

Фінанси, банківська справа та страхування

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Klymenko Maksym

PhD Student of the

National University of Life and Environmental Sciences of Ukraine

ORCID: 0000-0001-6481-9945

“GREEN” POLICY AND ENVIRONMENTAL TAXATION AS THE INSTRUMENTS TO TACKLE CLIMATE CHANGE

***Summary.** The article is dedicated to environmental taxation as one of the possible policy instruments that along with other governmental and partnership measures could tackle climate change and assure green growth for the world and Ukraine in particular. European countries mostly focus on the taxation of energy sources, which allows them to be highly efficient in the field of GHG taxation. The Ukrainian model insists on controlling the level of environmental pollution for many years, it has low efficiency and control potential, high transaction, and administration costs. Price instruments for limiting greenhouse gas emissions are one of the most effective and rational solutions during the exacerbation of the climate change issue. These include taxes (on CO₂ emissions that are directly related to emissions or the carbon content of fuel and excise duties on energy carriers) along with emissions trading systems. With the establishment of excise duty on energy and carbon taxes, states form a price for each ton of CO₂ emissions, which contributes to dynamic efficiency, by stimulating technological changes to the development of innovative emission reduction technologies and static efficiency, i.e., reduction of CO₂ emissions in the most financially affordable way. Excise duty on energy resources and taxes on CO₂ emissions have the similar object of taxation, although the rates of excise taxes in the vast majority do not depend on the carbon content of the fuel. They are differentiated in the direction*

of promoting the competitiveness of more ecological types of fuel (reducing the rate for fuel with a lower sulfur content), protecting producers of energy-efficient enterprises, and preventing energy poverty. The excise duty rate consists of Pigou and Ramsay components, the proportions of which are chosen by fiscal necessity and occupy a large share of budget revenues. They are harmonized between EU countries with a unified approach. In common practice, funds accumulated from carbon tax should cover the damages caused to society and the costs of protecting and restoring an environment. Therefore, the article identifies the key groups of environmental taxes in the EU countries, analyses the European experience of the economic impact on environment preservation, examines possible ways of environmental taxation reform in Ukraine, based on the best foreign experience, and analyses the CO₂ emissions among countries and continents by sectors and type of fuel.

In addition, the author developed the draft concept of Ukraine's transition to a climate-neutral economy, highlighting the models of side-x-side functioning of the tradable permits system and taxes on CO₂ emissions.

Key words: *environmental taxation, EU Green deal, environmental policy measures, carbon dioxide emissions, environmental preservation.*

Statement of the problem. The environment is affected by existing patterns of production and consumption. Solving environmental problems requires behavioural changes with significant economic costs and impacts on labour, product, and capital markets. Environmental policy is aimed at achieving the goals of ecological and sustainable development. Policymakers use incentive-based tools to ensure that environmental solutions are found at the lowest cost, correct externalities, and/or generate revenues for specific purposes. Thus, economic instruments for pollution control and natural resource management are becoming an increasingly important part of environmental policy in EU and OECD countries.

The Intergovernmental Panel on Climate Change is convinced that global warming is man-made. Back in 1995, the IPCC testified that "the available evidence allows us to state with a high degree of probability that humans are causing a noticeable impact on the global climate." Also, the latest report notes that carbon dioxide is the biggest contributor to climate change, followed by methane, haloalkanes and nitrous oxide.

In general, the world uses a variety of tools to stimulate the reduction of greenhouse gas emissions: 1) tax instruments (environmental taxes, including taxation of energy, transport, use of natural resources and emissions); 2) market instruments (tradable permits systems); 3) regulation and subsidization (supporting the implementation of ecological and energy-saving technologies, innovative sectors of the economy, the deposit return system and subsidies).

Among the main problems of environmental taxation, the following can be distinguished [1]:

1. Ukraine has not built an effective model to tax environmentally harmful activities, which is explained by permanent changes in the mechanism and proportions of revenue distribution from environmental taxes between the state and local budgets. During 2015-2017, 20% of the environmental tax was directed to the general fund of the state budget, 55% to the regional, and 25% to the local budgets. In 2018 and 2019, the proportion changed in order to centralize financial resources: the share of the state budget increased to 45%, the share of the city budget remained unchanged, and only 30% belongs to regional budgets [2].

2. Low fiscal value without usage on purpose, which is evidenced by its budget classification as tax revenues instead of trust funds. Given that anthropogenic impact on the environment is inextricably linked to the economic development of our country, environmental taxes should primarily be aimed at restoring the natural properties of the habitat, fulfilling its main function - compensatory. Also, the domestic tax system does not fully use subsidies and environmental insurance as auxiliary economic instruments of policy measures.

In addition, the system of target reservation of funds does not exist at all. 45% of the revenues from the environmental tax are directed to the State Budget's general fund, thereby losing its intended purpose of correcting the damage caused to the natural environment by polluters. At the same time, the total amount of expenses for environmental protection exceeds the receipt of the environmental tax as a whole, and these expenses are financed at the expense of other budget revenues.

3. With the constant growth of environmental tax rates since its introduction, its share in tax revenues remains insignificant and insufficient to finance the necessary environmental protection programs (about 63% in 2019), hence the compensatory and fiscal functions of the environmental tax unrealized. At that time, in European countries, the environmental tax performs both a compensatory function (tax revenues several times exceed state expenditures on environmental protection measures) and a fiscal one (the environmental tax forms up to 10% of all tax revenues, in Estonia it is about 9,6%).

4. One of the environmental policy goals is to increase domestic producers' interest in the effective use of natural resources and accumulate funds to implement modern technologies of environmental saving. A preferential lending program for eco-programs for the largest polluters has been introduced, but the interest of the business sector in using such programs and carrying out modernization is low. The amounts of environmental tax paid by enterprises are insignificant and do not stimulate high-cost modernization. One of the reasons for this phenomenon lies in the still insignificant impact of financial loss from pollution and irrational use of natural resources on the final performance indicators, and primarily on the profit of economic entities. The domestic system of environmental taxation mainly performs a redistributive function, as its level is relatively low to directly influence the behaviour of nature users.

