ENVIRONMENTAL AND ENERGY TAX REFORM IN THE EU[1]

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Abstract

The subject of the analysis is determination of energy tax revenue in the countries members in the EU, and monitoring of revenues generated through energy taxes. Environmental taxes can be collected in forms of energy taxes, transport taxes, pollution taxes and resource taxes. The role of energy taxes is to internalize external costs and to encourage potential polluters to change their behavior. Although they have limited fiscal significance, energy taxes contribute to total public revenue in a country. On the basis of the presented data in this paper, it is obvious that revenues collected by energy taxes are not negligible and it is measured in tens of millions of Euros. Monitoring of flow of revenues made by collecting these taxes proves that revenues have downward trend since the beginning of the crisis, since 2008, and only two EU countries members did not have negative values. EU has growth of the energy tax revenue in the period 2005-2008, of: 2,19% in 2006 in relation to 2005; growth of 3,28% in 2007 in relation to 2006 that is 2,45% in 2008 in relation to 2007. On one hand, collection of energy taxes provides country with revenues; however there is a possibility of jeopardizing position of domestic business entities in the future. It is the fact that market position of industries that pay energy taxes is unfavorable because the prices of their products are increased by the taxes.

Keywords: *energy taxes; environmental tax reform; European Union*

INTRODUCTION

Contemporary development of European countries is, apart from economic and financial problems (first and second economic crisis wave) burdened by ecological problems and high requirements imposed by ecological standards. Therefore, the role of the state and economic integrations, such as European Union, is to give answers to the question how to coordinate economic development without jeopardizing the environment. Active role of the state in ecological instrument implementation for the purpose of protecting environment is crucial, since the market solutions do not give the best results (Steinbach et all, 2009).

Sustainable development as a concept consists of four mutually related and conditioned subsystems: economic, ecological, social and institutional. Application of those instruments which are simultaneously support all subsystems is encouraged. The authors intend to show that energy taxes is an economic instrument which entirely supports the principles of sustainable development and has impact on balanced improvement of all four subsystems. For application of any fiscal instrument, including energy taxes, it is necessary to have consistent legal regulations, which can be provided only by the state. The state relies on direct regulations which provide certain amount of pollution: if the environment pollution is banned above a defined level, that is, if the pollution is regulated by sanctions, then the maximal level of pollution is known in advance. Institutional aspects of sustainable

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development are established in the end, only after ecological, economic and social subsystems have been developed. Since the existence of the state regulation is necessary for the application of energy taxes, it is obvious that energy taxes have substantial share in establishing and application of the institutional component of sustainable development (Taylor and Turner, 2012).

The idea of implementing special instrument of tax system which would be in the function of preserving environment originated from Arthur Pigou, theoretic of welfare economic. In 1918 Pigou explained that energy taxes introduction with the need to internalize external costs, which are made as a consequence of nature devastation. External cost is made outside the market, in the situation when economic situation of a certain business entity is influenced, positively or negatively, by other entity activities (Coase, 1960). Energy taxes are capable to correct market limitations and imperfections incurred by externalities.

Frequently markets are not in position to effectively allocate resources. These are the cases when external effects are created. There are several solutions to the elimination of such consequences. According to the OECD division, there are following instruments (OECD, Executive EAP, 1999): compensations and taxes for emissions, users' compensations and taxes, compensation for products, performance and indemnification guarantee.

Since public good and transaction costs aggravate finding efficient solutions, there are limitations in exclusive application of certain measures (Barde, 1999). In practice, right to adequate environment under contemporary conditions is carried out by a combination of one of these instruments (**Gasparatos**, 2011):

1. Energy taxes and penalties,
2. Subsidies for pollution reduction,
3. Transferable permits and
4. State regulation.

Each of these instruments has its characteristics, different effects on resource allocation, different treatment of ecological expenses and specific redistribution effect. All this proves that energy taxes support not only institutional subsystem but also economic and ecological subsystems. The authors pay special attention to energy taxes, revenues made from collection of such taxation and trends of revenues made from energy taxes.

