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PRIORITY AREAS FOR SUSTAINABLE DEVELOPMENT OF ENERGY INDUSTRIES IN KAZAKHSTAN

Purpose of the study: The authors investigated the main directions of development of mineral resources of Kazakhstan, such as oil and gas industries, nuclear energy. From the point of view of developing the economic potential of the country, the mineral and raw materials sector of Kazakhstan is very promising. The development of competitive mining industry in Kazakhstan contributes to the expansion of the tax base and high revenues to the state budget. Research methods used: Statistical analysis, analysis and synthesis methods, comparative analysis, system analysis and an evolutionary approach were used. The results of the study: based on the analysis of hydrocarbon and nuclear reserves, the authors identified the main factors for the sustainable development of these commodity industries, proposed directions for their sustainable development, as well as state stimulus measures. Conclusions of the study: the main task of the state is to create conditions for the development of the industry, attracting investments and building the appropriate infrastructure, which will contribute to the maximum use of the competitive advantages of the industry. Due to the intensive development of production and export of raw materials, the national economy in recent years has managed to achieve high rates of economic growth, strengthen investment potential, and subsequently take the lead in the world arena.

Keywords: *mining industry, oil, gas, fuel and energy complex, nuclear power, sustainable development, mineral resources, industry, hydrocarbons, investments.*

Кілт сөздер: *минералды ресурстар, мұнай, газ, тау-кен өнеркәсібі, отын-энергетикалық кешен, атомдық энергия, тұрақты даму, минералдық ресурстар, өнеркәсіп, көмірсутектер, инвестициялар.*

Ключевые слова: *минерально-сырьевые ресурсы, нефть, газ, добывающая промышленность, топливно-энергетический комплекс, атомная энергетика, устойчивое развитие, минеральные ресурсы, промышленность, углеводороды, инвестиции.*

Introduction. The primary sector of the economy of Kazakhstan, mineral resources and especially export-oriented industries, which form the basis of the country's fuel and energy complex, represent the most important material resource for economic growth and maintaining the level and dynamics of export income.

Mineral resources are and in the foreseeable future will remain the main natural wealth and a prerequisite for the transition to high technologies. The Republic of Kazakhstan occupies a leading position among the raw material powers of the world and plays an important role in the world market, is a monopoly on the Eurasian subcontinent, and has a significant impact on the regional market. The latter is especially important during the period of accelerated development of the technological potential of the manufacturing sector of industry, construction and transport.

The main task at this stage is to create such conditions for the sustainable development of the industry and attracting investment, which will contribute to the maximum use of the competitive advantages of the industry in the future. And the implementation of the conditions for achieving sustainable development is possible if there are adequate laws, regulations, as well as a system of institutional structures that ensure the implementation of these laws.

The practical basis of the research is the materials of statistical collections, as well as research by leading domestic and foreign scientists in the field of the mining industry.

Materials and methods. Methods of statistical analysis, analysis and synthesis, comparative analysis, system analysis and evolutionary approach were used in the work.

Literature review. A significant contribution to the development of approaches to assessing the impact of mineral resources on economic growth, solving the problems of the development of the domestic raw materials complex in the context of global competition was made by: Kontorovich A.J., Burshtejn L.M., Livshic V.R., Ryzhkova S.V. [1, p. 1095-1104] and others. In Kazakhstan, research in the field of sustainable development, efficient use of energy resources is carried out by such leading Kazakhstani scientists as Koshanov A.K. [2, p.14-12] and Satybaldin A.A [3, p.9]. A.K. Koshanov: «... measures are being taken to overcome the raw material export model of the economy and a task has been put forward for high-tech modernization of the economy. The export-raw material model, formed after the large-scale denationalization of the main industries and industries, supports the high profitability of the extraction and export of raw materials at one pole and the low profitability of the processing sectors at the other...». A. Satybaldin: «...Sustainable economic growth should be ensured by accelerating diversification through industrialization and infrastructure development...».

Despite the high level of development of the above issues, the sustainable development of the energy industries of the Republic of Kazakhstan in the context of ever increasing competition is an urgent problem, since a thorough assessment

of this process is required at the present stage to develop proposals for the implementation of the most effective proposals for its implementation.

Main part. Oil occupies a central position in meeting the energy needs of the entire world, which predetermines the role of oil-producing countries as guarantors of market stability. These include Kazakhstan. In the last 10 years alone, the volume of oil production in the republic has more than doubled – from almost 40 million to 80 million tons. The number of contracts with subsoil users has increased from about 100 to over 400. In the most attractive geological region - on the Caspian shelf - about fifteen new oil and gas projects.