Analysis of recent researches and publications. The problem of environmental taxation as a "green" policy instrument is the subject of research by many Ukrainian and foreign scientists. In particular, Vasylyshyna L.M.

devoted her works to the strategy of reducing carbon dioxide emissions of the Ukrainian economy and the influence of externalities [3]; O.O. Veklych [4], where the basic principles of the functioning of environmental taxation as a mechanism for increasing the competitiveness of the economy are highlighted; O.P. Maslyukivska [5], with a detailed analysis of the signs of ecological and economic transformation, which form the dominant part of the evolution of society; Zelezna T.A. turned its attention to the European "green" course and new opportunities for the development of renewable energy [6]. Theoretical principles of environmental taxation were developed by A. Pigou [7] on the issue of using taxes and subsidies to internalize externalities; E. Smeets and R. Weterings [8], who classified environmental indicators by types; H. Vollebergh [9], who raised the issue of assessing the environment, nature and economic growth, reported on environmental taxes and green growth with a stepwise issues analysis of tax instruments as part of the policy on sustainable economic growth; U. Baumol [10], with a detailed analysis of the economic theory of environmental policy. In turn, A.L. Bobrovsky [11], who described the principles and foundations of a state environmental management system; Lucien Georgeson, and Martyn Poessinouw reviewed current shortcomings and proposed measures for green economy transformations [12]; Piciu Gabriela Cornelia and Trica Carmen Lenuta investigated the impact and effectiveness of environmental taxes, considering budgetary criteria [13]. Furthermore, this topic was examined by Varlamova, E. Weizsäcker, I. Bakhovych, O. Gubanova, V. Kravtsov, N. Kraft, S. Mezentsev, R. Klamtam, D. Stiglitz, J. Farley, with a broad discussion about environmental tax reform in the international literature [14; 15].

However, even with a significant number of publications, further drilling is required to identify the best foreign experiences of adequate taxation instruments to stimulate citizens and businesses to take into account environmental responsibility, emphasize the fiscal and regulatory potential of environmental taxation, which would be an impulse to improve the environmental policy and

move towards an innovative green economy that could tackle the climate change in Ukraine. The methodological basis of the study is the theoretical achievements of domestic and foreign scientists, devoted economists to the problems of environmental taxation, normative and legislative acts of Ukraine [16; 17; 25; 26], data from the State Statistics Service of Ukraine [18], the Ministry of Economy of Ukraine [19], the Ministry of Finance of Ukraine [20], the United Nations [21], Eurostat [22], publications and statistical data of the Organization for Economic Cooperation and Development (OECD) [23], the International Monetary Fund (IMF) [24], and the State Treasury Service of Ukraine [2].

Formulation purposes of article (problem). The study set the main goal of identifying and analyzing the problems and priority areas of development and reform of the instruments to tackle climate change in order to achieve zero emissions of carbon dioxide by the economy of Ukraine, taking into account the successful experience of the EU countries. The research is limited to the period of 2007-2019 years due to the data availability. A complex of general scientific and applied methods of studying economic processes was used. Methods of analysis and synthesis, abstraction, dialectical, structural, and dynamic comparisons to find the right combination of reasonably designed and relatively prime to implement environmental taxes, estimating the effectiveness of taxes used for environmental regulation, and analyzing the experience of European countries regarding habitat issues solutions.

The main material. Thus, one of the most ambitious and comprehensive environmental protection programs is the European Green Deal. This strategy is designed to achieve a zero balance of CO₂ emissions by 2050 and rethink the EU economy from the point of resource efficiency. While the process of economic growth will become separated from the progressive use of energy resources.

The Green Deal concerns such priorities as the supply of clean energy; increasing the importance of protection and restoration of the natural environment, rational use of resources and improvement of people's health. A wide range of tools will be used, from tight regulation to coordination mechanisms and economic incentives to build both the overall framework and each individual policy area. This strategy is focused not only on the energy sector but also on transport, sustainable oil development, agriculture, etc (fig. 1).



Fig. 1. The European Green Deal, the objectives of the EU Green Deal and ways to achieve them

Source: compiled by the author based on materials [22]

The strategy is based on the principle of "leave no one behind". In order to implement this principle and provide comprehensive support to the least developed regions, territories and islands that may face socio-economic problems in their pursuit of climate neutrality, the EU created a special EU Just Transition Fund. In addition, there are a number of legislative initiatives such as 1) The circular economy action plan (CEAP) [28]; 2) The European Battery Alliance (EBA) [29]; 3) The Farm to Fork Strategy [30]; 4) Carbon adjustment mechanism at the border Border Carbon Adjustments [31]; 5) The European Climate Law, with direct EU commitments to climate neutrality. With an intermediate goal of reducing CO₂ by 55% by 2030, which is a significant challenge for European industry [32].

In turn, Ukraine, as part of the National Economic Strategy, announced its intention to achieve climate neutrality by 2060, which poses a huge challenge for industrial technologies and the state administration system [27]. Also, the Sustainable Development Goals of Ukraine for the period up to 2030 provide for a whole set of tasks in the field of environmental protection:

- ensuring availability and sustainable management of water resources and sanitation;
- ensuring access to inexpensive, reliable, sustainable and modern sources of energy for all;
- ensuring the openness, safety, viability and ecological stability of cities and other settlements;
- ensuring the transition to rational models of consumption and production;
- taking urgent measures to combat climate change and its consequences;
- preservation and rational use of oceans, seas and marine resources in the interests of sustainable development;
- protection and restoration of terrestrial ecosystems and promotion of their rational use, rational forest use, combating desertification, stopping and

reversing the process of land degradation and stopping the process of biodiversity loss [12]. The IPCC group was created in 1988 as a UN body, and representatives of 195 countries participate in its work, which evaluates scientific data related to climate change. The IPCC also believes that the increase in CO₂ in the atmosphere is the result of human-caused emissions, three-quarters of which are from the combustion of fossil fuels, and the rest is caused by changes in land use. In May 2019, the average CO₂ concentration in the Earth's atmosphere was 415 ppm. The last time such a high concentration of carbon dioxide in the Earth's atmosphere was a few million years ago - when there was no modern man, and the level of the world ocean was on average 30 meters higher than it is now. Therefore, as a next step, we will analyze the sectoral impact on the level of CO₂ emissions (fig. 2) in terms of analyzed countries, continents and global players.