ENERGY TAXES AS AN ECONOMIC INSTRUMENT OF ENVIRONMENT PROTECTION

The OECD countries' legal regulations make strict distinction between expressions „environmental (including energy) taxes“ and „ecological compensation“ in terms of allocation of the financial means collected by compensations and taxations. For the state, both instruments bring revenues, but the revenues are allocated differently. *Ecological compensation* is related to the cases when the dominant part of revenue is intended for covering costs and environment protection (e.g. financial means are collected through funds for protection of certain resources). *Environmental tax* is centralized revenue which is not primarily intended for environment protection, but it increases local and state revenues. This is in support of the fact that this instrument is a part of economic subsystem of sustainable development (Golušin and Munitlak Ivanović, 2009). Energy tax is relatively new tax form, which for tax base takes physical unit of the substance which has harmful effect on the environment (Munitlak Ivanović and Golušin, 2011).

On one hand, energy taxes include taxes directly imposed on goods which have impact on increasing of environment pollution, that is, have impact on scarce natural resources due to the degree of their pollution, and on the other hand, different compensations and similar fiscal duties (e.g. registration taxes, taxes for not compiling with ecological standards and regulations). Environmental taxes

influence limitation of ecological harmful products consumption. It reduces harmful emissions up to the level which is considered to be „sustainable“ (Pirvu and Clipici, 2010). According to the Rio Declaration on Environment and Development (1992), environmental taxes need to be: efficient in terms of ecology – to achieve goals of environment protection at the least price, efficient in terms of economy – to interfere as least as possible in resources allocation in the market simple in terms of taxation and administration, „cheap taxation“ and neutral in comparison to competition terms and free trade (Thun et all, 2012).

ENVIRONMENTAL TAXES REFORM IN EU COUNTRIES

Environmental taxes reform is a process of implementation of environmental taxes parallel with abolishing ecologically harmful subsidies (Golušin et all, 2011). The essence of environmental taxes reform is the intention to reduce pressure on natural environment by encouraging industrial producers to implement new and more efficient technologies from the point of view of energy and resources consumption. On the other hand, consumers are encouraged to use more often goods produced in „ecological friendly“ way, which supports sustainable development concept and do less harm to the environment.

Fiscal duties (environmental taxes) are incorporated into the products' and activities' prices, and force producers and consumers to take into consideration cost of polluting environment when making economic decisions. This is a simultaneous and combined application of two principles: „producers pays“ and/or „consumer pays“. Since the environmental taxes are incorporated into the selling price, the cost of taxation in the end pays the consumer and essentially in the end taxation will be paid by the end user. Thus it means that this is a final application of the principle „consumer pays“.

In the early 1990s, the process of environmental taxes started in EU articles. Ecological tax reform „green tax reform“ was first implemented in Sweden (1990), then in Denmark (1993), Spain (1995), Netherlands (1996), Great Britain (1996), Finland (1997), Italy (1999), Germany (1999), France (1999) and Austria (1999). Environmental taxes reform, „green tax reforms“ is enforced in one or a combination of the following ways: reduction or abolishing subsidies to production with ecologically harmful externalities, taxation imposing taxes on potentially dangerous substances to for the environment, restructuring of the existing taxation system according to the criteria of environment protection, and implementation of new forms of environmental taxes (Golušin at all, 2012).

There are several divisions of environmental taxes depending on what is taken as the basis of the division. In EU most frequent division of environmental taxes is the one based on the subject of taxation:

Energy taxes: refer to energy sources used for transportation and households needs. The most significant taxed energy resources are gasoline and diesel, that is natural gas, fuel oil, electrical energy, coal, and all products which cause negative externalities and which are not ecologically acceptable. These are, in fact, taxes on products which create pollution either at the moment of their production or at the moment of their consumption. The main advantage of energy taxes is the fact that it is becoming a form of the existing consumption taxation (value added tax, excise tax and other forms of general taxes on sales). For that reason, this form of taxation is more efficient and it has lower administration costs which makes its enforcement cheaper and simpler (Yu and He, 2012).