As a result, recoverable oil reserves increased from 2.9 billion tons to more than 4.8 billion tons, while gas reserves increased from 1.8 trillion m³ to 3.7 trillion m³. At the same time, the forecasted oil reserves can reach 17 billion tons, gas – 8 trillion m³. Kazakhstan's oil reserves now account for 3.2% of the world's total, and the country itself is among the ten largest owners of this type of hydrocarbons. In terms of gas, our country has 1.7% of the world's reserves [4, p. 3]. The oil and gas industry in Kazakhstan relies on a strong resource base. Most of the developed oil and gas reserves are at the growth stage. Now hydrocarbon reserves have been identified in 8 regions and are distributed extremely unevenly throughout the country. This information is reflected in the table 1.

Table 1

Distribution of hydrocarbon reserves by regions of Kazakhstan*

Republic, region	Oil, million tons		Condensate, million tons		Gas, billion	
	Balance sheet	Recoverable	Balance sheet	Recoverable	Balance sheet	Recoverable
Aktobe	806,3	212,3	53,7	32,7	53,5	1,5
Atyrau	1211,5	839,2	18,3	12,6	373,4	79,4
Mangystau	2524,8	742,9	7,1	3,3	33,3	114,8
West Kazakhstan	338,1	191,4	855,9	638,4	133,2	1338,2
Karaganda	167,2	94,0	-	-	8,7	1,0
Kyzylordinskaya	87,2	27,4	0,1	0,1	0,3	0,8
Zhambyl	-	-	0,2	0,2	-	14,8
Total for the Republic of Kazakhstan	6293,0	2095,0	944,0	688,0	602,4	1528,0

* Compiled according to the source [4]

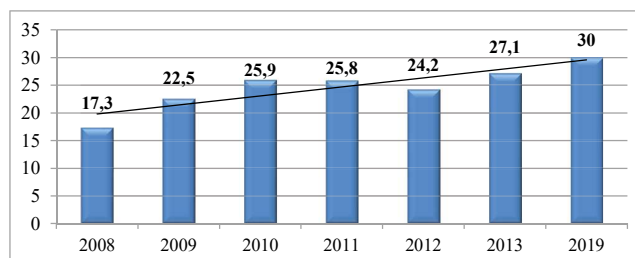
Today in Western Kazakhstan there are 90% of the explored deposits, which account for 98.2% of the exploited deposits. The largest of them in terms of explored reserves are the Tengiz, Karachaganak,

Zhanazhol, Zhetybai, Kenbai, Kalamkas, Karazhanbas, Kumkol, Uzen fields. Their total recoverable reserves are: for oil – 1.565 billion tons, for gas condensate – 650 million tons [5, p.10].

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In recent years, a significant part of oil production in Kazakhstan has been provided by consortia such as TCO and Karachaganak Petroleum. Thus, JV Tengizchevroil LLP (TCO), which develops the giant Tengiz and Korolevskoye fields, in 2008, TCO reached a production volume of 17.3 million tons, in

2009 – 22.5 million tons, in 2010 – 25,9 million tons, in 2011 – 25.8 million tons, in 2012 – 24.2 million tons of crude oil, in 2013 – 27.1 million tons and in 2019 TCO's production volume reached 30 million tons. Dynamics of crude oil production by Tengizchevroil JV LLP are shown in the figure 1.



Picture 1. Dynamics of crude oil production by Tengizchevroil JV LLP, million tons*

*Compiled according to the source [4]

The implementation of the State Program of Forced Industrial and Innovative Development and the fulfillment of the outlined tasks will increase the business attractiveness of Kazakhstan in the next 10 years. Due to these projects, the government plans to more than double oil production by 2020, bringing it to the level of more than 160 million tons and, as a result, Kazakhstan will enter the top five world oil producers [5, p.2].

In recent years, the gas industry and the econ-

omy of KazTransGas JSC have become stronger both inside the country, and outside it, they increase the international role and income of Kazakhstan. Over the past 10 years, KazTransGas JSC has turned the stagnant gas transportation business into a powerful factor in the development of energy, industry, social and geopolitical life of the country. Implementation (or expected) of important investment projects are reflected in the table 2.

