

Iron Ore Use as a Potential of Sustainable Development of Industrial Regions of Ukraine: Aspects of Environmental Taxation

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Abstract. The article investigates the resources potential of Ukraine, which is not used effectively enough for the needs of sustainable economic development of industrial regions. The article aims to identify ways to increase the eco-tax base in order to improve the budget support for sustainable development of the iron ore subsoil use and synergetic development of industrial regions of Ukraine. The normative-legal base of subsoil users' taxation is investigated. The necessity of ecological taxation is substantiated as the consequence of enterprise activity is actual environmental pollution. Applied innovations in the method of calculating the environmental tax are proposed. They consider the factor of ownership of natural resources and the discount change in their value over time, which will ultimately increase tax revenues to the budget. It is recommended to introduce the author's approach in the methods of calculating the environmental tax in the field of iron ore subsoil use, which synergistically affects the development of industrial regions of Ukraine. It is justified that the COVID - crisis is a heavy burden on local and state budgets. Therefore, it is necessary to further optimize the system of environmental taxation in order to increase environmental contributions to the budget. Keywords: sustainable development, subsoil use, iron ore, deposits, environmental pollution, environmental tax, tax rate, economic geology, industrial regions, COVID – crisis.

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1 Introduction

In Ukraine, state activity in solving the problems of subsoil use is legalized by regulations, notably the National Program for the Development of Mineral Resources of Ukraine for the period up to 2030 (Law № 3268-VI of 21.04.2011). This state document is valid until 2030, so its provisions are relevant for solving mining problems. In addition, it was amended by the Law of Ukraine № 4731-VI of May 17, 2012.

The following document is the Subsoil Code of Ukraine, which is reflected in the Law of Ukraine of July 27, 1994, № 132/94-BP (latest version № 1423-IX of 28.04.2021). This Law defines the essence of economic activity of users of subsoil resources, their relations with state bodies.

The Subsoil Code of Ukraine (Article 4. Subsoil Ownership) stipulates that "Subsoil is the exclusive property of the Ukrainian people and is provided only for use". All issues and problems with subsoil use must be resolved based on the interests of the Ukrainian people. Rational use of subsoil ensures the well-being of the population, provides jobs for residents of industrial regions of Ukraine. Sustainable development of Ukraine's industrial regions is a potential for economic growth and security of the state. The purpose of environmental taxation is to preserve the health of the nation.

The Cabinet of Ministers of Ukraine has developed documents: "Economic audit of the country", "Vectors of economic development until 2030". These documents became the basis of the "National Economic Strategy until 2030". These government documents analyze the current state of the country's economy, present the general directions of government activities to improve the situation in various industries. In these documents, the Government emphasizes the importance of solving the problems of ferrous metallurgy, ore mining and growth of production and resource potential of the mining and metallurgical complex of the country.

The post-pandemic period requires further research. Now we need innovative sound recommendations for the development of the country's mineral resources complex. This will help increase Ukraine's political prestige and international economic importance. In the context of the post-pandemic budget deficit, solving the fiscal obligations of the country's mining and metallurgical complex is very important.

The purpose of the research is to identify ways to increase the eco-tax base in order to improve the budget support for sustainable development of the iron ore subsoil use and synergetic development of industrial regions of Ukraine.

2 Results

According to statistical indicators, Ukraine ranks first in Europe in terms of iron ore reserves of various types. Therefore, the iron ore economy represents a powerful potential for sustainable development of the industrial regions of Ukraine and the country's economic development as a whole. This potential can ensure financial growth in the country, providing jobs for the population of different territories.

The National Program for the Development of the Mineral Resources Base of Ukraine for up to 2030 states that in Ukraine, iron ores (explored and confirmed reserves) amount to 28 billion tons. Globally, iron ore reserves are distributed among four countries: Russia, Ukraine, Brazil and China. Their total share in the world's proven reserves is 67.2 per cent (139 billion tons). Thus, the natural resource potential of meeting the needs of industrial regions of Ukraine, in particular in the field of metallurgy, is too strong.

Thus, the promising development of ferrous metallurgy in Ukraine is due to too large a resource of iron ore, in particular. These ores are divided into three main types: rich magnetite-hematite, ferrous quartzite, oolite brown iron ore.

Iron quartzites belong to the unoxidized type of Precambrian formations of the Ukrainian Shield. They are concentrated in deposits of so-called poor martite ores. They have an iron content of 15-45%. In the oxidized zone, rich ores of hematite composition have 46-70% iron. Main with iron quartzites deposits of Kryvyi Rih iron ore basin, Kremenchug and Belozersky iron ore districts [4].

According to the content of ore reserves, the following deposits of ferrous quartzites are distinguished: unique resource (over 10 billion tons) and significant resource (over 1 billion tons).

Economic geology (EG) and resource geology (RGL) is engaged in research of problems of information and cost reflection of a resource geological condition.