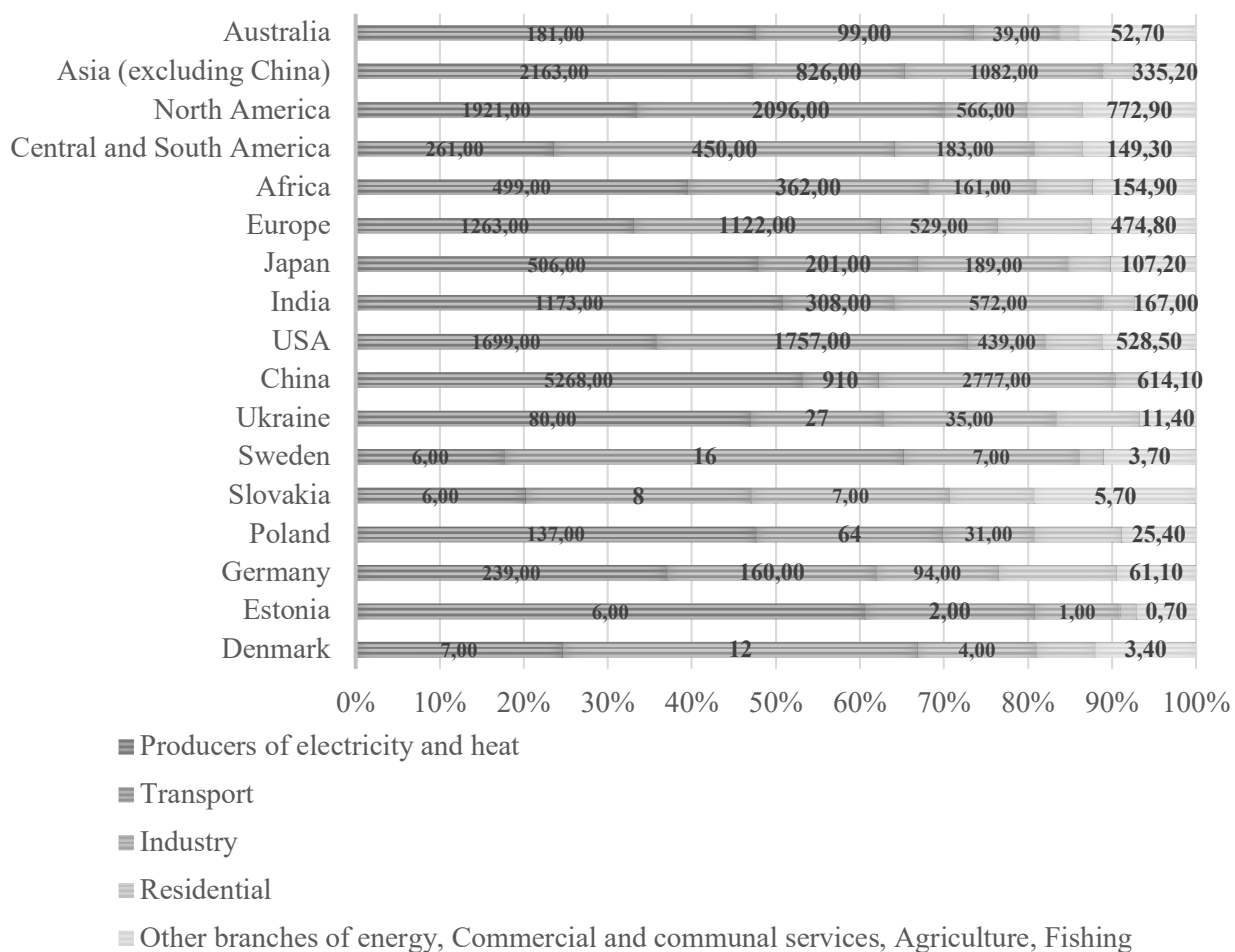


Fig. 2 The level of CO₂ emissions by sector in the analyzed countries in 2019, Mt CO₂

Source: compiled by the author based on materials [18; 22].

Electricity and heat producers, along with the transport sector, play a major role in carbon dioxide emissions. Although we notice certain differences in structure. Thus, for Australia, Asia (without China), Europe, Africa, Japan, India, China, Ukraine, Poland, Germany, and Estonia, electricity and heat producers have the greatest impact on the level of CO₂ emissions. From 33.1% in Europe in the overall structure for 2019 to Estonia with a dominant share of 60.6%. While for a number of countries, namely North America (36.5%), the USA (37%), Central and South America (40.6%), Denmark (42.3%) and Sweden (47.5%), more transport emissions play a role in the sectoral structure. Although there are countries and continents where industry dominates transport. These are Ukraine - 20.5%, Asia (without China) with a share of 23.6%, India - 24.8% and China - 28%.

The statistics use the following definition of an environmental tax in accordance with Regulation (EU) No. 691/2011: "A tax whose tax base is a physical unit (or a supplemented physical unit) of something that has a proven specific negative impact on the environment, and that is defined in the ESA as a tax" [22].

The definition emphasizes the impact of this tax on the cost of the activity and the price of products that have a negative impact on the environment. The effectiveness of an environmental tax arises primarily from the effect it has on the relative prices of products and the level of activity, combined with the corresponding price elasticity. Many taxes are introduced for different purposes, e.g. both to influence behaviour by making the product more expensive to use and to generate revenue. Since the environmental impact of a tax comes primarily from its effect on relative prices, a fuel tax imposed for fiscal reasons will have the same effect as one imposed with the stated goal of reducing emissions. So, the next step is to look at the number of tax revenues from the environmental tax in % of GDP (fig. 3).

