

# THE ROLE OF ECOLOGICAL TAXES IN SUSTAINABLE DEVELOPMENT AND SUSTAINABLE ECONOMY

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***Abstract:** The role of a state is of key significance for implementation of sustainable development. It collects funds that will enable realization of the concept of sustainable development by means of various instruments. The most common instrument for collection of funds is ecological taxes. This paper indicates the significance, elements, advantages and disadvantages of ecological (green) taxes and it describes the emergence of this fiscal instrument that required a tax reform. The concept of negative external effects is also explained in this paper, as well as the ways of finding a solution for this phenomenon. Arthur Pigou, a „father of ecological taxes”, recommends internalization of external effects.*

***Keywords:** ecological (green) taxes, sustainable development, sustainable economy, fiscal revenue*

## 1. INTRODUCTION

In addition to clear strategy, strong will and commitment, significant funds are necessary in order to realize the concept of sustainable development. All that is “green”, whether technology, machines, products or services, is usually more expensive as ecologically friendly production implies higher costs. The state wants to collect these funds in some way, whether from manufacturers or from customers.

Regardless the type of tax, it implies payment to the state that is not followed by any counter service and that is not voluntary. This kind of financial transfers is paid to the state by tax payers who belong to a certain tax administration. The aim of introducing a tax is state budget and local government financing. This is the most important source and way of collection of money by the state, as it could not function without this fiscal revenue. From this revenue, the state finances common needs and public wealth (defense, justice, education, culture, health care, infrastructure etc.). Essentially, fiscal revenues that are collected in this way are

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used for payment of various expenditures in accordance with economic and social goals of the state. The character of a tax is determined by functioning of the tax rate. The tax rate can be (Stiglitz, 2004, 457-579):

1. Proportional (tax rate does not change if the income changes)
2. Progressive (tax rate follows the income growth)
3. Regressive (tax rate is reduced by the income growth).

The aim of ecological taxes is collection of funds for the state budget as a result of non-ecological behavior of the manufacturer that caused environmental degradation or for goods whose usage causes the so-called “negative external effects”. Ecological taxes are especially significant. Not only do they provide the state income, but they also affect the connection of social and private benefit, which results in improvement of economic efficiency and achievement of sustainable economy (Musgrave, Musgrave, 1989, 7-9).

There is no uniform definition of ecological taxes. International institutions, such as OECD and European Commission, consider this type of tax from the point of view of the tax base. In this respect, ecological tax is each tax whose tax base is expressed in physical amounts of substance or some process that cause negative externalities (Petrović, 2016, 97-109). Although there is no uniform definition, it is possible to determine which tax is ecological based on its concrete usage. The revenues collected by the state on the basis of this tax should be directed to environmental protection or financing of projects that are directly connected with improvement of environmental quality or protection.

In addition to ecological taxes, there are also other forms of environmental protection where the role of the state is very important. These taxes could not even be introduced without a systematized and organized approach. The role of the state is to provide equal conditions for life and work to population and future generations, in accordance with the definition of sustainable development itself. By signing, and more importantly, respecting the signed conventions, agendas and strategies, as well as by adopting and applying the national strategy for sustainable development and the laws originating from it, the state shows that it respects the principles of sustainability (Munitlak Ivanović et al, 2013). In modern jurisdictions, the right on preserved environment is realized by combining or applying one of the following instruments:

1. Ecological penalties and taxes;
2. Subsidies for manufacturers in order to reduce pollution;
3. Transferable licenses for pollution and trading with this right;
4. State regulations.

The above mentioned economic instruments have their specificities, characteristics, various results for reallocation of resources and different calculation of ecological costs. Because of this, each of the above mentioned instruments has a different redistributive effect.

## **2. THE EMERGENCE OF ECOLOGICAL TAXES**

The term “external effects” or “externalities” was used for the first time by the welfare economics theoretician, Arthur Pigou, who also set basic standards of the theory of externalities. As a welfare economics theoretician, Pigou advocated the introduction of a tax instrument for preservation of the environment since 1912 (Pigou, 1918). In his capital work “Wealth and Welfare” Pigou dealt with the issues of external effects, setting a basis for standards of the theory of externalities. At the same time, Pigou suggested market prices that included the cost incurred by environmental pollution (in addition to private cost). He called this system of calculation and understanding of costs “internalization of external effects” (Filipović, 2004).

