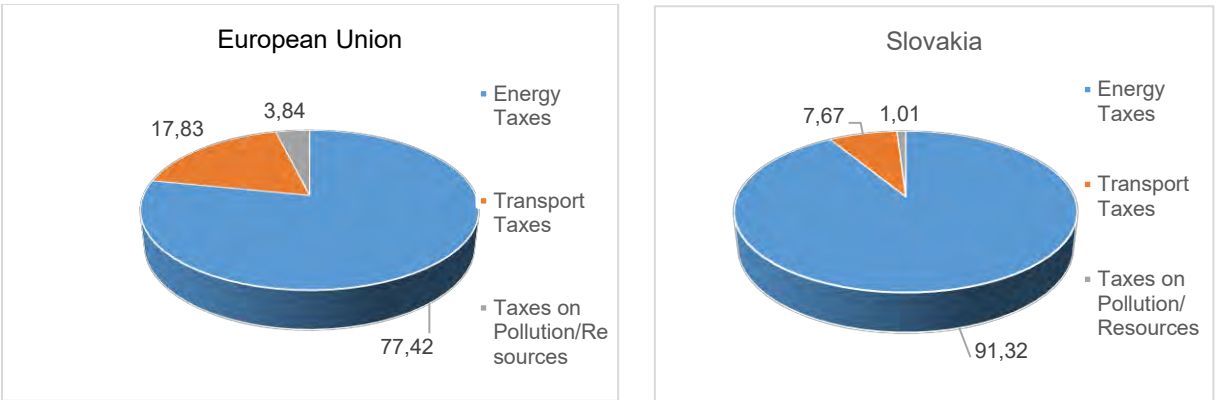
Source: based on Eurostat data

In 2020, all environmental tax revenues fell. In the EU, energy taxes dropped the most by 9.44%, while in the SR the highest drop was in transport taxes, by 14.13%. In the second covid year, 2021, these revenues were already increasing again, except for one type of tax in Slovakia. Pollution taxes showed a further decrease of 0.42%. This type of tax is the only one in Slovakia that has decreased by 14.78% since the base year. The following figures also illustrate how revenues from different types of environmental taxes have evolved over the ten-year period in the European Union and in Slovakia.



**Figure 3: EU and national environmental tax revenue trends**  
Source: based on Eurostat data

The following graphs show the structure of these types of environmental taxes and are shown for the year 2022. It is clear from the graphs that the percentage of each type of tax varies. If we compare this structure with the base year 2013, we would see that there are only small changes in decimal numbers for the EU. In Slovakia, the change in the structure is larger. In 2013, energy taxes accounted for 87.7%, transport taxes for 10.6% and pollution taxes for 1.7% of total environmental taxes.



**Figure 4: Structure of revenues from individual environmental taxes in the EU and the SR in 2022**  
Source: based on Eurostat data

The information presented so far indicates that revenues from pollution taxes in Slovakia have been declining over the years and their share in total environmental tax revenues is the lowest, at only 1%. At the same time, these are taxes where Slovakia ranks lower than in other Member States, as in the case of energy or transport taxes. Therefore, further attention is paid to pollution taxes.

#### 4. Analysis of pollution taxes in Slovakia

Pollution taxes in Slovakia consist of three types of environmental payments: fees for the discharge of wastewater into surface waters, fees for air pollution, and payments for quarrying space. The following table shows the values of these taxes in Slovakia over the last five years.

**Table 3: Taxes on Pollution/Resources (Million euro)**

|                                     | 2018  | 2019  | 2020  | 2021  | 2022  |
|-------------------------------------|-------|-------|-------|-------|-------|
| Fees connected with water pollution | 15.86 | 17.11 | 16.97 | 17.04 | 17.22 |
| Fees connected with air pollution   | 12.19 | 11    | 8.56  | 8.49  | 9.7   |
| Tax on excavation areas             | 0.5   | 0.6   | 0.4   | 0.3   | 0.3   |
| Pollution taxes                     | 28.59 | 28.69 | 25.91 | 25.8  | 27.22 |

Source: based on Eurostat data

The highest proportion of these taxes is for the discharge of wastewater into surface waters. However, the changes from year to year are not significant. Attention is therefore next turned to air pollution charges, which have fallen significantly in the covid years.

The quantity of emissions, the basic emission rate and other coefficients (the compensation coefficient and, before 2023, the emission limit coefficients) enter into the calculation of this charge. This charge is currently regulated by Act No 190/2023 Coll. on air pollution charges. However, in the period analysed, the calculation of this charge was regulated by Act No 401/1998 on air pollution charges. The Act states that the air pollution charge is payable by legal entities and natural persons authorised to conduct business who operate large, medium and small sources of air pollution. The pollutants to be charged for are indicated in the table below.