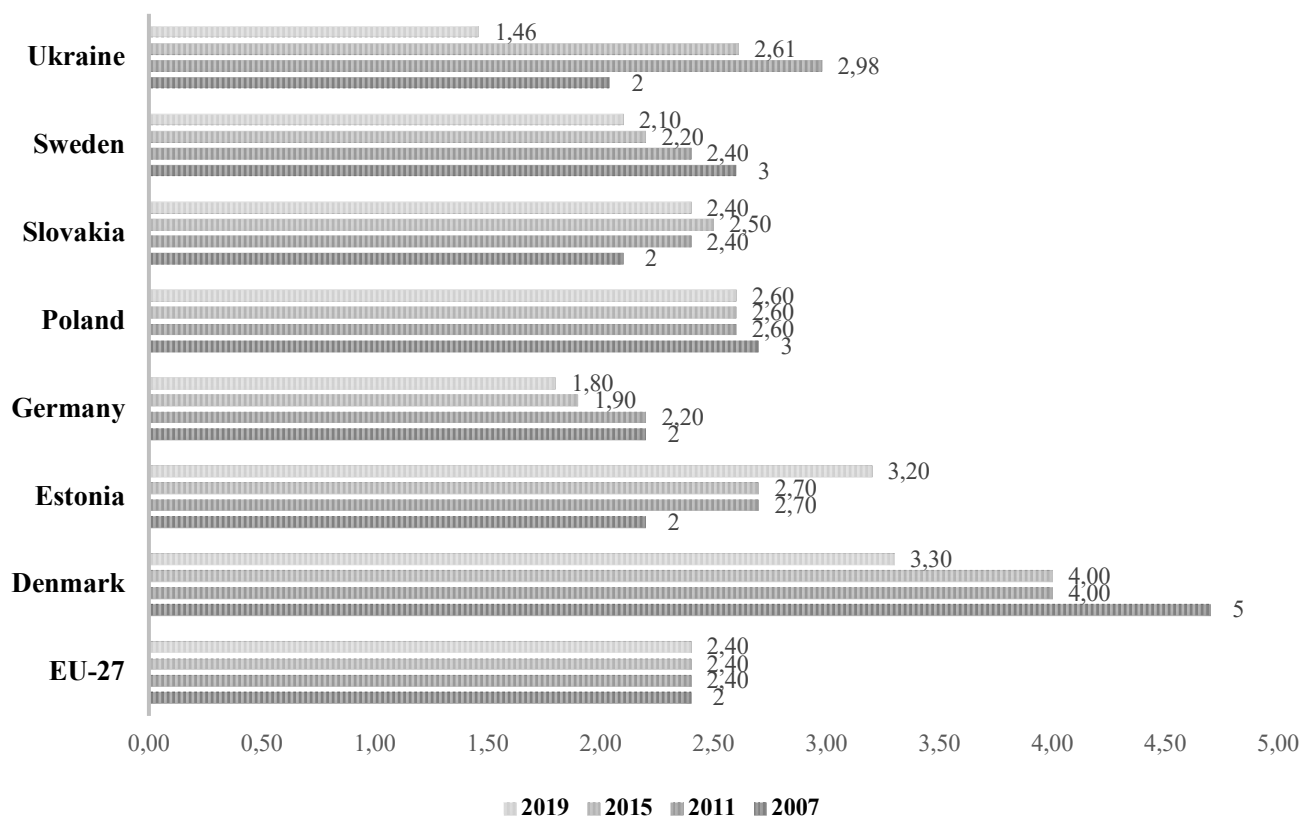


Fig. 3. Dynamics of budget revenues generated by environmental taxation, % of GDP

Source: compiled by the author based on materials [18; 22]

Among the analyzed countries, Denmark stands out, which fills its budget with environmental taxation by 3.3% of GDP in 2019 with a weakening trend compared to 2007, and Estonia (3.2% with a strengthening trend until 2019). A group of countries, namely Poland, Slovakia and Sweden, keep the level of the tax burden at around 2.1-2.6%, which is approximately equal to the average income of the 27 EU member states (2.4% of GDP). For a detailed definition of environmental taxes, in 1997 Eurostat (Eurostat), the European Commission's Directorate General Environment and the Directorate General Taxation and Customs Union, the Organization for Economic Cooperation and Development (OECD) and the International Energy Agency agreed on the list of environmental tax bases. This list was slightly updated in 2011 and 2012 by a Eurostat working group based on practical experience. The list of tax bases illustrated in fig. 4 is the

only objective prerequisite for determining environmental taxes for the purpose of international comparisons.