Transport taxes: refer to the ownership of motor vehicles. Taxes on transportation equipment and services related to transport are also included in this fiscal instrument. This tax can refer to the import of transportation means or selling of equipment and can be calculated annually though road tax. This kind of taxation includes taxes on gasoline, diesel and other fuels used in transportation.

Pollution taxes: refer to taxes on measured of estimated emissions of gas and harmful materials into water or air, managing of solid waste or noise pollution. The exception is tax on CO_2 which is included in Energy taxes (Jia, 2012). This kind of taxation is based on measuring harmful emission and estimation of quality and quantity of released polluting material. In terms of ecology, it is most efficient to directly tax the source of harmful emission. However, in most cases harmful emissions are hard to measure precisely.

Resource taxes: refer to exploitation of water, forests and mineral resources. Taxes on oil and gas extraction are excluded from this tax since they are meant to be calculated through the cost of consumption and do not have influence in the same way other types of ecological taxes do.

RESEARCH

The subject of the analysis is determination of environmental tax revenue in the countries members in the EU, and monitoring of revenues generated through environmental taxes. The analysis was carried out for two more countries, Iceland and Norway, which are not EU members but are in Europe and belong to the group of developed countries. Environmental taxes can correct imperfections of the market mechanism caused by externalities. Enforcement of environmental taxes (and penalties) generates double dividend since it increases fiscal incomes, and the country has possibility to reduce dependency on other taxes. As it was stated several times, this taxation stimulates ecologically acceptable production and generates budget revenue.

Table I. shows Environmental tax revenue in millions of Euros, in all EU countries members, Iceland and Norway in the period 2005-2010. On the basis of this table, Table II. was calculated and it monitors Environmental tax revenue trends in percentages year after year in each country individually. Numerical data in the Table II. were calculated as chain indices, where the level of Environmental tax revenue in millions of Euros from one year is related to the values of the same indicator in the previous year, for each country individually, on the basis of Eurostat data.

DISCUSSION

Generally, European Union has growth of the environmental tax revenue in the period 2005-2008, of: 2,19% in 2006 in relation to 2005; growth of 3,28% in 2007 in relation to 2006 that is 2,45% in 2008 in relation to 2007. Since 2008 the revenue in EU generated through environmental taxes has a downward trend. Tax revenues generated through environmental taxes in 2009 is decreased by 2,16% in relation to 2008 and in 2010 decreased by 3,50% in relation to 2009. Table I. indicates that level of tax revenue in the EU generated in this way in 2010 (286.602,86 mil EUR) is almost identical to the values in 2006 (286.896,74 mil EUR) and it is reduced in comparison to the same power unit in 2007 (296.304,06 mil EUR). Thus, the highest revenue was generated in 2008 at the time of the beginning of the first crisis wave.

Table 1. Environmental and energy tax revenue in millions of EUR

Geo/time	2005	2006	2007	2008	2009	2010
European Union (27 countries)	280.737,3	286.896,74	296.304,06	303.564,96	296.996,98	286.602,86
Belgium	6.845,1	7.083,6	6.846,8	6.989,6	6.790,6	6.874,1
Bulgaria	648,38	695,02	767,26	1.033,64	1.218,89	1.060,5
Czech Rep.	2.332,74	2.699,36	2.939,03	3.184,7	3.627,66	3.418,01
Denmark	11.058,33	12.400,02	13.497,55	13.317,34	13.329,06	10.662,62
Germany	56.031	55.159	55.732	54.205	54.538	54.164
Estonia	203,46	254,58	293,42	353,11	379,25	413
Ireland	3.740	4.090,19	4.417,35	4.678,42	4.506,83	3.781,2
Greece	3.993	4.081	4.196	4.627	4.561	4.611
Spain	16.857	17.630	18.396	19.124	17.840	17.163
France	38.683	38.550	39.660	39.828	40.061	39.927
Italy	38.281,06	38.928,3	40.064,48	40.028,54	38.130,84	39.864,54
Cyprus	506,97	481,34	483,34	535,22	542,3	490,1
Latvia	288,92	344,57	383,16	437,27	451,17	429,33
Lithuania	492,39	481,91	433,77	507,97	533,95	543,22
Luxembourg	838,89	892,65	891,93	953,8	986,15	931,4
Hungary	2.249,15	2.417,32	2.530,74	2.797,81	2.853,33	2.436,09
Malta	138,21	158,21	171,98	205,34	200,51	194,89
Netherlands	18.952	20.267	21.772	21.726	23.140	22.764
Austria	6.350,18	6.445,72	6.401,79	6.621,73	6.795,09	6.658,16
Poland	5.281,02	6.487,79	7.493,08	8.359,52	9.486,9	7.944,34
Portugal	4.478,84	4.557,71	4.603,88	4.783,4	4.406,32	4.202,98
Romania	1.447,82	1.604,49	1.900,11	2.564,75	2.486,23	2.213,99
Slovenia	899,87	919,83	934,31	1.038,43	1.119,53	1.260,83
Slovakia	849,81	919,48	1.014,53	1.161,84	1.317,32	1.225,48
Finland	4.924	4.861	4.993	4.934	4.992	4.553
Sweden	8.154,39	8.445,47	8.648,32	8.856,76	8.934,3	8.212,71
United Kingdom	46.211,77	46.041,18	46.838,23	50.711,77	43.768,75	40.603,37
Iceland	284,27	365,91	332,1	355,03	181,08	134,85
Norway	6.802,39	7.410,24	8.279,5	8.535,85	8.148,46	7.370,71

