

Kazakhstan Coal Industry: Current State and Approaches to Transition to an Innovative Type of Development

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Abstract: The paper presents an analysis of the production of coal in Kazakhstan and the basic methodological principles of transition of the coal industry to the innovative type of development to ensure the conservation of the regime. The methodological principles are as follows: the development is based on socio-economic approach, providing for the innovative capacity; transition to innovations determines the regulatory function of the state; innovative development requires adequate scientific support institutions; innovative changes suggest the existence of institutions that promote competition, innovation is the development of major factor in the growth of competitiveness of the industry. The concept of "innovative type of development" has no unambiguous wording. The author starts from key positions in the determination of the basic methodological principles of transition of the coal industry to the innovative type of development to ensure the conservation of the regime. The introduction of this innovation, the use of tested process flow diagrams and processes to improve the quality of coal products would provide the increase of its competitiveness in the domestic and export markets, making the coal industry economically attractive.

Key words: Coal industry • Coal industry • Innovation • Competitiveness • Modernization and sustainable development of the economy

INTRODUCTION

In the energy balance of Kazakhstan significant role is given to the coal industry, which is currently experiencing a need for high quality products, as extracted from the earth, the coal is characterized by relatively high ash content, moisture, sulfur, etc., which significantly affects its competitiveness.

The increase of the annual production of coal and the use of non-project coal leads to the increased waste output. With each extraction of 1 million tons of coal, 2.6 tons of various pollutants are released into the atmosphere, leaving 2.8 million m³ of soil pollutants, affecting the land area of 7.5 hectares, which will be added with 3.2 million m³ of waste water released to the reservoirs. Large volumes of waste output affects the results of operations of the coal enterprises in the direction of reducing them, as it requires the costs of collection, transportation and storage and the material composition of the waste that can be used as a complete process of raw material and fuel for different products,

which are in a stable demand with the enterprises in other sectors of the domestic industry.

The acuteness of the problem of protecting the environment from the pollution and waste emissions and the relevance of its solutions emerged in the late twentieth and early twenty-first century. The scale of industrial output and the constant growth in the near future will lead to further aggravation of the contradictions in the relations between nature and society.

The principles, goals and major tasks and mechanisms for achieving sustainability in all fields of Kazakhstan define the concept of transition to sustainable development for the period 2007-2024 years. The Message of the President of the country Nursultan Nazarbayev to the people of Kazakhstan from March 1, 2006 states that the basis for the country's strategy of entering the 50 most competitive countries of the world are on the principle of sustainable development [1].

The Achievement of sustainable economic development is a difficult and complex issue, involving the high efficiency of natural resources and raw materials,

increasing the competitiveness through the introduction of scientific and technical innovation and ultimately the well-being of society.

Currently, the objective function for the coal industry is being transformed. If earlier there was a task of maximizing the amount of produced coal, now the objective function can be formulated as a source of raw material for a number of new high-quality innovative products with the highest market value, ensuring their effective use by the consumer. To solve problems in our country Research Institute and Ministry of Research and Development Sector and the Ministry of Energy and Mineral Resources Ministry and other ministries have been involved. The introduction of innovation, the use of treated process flow diagrams and processes to improve the quality of coal products provide an increase of its competitiveness in the domestic and export markets, making the coal industry economically attractive.

MATERIALS AND METHODS

The economy of Kazakhstan after gaining its independence has moved on the path of industrial-innovative development, the import substitution policy is leading the country to accelerate its economic development and modernization. Having these circumstances, the market of innovative products and high-end technology now acts as one of the fastest growing segments in the country and in the world economy.

One of the first people who studied the nature of innovation are N.D. Kondratiev and J. Schumpeter. N.D. Kondratiev was not directly involved in the analysis of innovation problems, but he has identified large cycles conditions (long wave) contributed to the subsequent study of these cycles, their duration and the driving forces, where the most important innovations have been recognized. In his studies, he put forward the idea of the existence of large cycles of conditions, which are formed from each essential and many secondary advanced innovations [2]. He developed in particular the theory of long waves of innovation, according to its own concept of STP. Essentially N.D. Kondratev laid the foundation of so-called "cluster" approach to the study of the innovation process.