Tax bases of environmental taxes

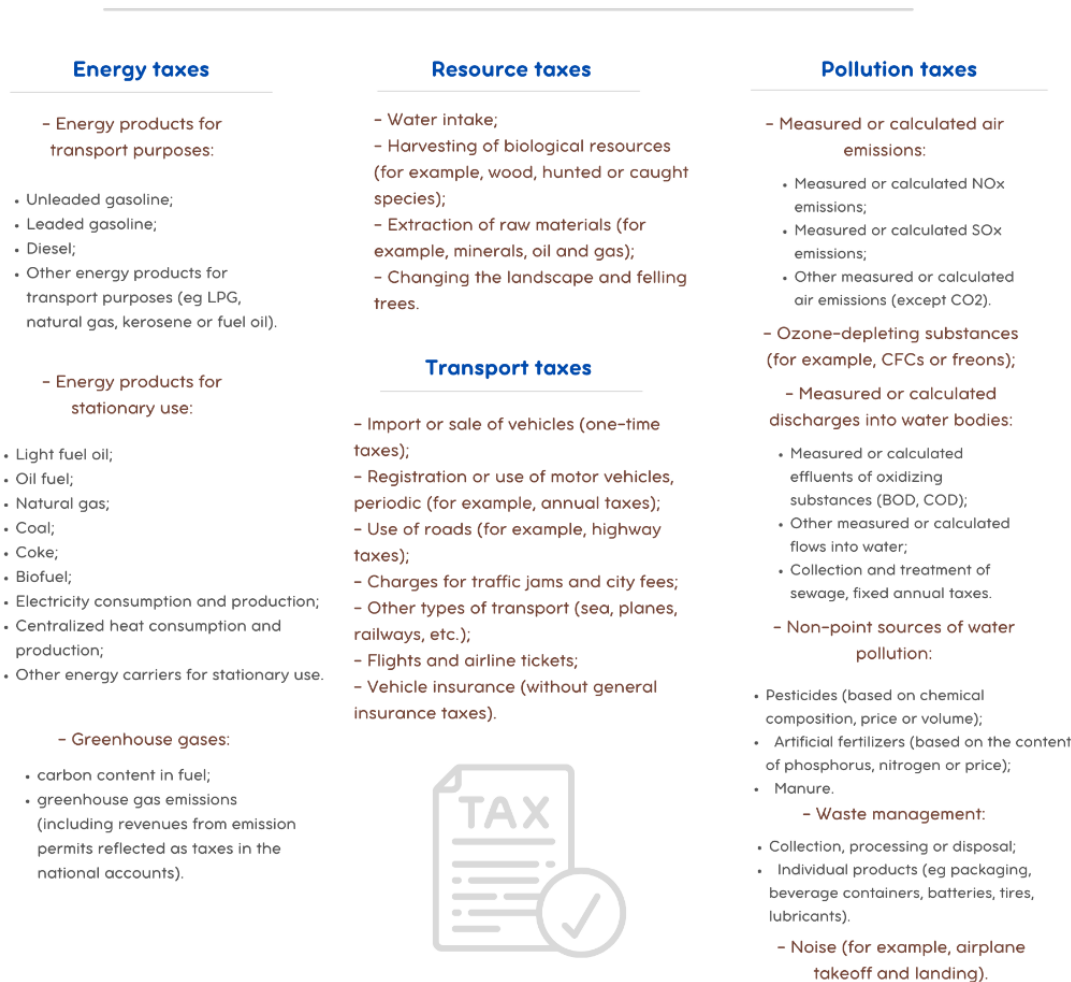


Fig. 4. Tax bases of environmental taxes according to OECD and The International Energy Agency

Source: compiled by the author based on materials [22; 23]

Taxes on carbon dioxide (CO₂) emissions are included in energy taxes in EU countries, not pollution taxes. There are several reasons for this. First of all, it is often not possible to identify CO₂ taxes separately in tax statistics because they are integrated with energy taxes, e.g. by differentiating tax rates on petroleum products according to the carbon content of the fuel. In addition, they are partly

introduced as a replacement for other energy taxes, and the revenues from these taxes can be very large compared to the revenues from pollution taxes. This means that including CO₂ taxes in pollution taxes rather than energy taxes will distort both time series at the national level and international comparisons. Therefore, let's look at the structure of environmental taxation in the EU countries and Ukraine (fig. 5).

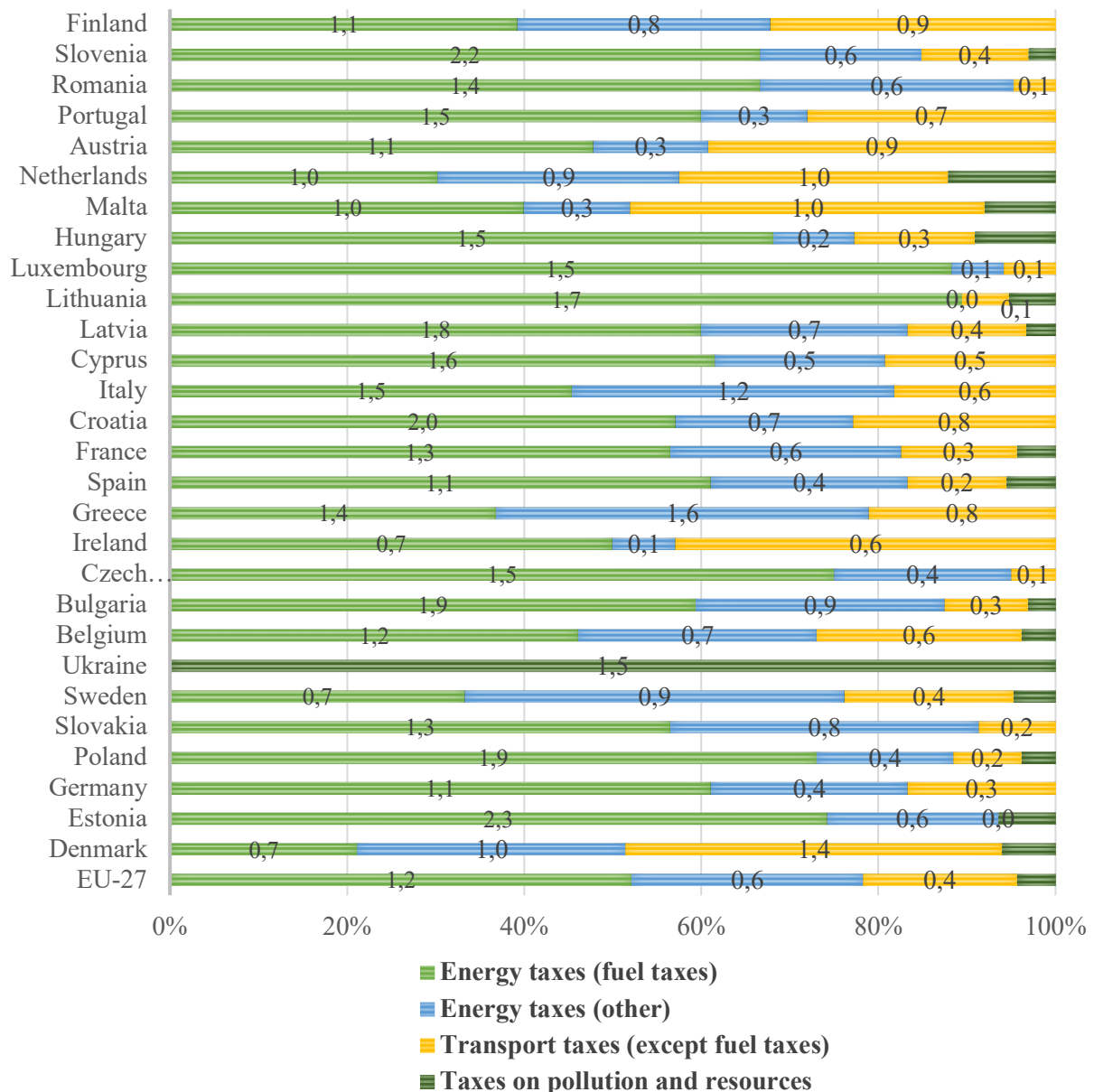


Fig. 5. Revenues of environmental taxes by main components, % of GDP in 2019

Source: compiled by the author based on materials [2; 18; 22; 33]

If CO₂ taxes can be identified, these taxes should be shown as a separate category alongside general energy taxes. This should also include taxes on greenhouse gas emissions other than CO₂. In Ukraine, environmental taxation included the following components according to the annual report on the implementation of the State Budget of Ukraine for 2019 by the State Treasury Service of Ukraine, as shown in Table 1.