3 Analysis of recent research and publications

Problems of the economic geology of iron ores and their deposits, in particular iron quartzites, are most widely covered in scientific works by the following authors: N.V. Vinnik, M.N. Korzhnev, M.M. Kurilo, M.H. Palilo, O.Petrusenko, O.V. Plotnikov, S.V. Radovanov, G.I. Rudkom and other scientists of geological sciences. Their research focuses on economic assessments of ore deposits, performance indicators of their exploitation, in particular iron. Thus, M.M. Kurilo, O.V. Plotnikov, S.V. Radovanov, G.I. Rudko conducted research and reflected the methodological foundations of geological and economic assessments of ferrous quartzites and their deposits, analyzed the compliance of the mineral resource base to the requirements of existing mining iron ore enterprises [4-6].

Iron ore is a dominant resource that can ensure the sustainable development of the industrial regions of Ukraine.

Officially, the State Program of Ukraine stipulates that in order to meet the demand for naturally rich iron ores in 2021-2030, the domestic industry needs an increase in their production over these years by 450 million tons. They are receiving 2600 million tons by conducting a searching assessment of Hrushkiv, Sekretarsky and Novoselytsky manifestations, exploration of Pishchansky, Savransky, Baibuzovsky and Moldovan deposits in the Middle Pobuzhye and others. The needs for financing the implementation of this program, in particular iron ore facilities, have been identified.

The dynamics of indicators of production of ores and concentrates of agglomerated iron are given in the table. 1.

Table 1. Production of ores and agglomerated iron concentrates

Years	2015	2016	2017	2018	2019	Average figure
Production, million tons	55,2	56,7	50,8	53,1	51,7	53,5
Chain indices	1,0	1,03	0,90	1,04	0,97	-

Source [7, p. 254]

They are listed in table. 1 data reflect the production of ores and iron agglomerated concentrates in the pre-pandemic period.

Exports of extracted ores and concentrates in 2018 reached 36.9 million tons, amounting to 2869.0 million dollars. USA; in 2019 - 39.9 million tons, amounting to 3397.8 million dollars. USA [8, p. 51].

The cost of resources and reserves of minerals in individual deposits or subsoil areas is calculated according to the Methodology for determining the value of reserves and resources of minerals of the deposit or subsoil area. This Methodology is approved by the Resolution of the Cabinet of Ministers of Ukraine of August 25, 2004, № 1117.

According to the substantiations of Gosgeonadr of Ukraine, the cost of resources and reserves of minerals in individual deposits or subsoil areas is recommended to be calculated by the formula in the following wording:

$$Bp = \sum [(Dt - Bt) - Pt] + A / (I + E)^t - \sum Kt / (I + E)^t \quad (1)$$

where Bp - the cost of resources on the date of assessment;

E - discount rate;

Dt - the amount of annual income from the sale of marketable products, which is accounted for as an object of rent, in the t -th year;

Bt - the number of operating costs in the t -year, which includes the amount of depreciation of fixed assets and costs associated with economic activities for the extraction of minerals (called the production cost of marketable products of the entity);

Pt - the amount of taxes and payments in the t -year, which are not included in operating costs;

At - the amount of depreciation of fixed assets and costs associated with economic activities for the extraction of minerals in the t -th year;

Kt - capital investments in industrial construction in the t -th year, including the acquisition of geological information;

T - the period of use of the deposit or subsoil area for geological study and/or extraction of minerals before decommissioning of the deposit;

Σ - sum sign [9].

In our opinion, it is not objective. For example, the discount rate used to determine the value of resources is taken equal to the discount rate of the National Bank of Ukraine. The formula indicates the t -th year. However, the discount rate of the National Bank of Ukraine changes several times, even from any specific monthly dates of one year.

This formula, as well as other authors' improvements, does not take into account the factor of national ownership of mineral deposits.

In addition, it is logical to use the proposal of V.V. Matyukha to take into account the discount, which changes the cost of the resource over time. He recommended the inclusion in the above formula of a correction factor (P), which estimates the relationship between the original cost of the resource and the value, together with interest discounts, at the end of the period. Thus, the author proposes to take into account the value of the resource (its monetary value) over time [10, p. 116].

Taking into account the proposal of V.V. Matyukha, the denominator of this formula will have the following form [10, p. 116]:

$$(I + E * P)^t \quad (2)$$

For many years, the Tax Code of Ukraine used a single rate of 8% of the subsoil use fee for iron ore mining. But the quality of these ores, mining conditions and other factors are different and depend on their deposits. Recently, variable rent rates for iron ore mining have been introduced, the value of which already depends on market factors.

If the average value of iron ore, according to the IODEX index 58% FE CFR China, which is officially determined by the world news agency Platts, for the tax (reporting) period is 70 and more US dollars, then the rate is 12.00%.

If the average value of iron ore, according to the IODEX index 58% FE CFR China, which is officially determined by the world news agency Platts, for the tax (reporting) period is less than 70 US dollars, then the rate is 11.00%.

In our opinion, these two orientations are not enough for the objectivity of the fiscal obligations of mining companies, as it is essential to take into account the average cost of iron ore.