The ideas of ND Kondratev were then applied by the Western economists in early 50's to justify and excuse the cyclical crises of overproduction. For example, Joseph Schumpeter considered the opportunities in innovation

for accelerated overcoming of economic downturns through the activation of radical technological innovation. [3] In his concept of the normal state of economy is a dynamic disequilibrium caused by the activities of the innovator-entrepreneur. In this case, the main direction of innovation is to increase the return on invested resources where modernization (innovation) is the most economic and social concept than a technical one. Further comprehensive development of ideas about innovative processes are associated with the names of P. F. Drucker [4, 5], Rogers CR [6] J. Zallmena [7] and other researchers, who knew him and acknowledged the increase in technological capabilities of the social subject, contributing to the opening of an access to a wider, compared with the previous range of limited resources, ensuring its existence.

Improving the competitiveness of the coal industry, the possibility of domestic scientific and technological potential to solve pressing challenges the energy industry is a generic measure of innovation. Components of getting a good result in international competition, Porter showed the diamond - the factors of production, related and supporting industries, local demand conditions, firm strategy and rivalry [8, p. 197]. In our view, "Porter's diamond" can be supplemented with the following components - "the conditions for the factors of innovative development." The improvement of the competitiveness of the industry is due to the base with the following provisions: the creation of conditions for the formation of a group of owners, who are really interested in long-term and sustainable development of the industry, carefully thought-out system in innovation, ensuring top management of highly qualified, knowledgeable about the prospects of technological development, improving social responsibility of the industry.

According to Porter, the main objective of the strategy of innovative development is the search for the first signs of aging technology developed in the production and detection capabilities for renewal of production [8, p.169]. Porter notes that the strategy is the formation of a unique and advantageous position, which involves a specific set of defined activities, the essence of the strategy is the fact that one must make a choice in favor of something, in order to give up the other [8, p.170].

Of course, if the strategy of innovative development is not determined in the country, it is difficult to determine the area of investment, as it is the more difficult to identify the possibility of not yet existing production methods.

In one of the messages of the President of the Republic of Kazakhstan Nursultan Nazarbayev People of Kazakhstan said: "We want to see Kazakhstan as a country that is developing in line with global economic trends. A country that absorbs all the new and advanced that it creates in the world, occupying the world economy in a small but its specific "niche" and able to quickly adapt to new economic conditions [9, p.1].

Kazakhstan has developed a "Strategy of Industrial and Innovation Development of Kazakhstan for 2003-2015". As part of the strategy "Kazakhstan-2030" in January 2010, the Government of Kazakhstan began five years of industrial-innovative development program. In this regard, the developed state program of industrial-innovative development of Kazakhstan for 2010-2015 is to implement the order of the President of Kazakhstan Nursultan Nazarbayev, of May 15, 2009 at the XII Congress of People's Democratic Party "Nur Otan" [10]. This program states that a promising direction in the development of the coal industry is to improve the technology of the primary processing of coal (enrichment, grading into classes, clustering coal fines), increase the energy potential of raw coal (thermocoal, thermobricks, semibricks) and a number of other areas of scientific and technological research, realizing the potential consumer qualities inherent in coal [10, p. 31].

Thus, in order to achieve the sustainable development of the country, contributing to shifting from extraction, through further modernization, diversification and competitiveness of the national economy and to prepare the conditions for the transition to long-term service and technology economy requires a complex and lengthy transition of the domestic economy to an innovative way of development.

The effectiveness of the momentum in this direction is due, firstly, to the role and position of the state. The hope for the "invisible hand of the market" is in the past. As it is clear, the market mechanism itself, does not automatically fixes itself to build a "necessary and proper" structure of the economy, we need a substantial help from the state. Thus, the government must take a full responsibility for economic growth and improve the living standards of its citizens. Since these issues are related to the organization of transition to an innovative type of development, by definition it cannot be deviated from the solutions of the problem.

Secondly, an innovative type of economic development should be interested to the business owners who are keenly vested in the share of national wealth and the management of this property manager.

Thirdly, the responsibility for transition to innovative development should be take on by the society, which is an important part of innovation strategy, it is necessary to carry out the effective monitoring of the activities of the businesses and the state of the given area.

Lastly, the productive innovation can only be meaningful in the mainstream of the state industrial policy.

Main part. 1. State mining of coal and its importance in the long term shaping the energy balance of the country

In most countries, the share of coal in the energy mix is 20-30%, while the number of countries it imports [9, p.525]. Proven coal reserves in the world is currently at 800 billion tons in terms of conventional fuel. The oil and gas reserves in the world compared with coal are limited, with the current level of consumption of coal in the world, with proven reserves will last for 270 years. As the scientists of Germany stated, the global demand for coal production in the future will tend to increase [10, p. 21].