Table 1

The main components of environmental taxation in Ukraine and the corresponding budget classification codes in 2019

Budget classification code	Tax revenues
13010000	Rent for special use of forest resources
13020000	Rent for special water use
13030000	Rent for the use of subsoil
13060000	Rent for the use of the radio frequency resource of Ukraine
13070000	Fees for the use of other natural resources
13080000	Rental fee for transportation
17000000	Fees for fuel and energy resources
19010100	Environmental tax, which is paid for emissions of pollutants into the atmosphere by stationary sources of pollution (except for emissions of carbon dioxide into the atmosphere)
19010200	Arrival from discharges of polluting substances directly into water bodies
19010300	Proceeds from the disposal of waste in specially designated places or facilities, except for the disposal of certain types of waste as secondary raw materials
19010400	Environmental tax, which is paid for the generation of radioactive waste (including already accumulated) and/or temporary storage of radioactive waste by their producers beyond the period established by the special conditions of licenses
19011000	Environmental tax, which is paid for emissions of carbon dioxide into the atmospheric air by stationary sources of pollution
19050000	Environmental pollution fee (cancelled on January 1, 2011)

Source: compiled by the author based on materials [18; 22; 2; 25; 26]

The evolution of environmental taxation decomposition: energy taxes, transport taxes, taxes on pollution and resources in the period from 2009 to 2019 is illustrated in fig. 6. During the analyzed period in Ukraine, there was a reduction in the share of the energy part of environmental taxes by 0.81% of GDP and a

concentration on taxation of emissions and resources in 2019 with the growth of this segment by 0.15% of GDP. Greece and Croatia showed the largest increases in both total environmental tax revenues and revenues from the energy component. Greece has increased its environmental revenues by 1.8 percentage points of GDP over the past decade. The decline in transport tax revenues was significant in Cyprus (0.6 percentage points of GDP) and Malta (0.5 percentage points of GDP).

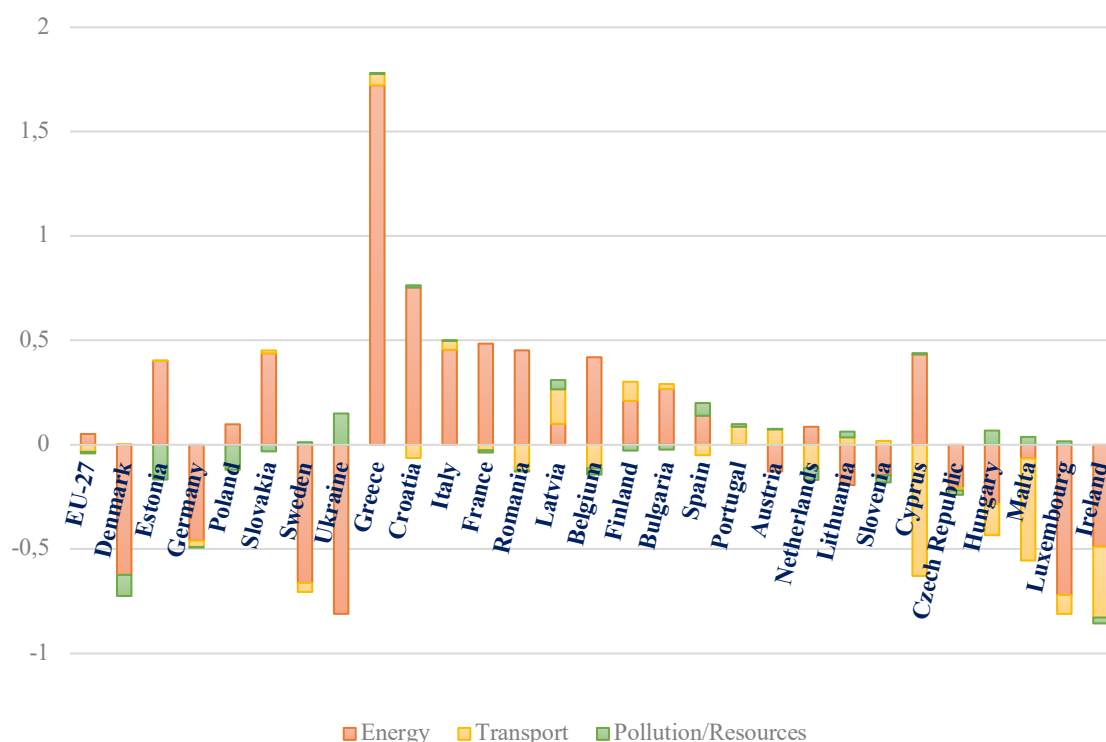


Fig. 6. The evolution of environmental taxation decomposition 2009-2019, % of GDP

Source: compiled by the author based on materials [2; 22]

In 2019, Ireland and Luxembourg had respectively 0.9 and 0.8 percentage points of GDP less environmental tax revenue than in 2009. Changes in income in the EU are caused primarily by taxes on energy carriers. Regarding resource income and pollution, hardly any changes can be observed.

To develop the concept of Ukraine's transition to a climate-neutral economy, it is worth highlighting the following models of practices for the

coordinated functioning of the system of emissions trading and taxes on CO₂ emissions [34]:

- model A – a combination of the emissions trading system to limit CO₂ emissions and excise taxes on energy resources, which act as price tools for reducing greenhouse gas emissions. But CO₂ emission taxes have not been established. This model works in: Austria, Belgium, Greece, Italy, Lithuania, Germany, Slovakia, Hungary, Czech Republic;

- model B.1 – combination of emissions trading system with taxes on direct CO₂ emissions, namely fuel base carbon tax. This model is used by: Denmark, Ireland, Iceland, Liechtenstein, Luxembourg, Norway, the Netherlands, Slovenia, Portugal, Finland, France, Switzerland, Sweden;

- model B.2 – a combination of the emissions trading system with taxes on direct CO₂ emissions, namely a tax on actual or measured CO₂ emissions (emission base carbon tax). This model is used by: Estonia, Spain, Latvia, the Netherlands, Poland, Ukraine;

- model C – a combination of an emissions trading system with a tax and a mechanism for ensuring the minimum price level for CO₂ emissions (Carbon Price Floor, CPF), which is used in Great Britain. The main advantage is to stimulate investment in environmentally neutral technologies, preserve market conditions for various sectors of the economy, and if the prices of allowances in the emissions trading system fall below the minimum prices of CO₂ emissions, polluters must pay the difference in the form of a tax.