Thus, in assessing the financial results of subsoil use, it is necessary to introduce further market orientations of the economic geology of iron ore.

However, it should be noted that the quality of iron ore, the conditions of their extraction, profitability, environmental consequences - differ by territory. Therefore, the rate of environmental tax for pollution should be set depending on the fiscal geological policy.

The dynamics of rates for calculating the environmental tax for the presence of hazardous waste, according to the Tax Code of Ukraine, are given in the table. 2.

These data show an increase in such a short period of environmental tax by 69%.

Table 2. Dynamics of rates for calculating the environmental tax

Danger Class	Waste hazard level	Tax rate, UAH per 1 ton in 2014	Tax rate, UAH For 1 ton in 2021	Rates 2021 to 2014, %
I	Extremely dangerous	822,52	1405,65	170,9
II	Highly dangerous	29,96	51,20	170,9
III	Moderately dangerous	7,52	12,84	170,7
IV	A little dangerous	2,93	5,00	170,6
V	Low-hazardous non-toxic waste from the mining industry	0,29	0,49	169,0

Source: [1, 7]

The scale of payment of the environmental tax by economic entities is evidenced by the following data. Private Joint-Stock Enterprise "Northern Mining and Processing Plant" (PJSC "PIVNGZK", Kryvyi Rih), engaged in the extraction of iron ore (07.10 Extraction of iron ore), in 2020 had an income of 24,063 bln UAH, paid environmental taxes in the amount of 151,674 mln UAH (its authorized capital is 579,707 bln UAH), which is 26% of the authorized capital [12; 15].

Public Joint Stock Company "Zaporizhzhya Metallurgical Plant" (PJSC "ZAPORIZHSTAL", Zaporizhia), engaged in the production of cast iron, steel and ferroalloys (24.10 Production of pig iron, steel and ferroalloys), had an income of 45,630 bln UAH paid eco 146,087 mln UAH (its authorized capital is 660,920 mln UAH), which is 22% of the authorized capital [13; 15].

Public Joint Stock Company "ARSELORMITTAL KRYVY RIG" (PJSC "ARSELORMITTAL KRYVY RIG", Kryvyi Rih) carries out the following activities: 24.10 Production of pig iron, steel and ferroalloys; 07.10 Extraction of iron ores; 19.10 Production of coke and coke products, etc. Its authorized capital is 3,859 bln UAH. It paid environmental taxes in the amount of 316,771 mln UAH, which is 8.2% of the authorized capital [14; 15].

In addition to the applied aspects of the economics of nature management, it is proposed to introduce new concepts in the theory of the economics of nature management, subsoil use and in the theory of their taxation. In particular, supplement the definition of "environmental tax" with the definition of "environmental tax" and distinguish them by content and function. In the case of total payment, an environmental tax should be used, in the case of a penalty - an environmental penalty. The introduction of these definitions will ensure the harmonization of terminological interpretations in the economics of nature management, subsoil use, tax theory and tax legislation in general.

4 Conclusions and suggestions

Ukraine is one of the richest countries in the world in terms of ore and resource potential. However, this potential is not used effectively enough for the needs of sustainable economic development of the industrial regions of Ukraine.

The regulatory framework for estimating the cost of subsoil uses needs to be improved, in particular, to take into account a range of natural and economic factors.

Theoretical provisions of ecological geology, fiscal geology, economic geology of iron ore, as well as other minerals must be combined in economic assessments of mining regions and enterprises. At the same time, it is necessary to different indicators and fiscal rates of taxation of enterprises depending on the factor of natural features of mineral deposits extracted by these enterprises. It is necessary to introduce along with the "environmental tax" payment called "environmental penalty" and distinguish them by content and function.

The current mechanism of environmental taxation of subsoil users, especially the calculation of environmental tax, needs to be improved.

This is relevant for the pandemic period. Subsoil users should be considered as economic entities whose activities result in environmental pollution. It is necessary to introduce innovations in the method of calculating the environmental tax, which will take into account the factor of national ownership of natural resources. It is recommended to implement the proposed author's approach in the methods of calculating the environmental tax.

Of course, the COVID crisis is a heavy burden on local and state budgets. Therefore, it is necessary to optimize the system of environmental taxation further and increase environmental contributions to the budget of subsoil users, in particular, iron ore deposits. This is a prerequisite for sustainable development and the subsoil use system, and the industrial regions of Ukraine as a whole.

When calculating the environmental payment, it is necessary to take into account the factor of privatization of water resources. The eco-tax of mining companies that have caused water pollution is becoming a source of recovery of these resources in the future on the principles of sustainable development.

In the conditions of decentralization, territorial communities should intensify the actual implementation of environmental measures and form eco-funds for environmental contributions of geological and mining entities in order to ensure sustainable development.

The funds generated should be used optimally to finance measures to reduce the level of locally manufactured load, to restore the resources used by businesses and the public, in particular, in the context of COVID - a protracted crisis.

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