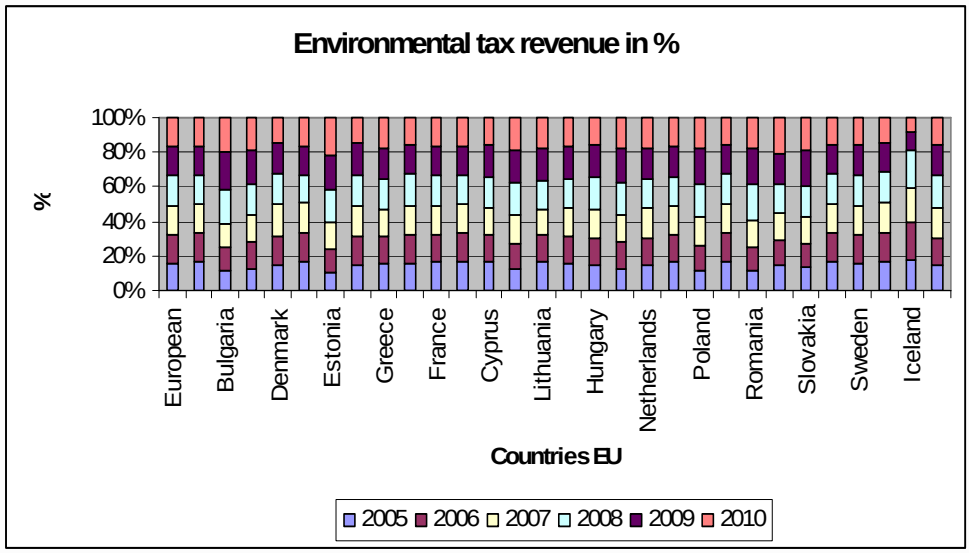
Source: Eurostat Statistical Books, last update: 28.07.2011.

When each country is considered individually, the highest environmental taxes revenue has Germany, followed by United Kingdom and France. Territorially smaller countries have substantially reduced revenues of ecological taxes: Malta, Iceland and Cyprus. It must be noted the fact that Iceland is not EU member and Malta and Cyprus become members in 2004. Unlike them, Germany and France are countries founders joined by the UK in 1973. This is surely one of the reasons for such different results in enforcement of environmental taxes. If we consider for comparison the year of 2008, when the level of generated revenue from environmental taxes was highest in Malta for the considered period (205,34 mil EUR) that is approximately 264 times less (54.205 mil EUR) then the taxation generated in Germany the same year. The territory of Germany is bigger than Malta, but not 264 times! Of course, the size of the country and the number of inhabitants have impact on the level of consumption of product and services for which environmental taxes is calculated, however the

dominant role has the government regulation in that field and perhaps even significant is – economic power of the countries. The best example for that is the case of Slovenia which in the same year, 2008, generated (1.038,43 mil EUR), five times more environmental taxes than Iceland, and it is not five times bigger than Iceland and it does not have five times more inhabitants.