These models function in the EU in conjunction with the system of harmonized excise taxation of energy resources. EU member states, along with Great Britain, Norway, Switzerland, Iceland and Liechtenstein, apply the CO₂ tax and the EU emissions trading system. Along with this, there are countries where companies in some sectors using the emissions trading system are given benefits in the form of CO₂ emission tax refunds. We would also like to emphasize that, although Germany is currently part of the group of model A countries, in

December 2019, the German government decided to introduce a tax on carbon dioxide emissions for oil and gas companies in the amount of 25 euros per ton of CO₂. To investigate the effectiveness of the symbiosis of harmonized excise duties and taxes on carbon dioxide, let's look at energy intensity, the carbon intensity of GDP and the effective rate of environmental taxation of energy resources (ITR on energy) during 2010-2018 in EU-27 member states average (fig. 7) and Ukraine (fig. 8).

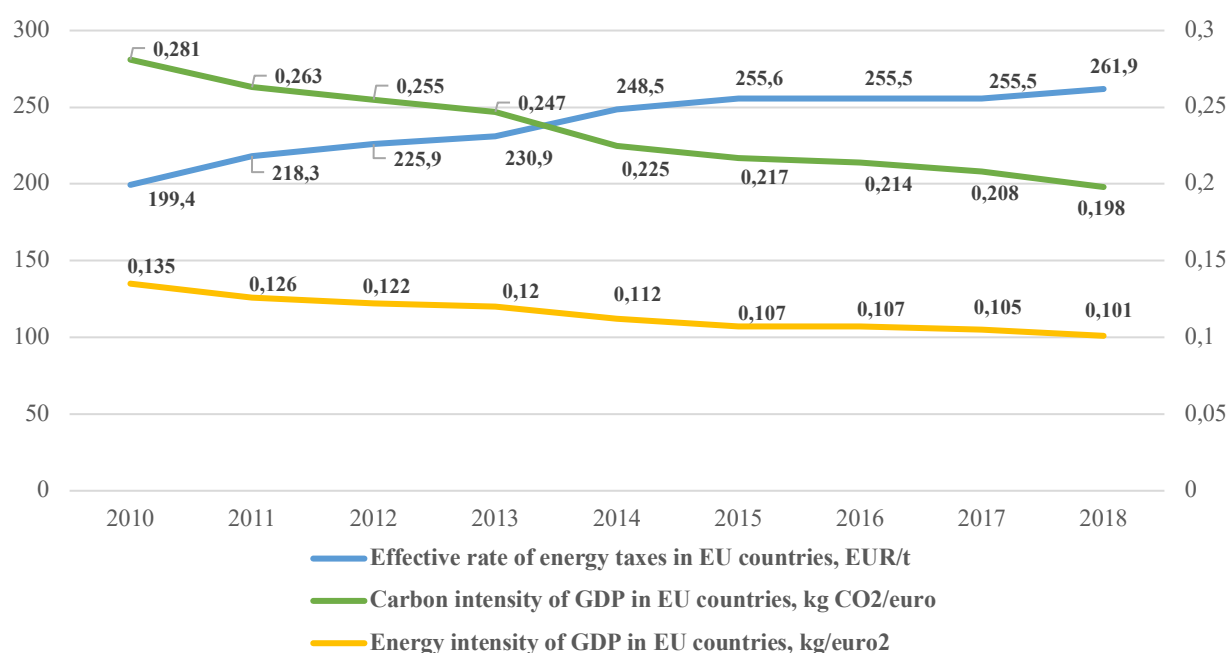


Fig. 7. Dynamics of energy intensity, the carbon intensity of GDP and effective tax rate on energy resources during 2010-2018 in EU-27 member states average

Source: compiled by the author based on materials [34]

To calculate indicators of energy intensity and carbon intensity, the total supply of primary energy and CO₂ emissions from the burning of energy resources, GDP at purchasing power parity is used. Whereas, to determine the effective rates of energy taxes, no such adjustment is made and GDP at market prices is used. In view of the given data, we can note the inverse relationship between the effective rate on energy resources and indicators of energy intensity and carbon intensity of GDP, although CO₂ emissions are not directly related to excise taxes on energy resources. The corresponding values of the correlation

coefficients for the effective rate and energy intensity and carbon intensity of GDP are -0.994 and -0.988, while in Ukraine they are -0.665 and -0.723.

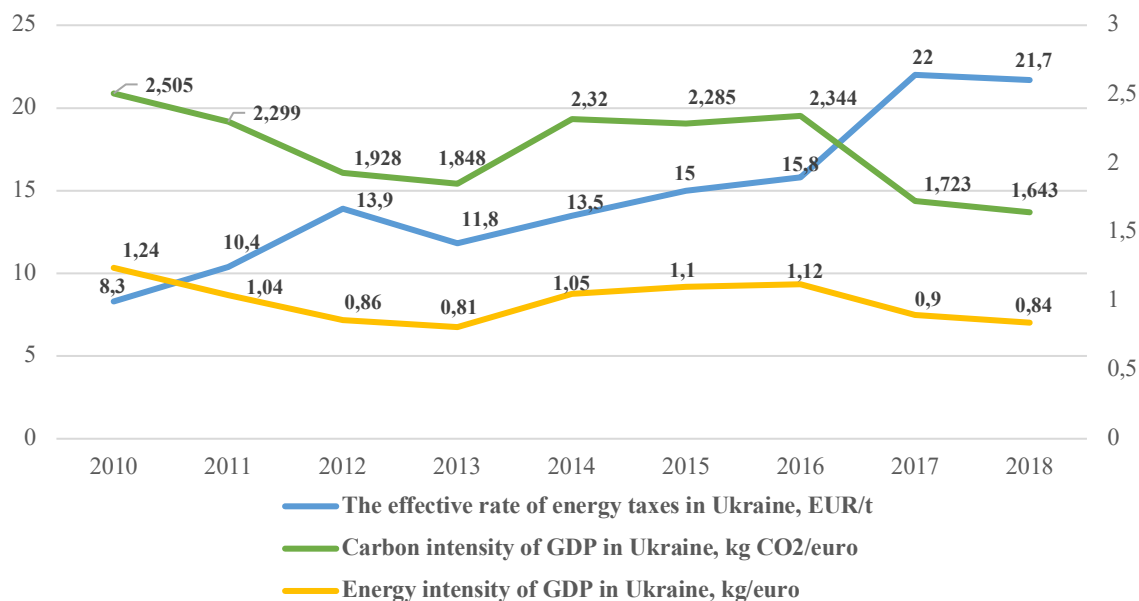


Fig. 8. Dynamics of energy intensity, the carbon intensity of GDP and effective tax rate on energy resources during 2010-2018 in Ukraine