Table 1: The forecast of world energy consumption

Energy Source	Forecast for 2020							
	1990		Growth Acceleration		Reference Index		Environmental Index	
	Bln/ton	%	Bln/ton	%	Bln/ton	%	Bln/ton	%
Total	12,5	100	24,7	100	19,1	100	16,0	100
Oil	4,0	32	6,7	27	5,3	28	3,9	24
Gas	2,4	19	5,0	20	4,0	21	3,3	21
Coal	3,3	26	6,9	2,8	4,6	24	3,0	19
Nuclear energy	0,6	5	1,5	6	1,1	6	1,0	6
Hydro energy	0,7	6	1,7	7	1,4	7	1,0	8
Renewable sources	1,5	12	2,9	2	2,7	14	3,5	22

Note - compiled from source materials [10, c. 21]

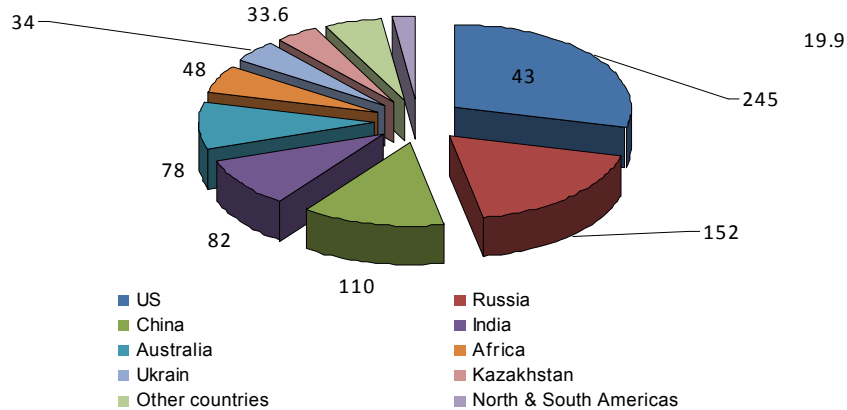


Fig. 1: 10 leading countries and their coal reserves

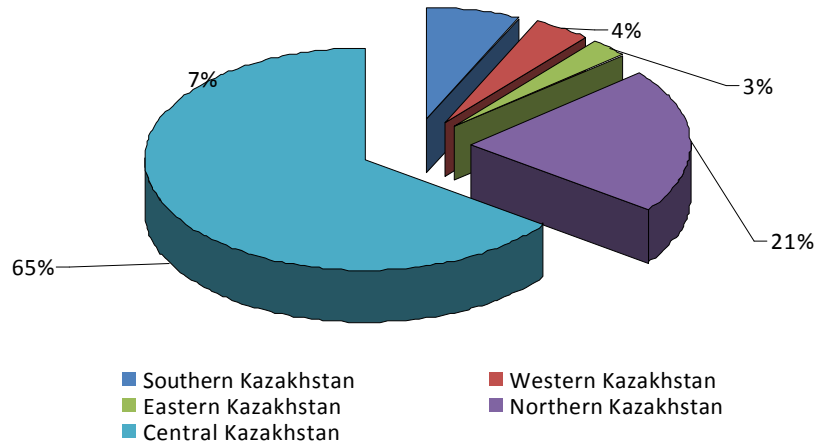


Fig. 2: The coal reserves of the Republic of Kazakhstan by regions.

According to the findings of various specialists since 1980, coal provides about 20% of the demand of electricity and thermal energy and is being projected over the long term as the share of solid fuels thus is expected to grow to 30-35% by 2015 and to 45% by 2050 [11, p.17].

The coal industry in Kazakhstan is one of the largest sectors of the economy. In terms of reserves of coal, Kazakhstan is among the ten leading countries, behind China, the USA, Russia, Australia, India, South Africa, Ukraine and contains of 4% of the world's total reserves.

The biggest coal producers in Kazakhstan are the companies Pavlodar region: TOO Bogatyr Access Coal "(42.8% of the nationwide production) cut "Vostochniy", JSC" Eurasian Energy Corporation" (20.7%), JSC" Maikuben West " (3.3%, including 96.6% of the national production of brown coal) and Karaganda: JSC "ArselorMital" Temirtau "(12.3%) and CA" Borly "Corporation" Kazakhmys "(8.7%). They account for 87.7% of coal production in the country.