On the bases of Eurostat data shown in Table I, graph I was made which shows that there was reduction in revenues on environmental taxes in all countries members in 2010 in relation to the previous years.

Figure 1. Environmental and energy tax revenue in % per EU country in the period 2005-2010



Data in the Table II were obtained on the basis of data presented in Table I and formula for the calculation of chain indices:

$$RG = \frac{ETR - N}{ETR - (N-1)} \cdot 100$$

Where:

RG - Revenue growth in the current year
ETR - Environmental and energy tax revenue
N – year

The highest index (revenue growth on the basis of environmental taxes) was noted in 2007, while negative values are noted in 2009 and 2010. Most countries have that trend. The countries which have positive index values in 2010 in relation to the previous year are: Belgium (1,23%), Estonia (8,90%), Greece (1,10%), Italy (4,55%), Lithuania (1,74%) and Slovenia – (as high as 12,62%). Opposite to them, the most intense reduction of the index of Environmental tax revenue have Iceland (-25,53%), Denmark (-20,00%) and Ireland (-16,10%).

The best index values were noted in 2007 in relation to 2006. Most countries note positive revenue growth in that period. The highest index value in that period have Romania (18,42%), then Poland (15,50%) and Estonia (15,26%). These data can be explained with the fact that that was the period of accession of new countries to the EU, Estonia and Poland were integrated in 2004 and Romania in 2007. Accession to the EU means adapting to higher and stricter ecological and other standards.

High index values in 2008 in relation to 2007 were obvious. The highest revenue growth in that period had Bulgaria (34,72%) followed by Estonia (20,34%), Malta (19,40%), Lithuania (17,11%), Slovakia (14,52%), Latvia (14,12%), the countries which became EU members in the last two most numerous enlargements in 2004 and 2007.

The year of 2009 in relation to 2008 is the beginning of growth values fall of Environmental tax revenue in millions of EUR and in percentage. That trend is characteristic for the average for the whole EU since it has index decrease of -2,16%. It is interesting to note that one of the most developed economies – United Kingdom has drastic index fall of -13,69% and two other strong economies Germany (0,61%) and France (0,59%) have slight increase less than 1%. That is the year when effects of financial and economic crisis represented in this way are noted.

Downward trend of fiscal revenues becomes clearer in 2010 in relation to 2009, since the crisis continues. Out of 27 EU members, as many as 21 countries note negative revenue growth. The highest revenue reduction is noted in Denmark (-20,00%) followed by Poland (-16,26%), Ireland (-16,10%), Hungary (-14,62%), etc. The least revenue reduction was made by France (-0,33%). Unlike most members, six countries made growth: Slovenia (12,62%), Estonia (8,90%), Italy (4,55%), Lithuania (1,74%), Belgium (1,23%) and Greece (1,10%).

It is necessary to emphasize two EU members, Estonia and Slovenia, who in the considered period did not note negative revenue growth. Both countries were integrated in EU in 2004.

Figure 2. Overview in percentages of Environmental and energy tax revenue trends in EU member states in period 2005-2010.