Source: compiled by the author based on materials [34]

All this clearly demonstrates the significant regulatory effect of such taxes and the inverse dependence, i.e. with the growth of the effective rate, the energy intensity of GDP decreases both in Ukraine and in the EU countries. Compared to European countries, Ukraine has significantly higher indicators of energy intensity and carbon intensity (8.4 and 8.3 times, respectively, in 2018), which indicates the need to promote the improvement of the efficiency of the use of energy resources through tax instruments. Since the effective tax rate of energy taxes in Ukraine is 12 times lower than in EU countries, there remains a large unrealized fiscal potential. However, legislative and administrative decisions in the direction of increasing tax rates should take into account the relatively lower purchasing power of economic agents. Given the experience of the analyzed EU countries, the practice of using taxes on CO₂ emissions in the form of an indirect tax on the consumption of energy resources remains relevant for Ukraine. Which

in turn will simplify administration, reduce the energy intensity of GDP and tackle climate change.

International experience shows that in order to convert from a tax on estimated emissions into a tax on the consumption of energy resources, it is necessary to use the following coefficients, which are the basis for compiling the inventory of greenhouse gas emissions of the countries of the Kyoto Protocol [23]:

- the coefficient of carbon content in the fuel, which will turn into CO₂ during combustion;
- calorific value coefficient;
- oxidation ratio.

The Intergovernmental Panel on Climate Change has developed carbon coefficients for different fuel variations. Although they require appropriate adjustment due to the national characteristics of the fuel in each country according to the instructions that compile the greenhouse gas inventories. For example, Ireland has an institution - the Environmental Protection Agency, which calculates the relevant coefficients.

This experience can be applied to Ukraine. The indicators that take into account the national characteristics of the fuel are determined by the National Center for Accounting for Greenhouse Gas Emissions, and the values form the basis of the National Inventory of Anthropogenic Emissions from Sources and Absorption by Sinks of Greenhouse Gases for the corresponding year. In the case of applying this approach, the Ministry of Environmental Protection and Natural Resources of Ukraine must approve such indicators every year [34].

The formula for converting the tax rate from one based on measured emission values to one based on physical units of mass/volume of fuel is as follows (1):

$$Rate_{FB_n} = Rate_{EB} * CC_n * NCV_n * COF_n * D_n * \frac{44}{12} * 10^{-3}, (1)$$

Exemptions/reductions for biomass tax should also be provided, as emissions are offset by the growth of new trees. So, in order to improve the

mechanism of environmental taxation of Ukraine, create a reliable source of funding for environmental protection activities and stimulate the introduction of resource-saving and environmentally friendly technologies into production, we consider it expedient to reorient environmental regulation from control over the level of environmental pollution to taxation of energy carriers.

Insights from this study and perspectives for further research in this direction. Looking globally, we have positive shifts toward ecological situation improvement. Ukraine is performing the first steps to harmonize and reform the environmental taxation system. In order to progress, it is necessary to take the experience of the countries which managed to succeed in this field. Environmental taxes not only directly address environmental damage but also indirectly influence the way of technological development. This effect should be considered when assessing the importance of taxes for green growth because technology development is also subject to market failures.

The main recommendations for reforming the "green" policy and environmental taxation system in Ukraine could be the following:

1. Balanced revenues to the budget due to the effective use of the country's resources and approximation of tax rates for CO₂ emissions to the European level. In general, the environmental tax rate is considered optimal if it is more profitable for economic agents to use modern technologies to reduce pollution than to pay an environmental tax. It is worth implementing taxation on a progressive scale and gradually increasing the environmental tax rate for carbon dioxide emissions by 10 hryvnias each year to reach the level of 60 hryvnias per ton by 2025. Along with the implementation of environmental tax rates by the level of "polluted" regions.

2. Increase the coefficient when calculating fees for over-limit emissions and discharges of polluting substances. Introduce a system of fines for environmental offences and expand the list of activities related to environmental

protection measures in order to use fiscal and credit levers to encourage nature users to preserve the environment.

3. Transfer fees for usage of natural resources or pollution of the environment to the financial results of the enterprise's economic activity, instead of the cost of production. Create conditions to refinance CO₂ emission tax amounts for the purposes of decarbonization and energy efficiency improvement;

4. Move towards changing the structure of environmental taxes in favour of energy and transport taxes, where the share of the former will be up to 50% of all revenues from environmental taxes, and the share of the latter - up to 20%. Also, simplify environmental tax administration and reduce transaction costs.

5. Taking into account that Ukraine has reached soils, the experience of EU countries regarding the tax on fertilizers and pesticides is gaining relevance.

6. Stimulate the use of biofuels for energy production and the transition of enterprises from fossil fuels to those produced from biologically renewable organic sources with the appropriate application of tax incentives, up to the establishment of a zero rate for CO₂ emissions for installations burning biofuels.

7. Create the State Fund for Environmental Protection as part of a special fund of the State Budget as a separate legal entity with the financing resources of 100% environmental tax of CO₂ emissions and 30% of remaining environmental tax except for the revenues of radioactive waste displacement. The allocation of funds should be controlled by the Cabinet of Ministers of Ukraine.

8. Use the experience of European countries in the introduction of Environmental Tax Reforms and, in response to the introduction of stricter tax regulation of environmental taxation with increased tax rates, make appropriate relief in the field of labour or capital taxation, such as income tax and/or social contributions. After all, further research is required as the increase in environmental tax rates can lead to a decrease in GDP, the level of population income and economic activity.

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