Some authors, like Meade (1955), Geoffrey, Buchanan (1980) and Pearce (1991), joined this idea of understanding of costs and ecological tax. These authors advocate the attitude that ecological tax could correct market imperfection and limitation as a result of the external action. Geoffrey, Buchanan (1980) determined the strength of tax introduction. A decade later, Pearce opened this issue again, dealing with the role of tax on CO<sub>2</sub> (Piljan et al, 2017). In this way, the sense of introducing ecological taxes was explained: bearing the consequences for environmental pollution resulting from economic activities (production or consumption).

Stiglitz (2004) points out that introduction of penalties for pollution and pollution taxes bring a double dividend. The double dividend is reflected in the following: fiscal revenues increase due to collected penalties and taxes and the state can reduce other taxes (capital taxes that disturb savings and labour taxes that disturb work). Another significant characteristic of these taxes and penalties is that their introduction causes the increase of ecologically acceptable production.

## **3. ECOLOGICAL TAXATION ARGUMENTS**

No economic or any other instrument is perfect. A special problem is reflected in the economic-ecological relationship. The traditional way of production involves the need for more raw materials and more (mostly) non-renewable energy for a higher volume of production. According to Vojinović (2017) “Renewable energy

sources are energy sources that come from nature and can be renewed. Today it is increasingly used because of its harmlessness to the environment”.

Restrictions on environmental taxes are diverse and can affect various business entities. Ecological tax can have a regressive effect, since this kind of tax is the most threatening to the population with lower income. This type of tax affects competitiveness. Different industries have been affected by this, because ecological tax is added to the prices of these products and services, thereby reducing competitiveness. Instead of paying taxes on the cause that led to the creation of the externality, the consequences of the actions that caused them are taxed, which is not the goal. The aim of the ecological tax is to improve the quality of the environment. When harmful effects arise from the activities of a large number of pollutants, the situation is even more complex, because it is not possible to determine the individual share of each actor in the emergence of the negative externality.

The economy of the new era has a tendency to become "green" with "green finance", "green banking", "green technologies", "smart homes" and the like. Dominant neoliberal economic practice has largely exhausted the possibilities for wider consideration of environmental problems. It is particularly necessary to take into account the problem of irreversibility of money capital, or its inability to convert to natural capital (Dražković, 2012).

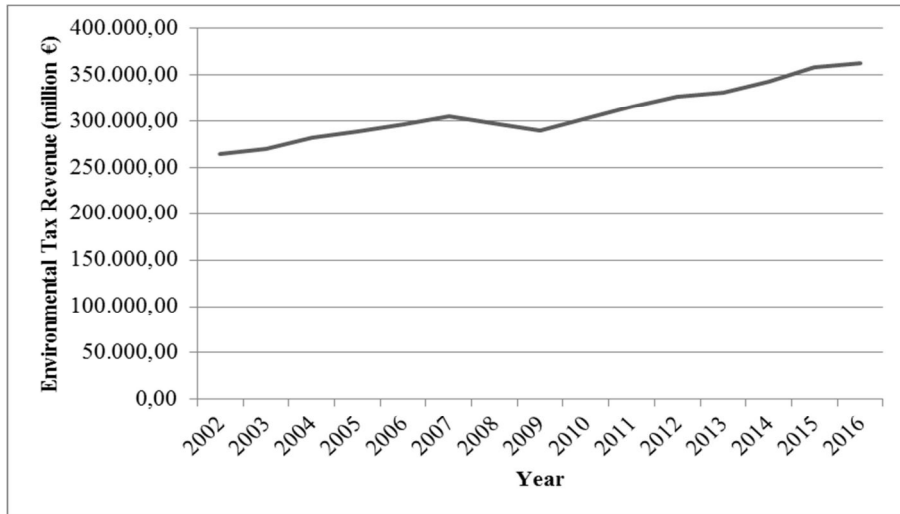
#### **4. THE SIGNIFICANCE OF ECOLOGICAL TAXES**

In 28 member states of the European Union (EU28) even 90% of public revenues are collected through taxes. Ecological taxes, as a relative type of taxes, required the reform of the tax system. Such reform was first done in Scandinavian countries. The aim of the tax system reform due to introduction of ecological taxes is to preserve the environment and implement the concept of sustainable development using fiscal instruments. In order to keep tax burden relatively unchanged, the application of ecological tax should be followed by reduction of the percent of burden through other tax forms at the same time. The taxes that should be reduced are those related to labour (earnings). In order to keep fiscal revenues unchanged, reduction of taxes related to earnings should be directed to activities that should be disturbed, as they result in negative external effects, i.e. they pollute the environment, or these activities should be modernized by introduction of clean technology (“green” technology), use of other raw materials and energy sources.