Table 2

Investment projects of KazTransGas JSC*

Project	Aim	Status
Construction of new sections on the SATs-4 pipeline	Increase in throughput capacity from 54.6 to 60 billion cubic meters per year	Implemented
Construction of a reserve line Uzen-Aktau	Ensuring uninterrupted supply of Mangistau region	Implemented
Modernization of the gas distribution system of the South Kazakhstan region	Uninterrupted and trouble-free gas supply to Shymkent and the South Kazakhstan region, an increase in the guaranteed service life of gas pipelines	Projecting
Reconstruction of gas pipelines in Almaty and Almaty region	Satisfy future consumption growth, security of supply	Projecting
Gasification of Western and Southern Kazakhstan	Gas supply to enterprises and households	Realize
Construction of the first stage of the Kazakhstan-China gas pipeline	Export of Central Asian Gas to China	Implemented
Construction of the Beineu-Shymkent gas pipeline	Substitution of imports by West Kazakhstan gas	Projecting
Construction of the Caspian gas pipeline	Transit of Turkmen and export of Kazakh gas	Projecting
Transfer of motor transport in Almaty to compressed natural gas	Development of the compressed natural gas market, as well as improvement of the ecological situation in the air basin of Almaty	Implementing

* Compiled according to the source [5]

It is expected that in 2030 Kazakhstan will produce 100 billion cubic meters of gas per year. Such promising gas resources, including those on the Caspian shelf, are of great interest to a number of foreign companies and states. It is not difficult to assume that the North, and in the

future the East and the West - these will be the directions of export of Kazakhstani gas. This multi-vector nature provides strategic guarantees to Kazakhstan of maintaining favorable prices and tariffs for transit and export gas supplies, which we can see at the table 3.

Table 3

Directions for the development of nuclear power*

Kind of resources	Years			
	1990	2000	2020	2050
Total	100	100	100	100
Oil	43	38	28	20
Natural gas	19	23	23	23
Coal	28	27	25	21
Nuclear fuel	5	6	7	14

* *Compiled according to the source [5]*

As the analysis of the presented data shows, the share of nuclear fuel in the world energy balance has increased from 5% in 1990 to 7% in 2020 and it is planned to bring this growth to 14% in 2050. At the same time, until now, nuclear energy occupies a special place due to the significant unused potential and the ambiguous attitude towards it of various segments of the population, even the governments of a number of countries [6, p. 23].

129 uranium deposits and ore occurrences have been explored on the territory of Kazakhstan. Kazatomprom JSC is the national operator of Kazakhstan for the export of uranium and its compounds, rare metals, nuclear fuel for nuclear power plants, special equipment, technologies and dual-use materials. Since its inception, Kazatomprom JSC has increased uranium production from 6,632.9 tons in 2007 (13th in the world) to 13,291 tons in 2019 (first in the world). Today there are 21 mines in the republic. Kazatomprom JSC from 2015 to 2040 intends to invest over \$ 220 million in geological exploration [7, p.27].

Since energy is one of the main branches of the national economy of any country, the level of its development and potential capabilities can be used to judge the economic power of the country. At the current rate of growth in the consumption of fossil fuels, oil reserves will last for about 75 years, natural gas for 100 years, and coal for 200 years. Global consumption of primary energy resources may increase by 65%, and the share of fossil fuels in the world energy balance by 2020 should be reduced to 76% and by 2050 - up to 64% [8, p.3].

To do this, it is necessary to strengthen the study of the republic's subsoil, using the potential of the older generation of geologists, using the latest geological exploration technologies for forecasting and searching for hidden deposits, stimulating advanced scientific support for the geological industry [9].

It follows that the stability of the mineral processing industry is determined by the reserves of mineral raw materials and the need for it by society, the volume of mining, the amount of extracted and processed raw materials, the efficiency of the technology for extracting minerals, environmental friendliness and safety of processes [10, p. 6].

One of the prerequisites for achieving sustainable development is the existence of adequate laws, regulations and standards or mining legislation, as well as a system of institutional structures that ensure the implementation of these laws [11, p.14].

The development of this area must be stimulated at the state level in three main areas:

- 1) involve in the zone of internal consumption as many types of minerals produced in the country as possible;
- 2) create conditions for the creation of finished products at the highest possible technological level;
- 3) stimulate innovation processes and the development of more advanced technologies for deep processing of ores and the extraction of a useful component from them.

Based on the indicated factors that determine the conditions for sustainable development of Kazakhstan in relation to the mining industry, we

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will formulate the following basic principles of sustainable development of the mining complex of the Republic of Kazakhstan [12, p. 35]:

- satisfaction of basic life needs, both of the modern generation and future ones;
- ensuring environmental and technical safety of mining operations;
- maintaining the balance of interests of the state, society and representatives of the mining business;
- preservation of existing ecosystems and restoration of damaged ones;
- timely and adequate to the volume of mining production replenishment of the mineral resource base;
- expansion of the mineral resource base by types of mined mineral raw materials;
- development of technologies for deep extraction of useful components from ores, intensive and extensive development of technological modes of the country's industry.