**Table 4: Basic Charges for Emissions from Large and Medium-sized Pollution Sources**

| Issue (fee in EUR/t)  | Basic fee according to Act No 401/1998 | asic fee according to Act No 190/2023 |
|---|--|---------------------------------------|
| Particulate pollutants  | 165. 9595                              | 330                                   |
| Sulphur oxides expressed as sulphur dioxide                           | 66. 3878                               | 130                                   |
| Nitrogen oxides expressed as nitrogen dioxide                         | 49. 7908                               | 100                                   |
| Carbon monoxide   | 33. 1939                               | 60                                    |
| Organic substances in the gas phase expressed as total organic carbon | 132. 7756                              | 260                                   |
| Ammonia   | -                                      | 60                                    |

Source: based on the Air Pollution Charges Act

The method of calculation is different for large and medium pollution sources than for small pollution sources, which fall under the delegated competences of municipalities. Since the data showed a decrease in the air pollution charge (Table 3) and the charging rates for individual pollutants were not changed at that time, the following table gives an overview of what the emissions for each pollutant were in the years analysed.

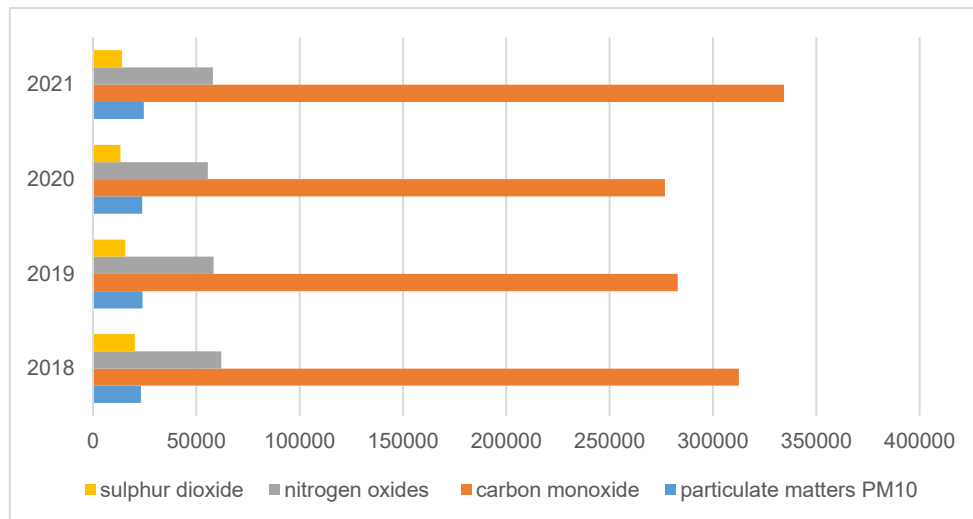
**Table 5: Amount of Selected Air Pollutants (Tonne)**

| Emissions of pollutants  | 2018      | 2019      | 2020      | 2021      | 2022     |
|--------------------------|-----------|-----------|-----------|-----------|----------|
| Particulate matters PM10 | 23 213.7  | 23 904.3  | 23 818.5  | 24 554.6  | No datas |
| Carbon monoxide          | 312 589.9 | 282 952.5 | 276 770.2 | 334 393.8 |          |
| Nitrogen oxides          | 62 140.8  | 58 382.8  | 55 617.3  | 58 035.6  |          |
| Sulphur dioxide          | 20 264.71 | 15 613    | 13 211.9  | 14 127.9  |          |

Source: based on data from the Statistical Office of the Slovak Republic

The data show a decrease in air emissions for each pollutant. The largest decrease was for sulphur oxides, by 15.37 %, while the lowest decrease was for PM10, by only 0.35 %. The data are illustrated in Figure 5.

The lowest emission values were found in the first year of the pandemic Covid 19. This was a period in which there was a significant restriction of movement and a slowdown in economic growth, which had a negative impact on economic indicators. However, from an environmental perspective, the downturn in economic activity has yielded positive results. This can be seen in the decrease in all the air pollutants presented.



**Figure 5: Emissions of Pollutants in Slovakia**

Source: based on data from the Statistical Office of the Slovak Republic

Air emissions are the result of both industries and households and come from both stationary and mobile sources of pollution. Looking separately at total industrial emissions, they have fallen in 2020. Industrial production, mainly focusing on metals and metal structures, was the largest contributor, with transport also contributing in the case of nitrogen oxides. If we consider emissions from the household sector, the main contributor was heating, with a difference only for nitrogen oxides, where transport emissions accounted for the highest share.

## Conclusion

The paper was oriented towards the analysis of revenues from total environmental taxes as well as from individual types of environmental taxes. The results show that revenues from environmental taxes are increasing year by year, both in the European Union and in Slovakia. However, Slovakia is one of the countries at the bottom of the European ranking in terms of the level of environmental taxes. This is due to relatively low charging.

The exception to the annual increase in environmental tax revenues was the period of the covid, when there was a decline. This was due to a reduction in the movement of people and a slowdown in economic activity, but this can be seen as positive for the environment. Covid measures have led to improvements in many environmental quality indicators. The paper has shown this in the case of pollution taxes, where we have shown, using Slovakia as an example, that the state of the air improved during the pandemic, with a reduction in all the pollutants mentioned.

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