Total environmental tax revenues have an increasing trend in absolute numbers in the EU28, over the period 2002-2016 (Figure 1). The trend increases throughout

the whole period, except 2007-2009, where a decrease is evident, due to the consequences of the Global financial crisis.

**Figure 1: Total environmental tax revenues in the EU28 (2002-2016)**



Source: Eurostat, Total Environmental Tax Revenues, the EU28, available at: <http://ec.europa.eu/eurostat/data/database>

In addition to their significance as the state revenue, ecological taxes also have a special goal: reduction or neutralization of negative external effects. An economic activity that results in negative external effects has the difference between social costs (incurred in the environment) and private costs (manufacturer's costs) as a side effect.

In a part of the paper related to the history of ecological taxes, Arthur Pigou was mentioned as the first theoretician of this type of tax. He considered that the market is not automatically perfect and advocated the intervention of state in this field. Pigou thought that the role of the state is to ensure such market prices (of the activities and products that cause a negative externality) that will correspond to social cost. In this way, the society would be protected from the liabilities resulting from externalities, and the cost of pollution would be included in the price of the products or activities that caused this externality. Pigou called this type of calculation "internalization of external effects" (Munitlak Ivanović, Golušin, 2012, 83-98).

One way of internalization of external effects is the introduction of ecological taxes that burden the unit of the product caused by that product (Munitlak Ivanović et al,

2014, 377). In this way, taxes per unit of product and costs of pollution per unit of product are equalized. As a result of such calculation, production will be limited to what is necessary on the market, and, on the other hand, the company will be encouraged to produce “socially acceptable” level of pollution. A green tax rate that is defined adequately helps the company to realize real total costs incurred by economic activity. The task of “green” or ecological taxes is to calculate social costs in addition to private costs. Assuming that the amount of environmental damage is proportional to the production volume and that marginal costs of each unit of damage are always fixed, private and social costs will be equalized by introduction of a fixed fee in the form of ecological tax per unit of product (that is equal to marginal costs of pollution).

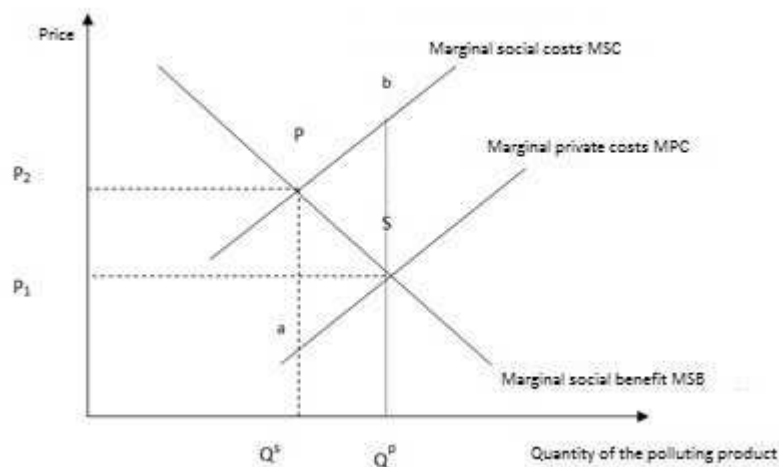
In this way, social costs incurred by the activities of the business entity will not be transferred to the society, but calculated in the price of products manufactured in such way.

Generally, the demand curve indicates marginal benefit of the manufacturer during the production of a marginal unit of product. The supply curve indicates marginal costs of production of the additional unit. In the intersection of two curves, the demand curve and supply curve respectively, limit benefit is identical to limit costs of production of the output. If production caused negative externalities, the supply curve does not show social costs, but costs borne by manufacturers. If pollution is increased due to production, the increase of production volume incurs real costs. These real costs are higher than the costs of production. Manufacturers do not calculate costs of pollution, unless they are forced to. This deviation between private and social costs leads to inadequate production volume and resource consumption. Therefore, it is important to observe a “wider picture” when estimating the benefit of increase of production and take into account external effects, i.e. total additional costs (private costs and social costs – pollution). In this case, when it comes to such calculation, market balance is achieved when socially efficient level of production is lower than privately optimal level of production.