In turn, on the basis of the above basic principles, it is possible to form the Concept of sustainable development of the extractive industry, which should be organically integrated into the Concept of sustainable development of the Republic of Kazakhstan.

The next step in this direction should be the Program for the implementation of the developed Concept, within the framework of which it is necessary to outline specific ways, stages and mechanisms for its implementation. [13, p.160, 14, p. 203].

Conclusion. Currently, there is an urgent need for the republic to move away from the raw material orientation. However, it should be understood that the path to high-tech production is the use of income from the sale of raw materials and products of a low level of processing into more and more technological and science-intensive ones. The result of such an industrial policy should be a change in the structure of the economy due to an increase in the share of manufacturing in GDP, which by 2020 will amount to at least 13%, an increase in the share of non-resource exports in total exports to 45%, and an increase in the potential of non-resource budget revenues. Support for non-resource exporters is considered in the President's Address to the people of Kazakhstan (January, 2010) as a «key area of industrialization» designed to expand the export opportunities of the Kazakhstani industry in international markets.

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**ҚАЗАҚСТАНДА ЭНЕРГЕТИКА САЛАЛАРЫН
ТҰРАҚТЫ ДАМУЫДЫҢ БАСЫМ БАҒЫТТАРЫ**

Адапта

Зерттеудің мақсаты: Авторлар Қазақстанның мұнай-газ өнеркәсібі, атом энергетикасы сияқты минералдық ресурстарды игерудің негізгі бағыттарын зерттеді. Елдің экономикалық әлеуетінің дамуы тұрғысынан Қазақстанның минералды-шикізат секторының болашағы зор. Қазақстанда бәсекеге қабілетті тау-кен өнеркәсібінің дамуы салық салу базасының кеңеюіне және мемлекеттік бюджетке жоғары түсімдердің түсуіне ықпал етеді. Қолданылатын зерттеу әдістері: Статистикалық талдау, талдау және синтез, салыстырмалы талдау, жүйелік талдау және эволюциялық көзқарас әдістері қолданылды. Зерттеу нәтижелері: көмірсутегі және ядролық шикізат қорын талдау негізінде авторлар осы шикізаттық салалардың тұрақты дамуының негізгі факторларын анықтады, олардың тұрақты дамуының бағыттарын ұсынды, сондай-ақ оларды мемлекеттік ынталандыру шараларын белгіледі. Зерттеудің қорытындылары: мемлекеттің негізгі міндеті – саланың бәсекелестік артықшылықтарын барынша пайдалануға ықпал ететін саланы дамытуға, инвестиция тартуға және тиісті инфрақұрылымды құруға жағдай жасау. Өндіріс пен шикізат экспортының қарқынды дамуының арқасында ұлттық экономика соңғы жылдары экономикалық өсудің жоғары қарқынына қол жеткізіп, инвестициялық әлеуетті нығайтып, кейіннен әлемдік аренада жетекші орынға шықты.

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**ПРИОРИТЕТНЫЕ НАПРАВЛЕНИЯ УСТОЙЧИВОГО РАЗВИТИЯ
ЭНЕРГЕТИЧЕСКИХ ОТРАСЛЕЙ В КАЗАХСТАНЕ**

Аннотация

Цель исследования: Авторами исследованы основные направления развития минерально-сырьевых ресурсов Казахстана, таких как нефтяная и газовая отрасли, ядерная энергетика. С точки зрения развития экономического потенциала страны, минерально-сырьевой сектор Казахстана является весьма перспективным. Развитие конкурентоспособной добывающей промышленности Казахстана способствует расширению налогооблагаемой базы и высоким поступлениям в государственный бюджет. Использованные методы исследования: Использованы методы статистического анализа, анализа и синтеза, сравнительный анализ, системный анализ и эволюционный подход. Результаты исследования: на основе проведенного анализа запасов углеводородного и ядерного сырья авторами обозначены основные факторы устойчивого развития этих сырьевых отраслей, предложены направления их устойчивого развития, а также обозначены меры их государственного стимулирования. Выводы исследования: основной задачей государства является создание условий для развития отрасли, привлечения инвестиций и строительства соответствующей инфраструктуры, что будет способствовать максимальному использованию конкурентных преимуществ отрасли. За счет интенсивного развития производства и экспорта сырьевых ресурсов национальная экономика в последние годы сумела достичь высоких темпов экономического роста, укрепить инвестиционный потенциал, а в последующем выйти в лидирующие позиции на мировой арене.