GEO/TIME	Revenue growth 2006-2005	Revenue growth 2007-2006	Revenue growth 2008-2007	Revenue growth 2009-2008	Revenue growth 2010-2009
EU (27 countries)	2,19%	3,28%	2,45%	-2,16%	-3,50%
Belgium	3,48%	-3,34%	2,09%	-2,85%	1,23%
Bulgaria	7,19%	10,39%	34,72%	17,92%	-12,99%
Czech Republic	15,72%	8,88%	8,36%	13,91%	-5,78%
Denmark	12,13%	8,85%	-1,34%	0,09%	-20,00%
Germany	-1,56%	1,04%	-2,74%	0,61%	-0,69%
Estonia	25,13%	15,26%	20,34%	7,40%	8,90%
Ireland	9,36%	8,00%	5,91%	-3,67%	-16,10%
Greece	2,20%	2,82%	10,27%	-1,43%	1,10%
Spain	4,59%	4,34%	3,96%	-6,71%	-3,79%
France	-0,34%	2,88%	0,42%	0,59%	-0,33%
Italy	1,69%	2,92%	-0,09%	-4,74%	4,55%
Cyprus	-5,06%	0,42%	10,73%	1,32%	-9,63%
Latvia	19,26%	11,20%	14,12%	3,18%	-4,84%
Lithuania	-2,13%	-9,99%	17,11%	5,11%	1,74%
Luxembourg	6,41%	-0,08%	6,94%	3,39%	-5,55%
Hungary	7,48%	4,69%	10,55%	1,98%	-14,62%
Malta	14,47%	8,70%	19,40%	-2,35%	-2,80%
Netherlands	6,94%	7,43%	-0,21%	6,51%	-1,62%
Austria	1,50%	-0,68%	3,44%	2,62%	-2,02%
Poland	22,85%	15,50%	11,56%	13,49%	-16,26%

Portugal	1,76%	1,01%	3,90%	-7,88%	-4,61%
Romania	10,82%	18,42%	34,98%	-3,06%	-10,95%
Slovenia	2,22%	1,57%	11,14%	7,81%	12,62%
Slovakia	8,20%	10,34%	14,52%	13,38%	-6,97%
Finland	-1,28%	2,72%	-1,18%	1,18%	-8,79%
Sweden	3,57%	2,40%	2,41%	0,88%	-8,08%
United Kingdom	-0,37%	1,73%	8,27%	-13,69%	-7,23%
Iceland	28,72%	-9,24%	6,90%	-49,00%	-25,53%
Norway	8,94%	11,73%	3,10%	-4,54%	-9,54%

One of the macroeconomic effects of collecting ecological taxes is competitiveness effect. Implementation of ecological taxes can have negative implementation on competitive position of polluters. Such companies bear two types of costs. The first group is costs related to using technology and devices for pollution reduction. As a rule they are more expensive than the traditional equipment. The other group of costs relate to paying taxes on emissions. Due to this, such companies are at risk of losing competitive position and at risk of being brought to an unfavorable position in comparison to similar companies whose production is not burdened with paying ecological taxes.

In order to mitigate these effects of environmental taxes reform, it is necessary to solve national and regional ecological problems among countries so that the sustainable development is achieved. Such an approach prevails in the Rio Declaration on Environment and Development, which emphasizes that in order to solve the problem of environment devastation it is necessary to prevent relocation of business activities which cause environment degradation to another country. This supports the claim that environmental taxes are definitely significant part of social subsystem of the sustainable development concept.

CONCLUSIONS

Regardless of the fact that there are differences between terms „ecological taxes“ and „ecological compensations“, both instruments bring revenues for the country. The difference is that the money collected by ecological compensation is reinvested into environment protection, and ecological taxes is not primarily intended for environment protection, but it increases local and state revenues. Environmental taxes introduced through ecological tax reform, is relatively new form of taxation, whose tax base is material unit which makes negative impact to the environment.

The advantage of environmental taxes is the fact that it influences the limitation on consumption of ecologically harmful products; it reduces harmful emission to the level which is considered to be acceptable. For this revenue to be economically and ecologically acceptable, the countries need to provide environment protection at the lowest possible costs, to make as few changes as possible to resource allocation in the market, to be simple for implementation, to be economically justifiable and acceptable but not to interfere in free trade at the same time.

Finally, ecological taxes will be directly or indirectly paid by the final buyer. For that reason, environmental taxes can have regressive effect, since it affects citizens whose incomes are reduced. Still, the main goal of the environmental taxes reform is to contribute to preserve of the environment and achievement of sustainable development with introduction of fiscal instrument. Environmental taxes reform places clear accent on transferring taxation burden from activities which need to be encouraged to activities which need to be dissimulated. Introduction of environmental taxes needs to be followed by reducing other taxed so that the total taxes remain same. It can be concluded that environmental taxes is entirely in accordance with the concept of sustainable development because it supports this concept and it is included in economic, ecological, social and institutional subsystem of this concept.

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