Figure 2 shows the difference between social and private costs. The difference between the levels of optimal production is noticeable in this Figure. It depends on the fact whether the needs originating from market demand are taken into account or not.  $Q_p$  takes into account only private limit costs unlike  $Q_s$  which takes into account socially justified demand. The Figure 2 shows two equilibriums, private  $P$  and social  $S$ . The point of intersection of real social marginal benefit and private marginal costs determines the desired level of production of the company  $Q_p$ . This level of production does not correspond to social standpoint, as the manufacturer makes external cost. However, manufacturer does not take into account the costs

borne by other entities. Point  $Q_s$  is a level of production that corresponds to the society. At this point, marginal social benefit is equal to marginal social costs. For this reason, the position of point  $Q_s$  is at lower level than the position of point  $Q_p$ . The change of production volume between points  $Q_p$  (market balance) and  $Q_s$  (efficient production volume) will result in change of prices  $P_1$  and  $P_2$ . Moving equilibriums from point  $S$  to point  $P$  results in losses of manufacturer and customer's surpluses. These surpluses are shown by the area of the triangle formed by connecting points  $a$ ,  $S$  and  $P$ . Ecological engagement, that will result in general increase of welfare, is marked with the surface formed by two triangles that are obtained by connecting points  $aSP$  and  $bSP$ . However, in practice, companies often do not bear external costs. They are transferred to the whole society. This is why companies increase production over the limit of social justification of the level of production.

**Figure 2: Calculation of social costs for estimation of optimal level of production**



Source: Stiglitz, (2004:219); Prekajac, Josifidis, (1998: 293)

If external costs are not included in the price, negative consequences are the following (Tietenberg, 1998):

- Prices of products, caused by externalities, are unjustifiably low;
- Volume of production of such products is unnecessarily large, as environmental damage is not taken into account;
- Reduction of pollution intensity per unit of product is not incited by the market, as the costs are external;

- Such behavior does not encourage the development of circular economy which is based on waste reduction and its recycling. On the other hand, recycling is not done as there is no motive for that: emissions are discharged into the environment at low (or none) penalties;
- Such system of functioning of production and society, without serious commitment environmental protection, only increases pollution.

## **5. PRACTICAL CHALLENGES IN IMPLEMENTATION OF ECOLOGICAL (GREEN) TAXES**

A gradual increase in the average rate of ecological taxes has been noticed since the mid-nineties of the twentieth century. However, the beginning of application of this new form of tax is characterized by the following challenges (Stevanović et al, 2003):

- a) Influence on competitiveness. Ecological tax will probably influence the increase of production price, i.e. selling price of products or services, and therefore it will have a negative effect on competitiveness, especially in relation to those manufacturers who do not calculate this type of tax in the price of products and services,
- b) Regressive effect of ecological tax,
- c) Uncertainty regarding positive fiscal effects of ecological tax,
- d) Influence of subsidies that have distortion effect on ecology,
- e) Inadequate harmonization and coordination of tax institutions and ecological institutions in the country,
- f) Resistance of stakeholders, who don't understand the cause of environmental protection, to this new type of tax.

Practical obstacles that societies face during implementation of ecological taxes can be neutralized by procedures opposite to those used for determination of obstacles. The challenges that accompany implementation of ecological taxes can be solved in another way, systematically or by means of a tax reform that will have "green, sustainable or ecological" elements in the future. These elements can be (Dražković, 2012):

- a) Introduction of a tax reform, i.e. implementation of ecological tax reform;
- b) Definition of concepts: what is ecological tax, which is the basis of calculation, what is the level of tax rate and who is a tax payer;
- c) Elimination of ecological subsidies having a distortion effect;
- d) Continuous awareness of possible environmental issues, guaranteed by accepting of Aarhus Convention;



- e) Continuous cooperation of the institutions responsible for environmental protection and tax administration;
- f) Gradual introduction of ecological taxes.

## **6. CONCLUSION**

Despite a gradual increase in ecological tax rate and therefore in fiscal revenue that is collected in this way, application of this tax is followed by certain challenges. Private costs and hence formed price and production volume, that do not take into account environmental damage, are never equal to social costs and socially justified production volume, which is lower, as a rule. However, as it can be seen clearly in the Figure 2, the prices have a reverse trend. Socially justified production volume is lower, but the selling price of the product is higher as costs of pollution are included in the price. Speaking of private costs, the opposite is the case – manufacturers, encouraged by a bigger profit, want as large volume of production as possible. However, as costs of pollution are not included in the price, the price of these non-ecological products, processes or economic activities is lower. This is why the role of the state is very important. By its clear attitude, regulations, penalties, tax reform etc., the state can influence the use of green and ecologically acceptable technology that would not incur costs of pollution.

Although this type of tax started to be considered at the beginning of the twentieth century, it took a long time to adjust the consciousness of theoreticians, as well as manufacturers and consumers to this way of thinking and even more time to implement ecological taxes in practice. The essential characteristic of these taxes is that their basic purpose is improvement of the quality of environmental protection and investment in this type of technology while eliminating ecological subsidies having the distortion effect at the same time.

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