Federal balance reserves in 49 fields is 33.6 billion tons, including stone - 21.5 billion tons of brown coal - 12.1 billion tons Most of the coal deposits are concentrated in the Central part (Karaganda and Ekibastuz coal pools, as well as field Shubarkol) and Northern Kazakhstan (Turguy coal basin).

In Kazakhstan, in 2010 the total volume of coal production was 110.8 million tons (growth rate to the level of 2000 - 143.3%). The share of coal in Kazakhstan in 2010 amounted to 94.9% of the total volume of coal produced in the country.

In 2011, according to preliminary data, in Kazakhstan produced 107 million tonnes, of which the internal market delivered 50.5 million tons, including for the needs of the electric power industry - 37.6 million tons of coal supplies to the cuts made Ekibastuz on the largest thermal power plant of the Urals - Reftinskaya, NizhneTurinskaya power plant, power plants and Krasnogorsk Verhnetagilskoye power plant providing electricity supply industrial and residential areas of the Sverdlovsk, Tyumen, Perm and Chelyabinsk regions.

By 2015, Kazakhstan plans are to increase coal production to 128-134 million tons (growth rate to the level of 2010 could reach 120.9%). By 2020, the volume of coal produced in the country is planned to grow in the amount of 145-151 million tons, this would require the investment of more than \$ 4 billion U.S. dollars, including the production of steam coal - \$ 1.8 million, coking coal - \$ 1.5 million.

In accordance with the program of forced industrial-innovative development of Kazakhstan for 2010-2014., the increase in coal production will be achieved through the implementation of a number of coal projects. In particular, it includes the reconstruction of the section "Hercules" and its transition to a new auto-conveyor technology. As a result, the cut is expected to raise the coal production to 48 million tons of coal a year. Also it is planned to complete the reconstruction of the section Ekibastuzsky "East" and the construction of overburden stripping of the complex in this section, where a stable extract 20 million tons of coal a year is expected. In addition, in the Karaganda region (Kazakhstan) it is expected to put into operation a stone deposits of coal, "Jalyn", with capacity of 500 thousand tons of coal a year. By 2017, Karaganda JSC "ArcelorMittal Temirtau" (part of the international corporation ArcelorMittal), which, as of June 2012, is owned 8 coal mines in the Karaganda region, plans to launch a new mine "Tentekskaya number 10" stocks that make up 340 million tons company "Arselor Mittal Temirtau" in 2010 invested in the modernization of the coal industry in the Karaganda region of \$70 million USD, while in the entire period from 2007 to 2012 there \$520 million USD are being invested to improve the working conditions in coal mines in Kazakhstan. It should be noted that the "ArcelorMittalTemirtau" has begun to implement a "pilot" an innovative project, worth \$ 2 million USD, for electricity generation by degassing of methane on Kazakh mines. The electricity is produced with a capacity of 1.4 MW and this energy covered 20% of its needs in the mines.

To date, the mining resources sector of Kazakhstan is the basis for the development of the real sector of the economy. Exploration expenses in Kazakhstan during the transformation and reform have decreased by 3 times. The scale extraction of natural resources exploration is covered by only 40-50%. Enterprises of the mining sector of the economy are trying to save on the costs of exploration.

The deposits of the major coal basins of Kazakhstan have a fairly high level of exploration and have large potential reserves of construction on the basis of their current competitive coal enterprises.

CONCLUSION

These materials allow the article to the following conclusions on the recommendations of methodical and applied features.

In this article the theoretical and methodological principles of the transition of the coal industry to the innovative type of development will solve the complex technical, environmental and economic challenges are the following: the development based on socio-economic approach, the provision for the innovative capacity; transition to an innovative type of development determining the regulatory function of the state; innovative development involving the proper scientific support, innovative change involving the existence of institutions that promotes the competition, innovation development which is considered as the main factor of competitiveness of the industry.

The implementation of innovative processes at all stages of the production cycle (production, transportation, refining and incineration) will improve the quality parameters of coal products, which will create the conditions for improvement of its competitiveness and reduction of harmful emissions.

The coal industry innovations are connected with the conduct of the research and pilot projects, the sources of funding of which shall be the coal industry and state funds, as many of the problems addressed by the industry are of national importance.

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