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MAIN INDICATORS OF ENERGY SYSTEMS

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Abstract

The Russian Federation has high competitive advantages in the gas sector over most countries, as well as great potential for their effective use. But recently, the priorities that determine the sectoral specifications for the development of the fuel and energy complex of the Russian Federation should be transformed. In the strategic factor of economic growth of the Russian Federation, the structural restructuring of the national economy based on the available mineral resources of the country should take its place in order to achieve a higher level of its efficiency. This requires the development of a network component and generating sources. The inclusion of the construction of the necessary energy facilities in the Scheme and development program of the Unified Energy System of Russia, as well as the scheme of territorial planning of the Russian Federation in the field of energy will attract investments for the implementation of large projects in promising territories.

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1. Introduction

Having significant competitive advantages in the gas sector over most countries, the Russian Federation has great potential for their effective use. The key strategic task of the last "five-year plan" is the need to transform the priorities that determine the sectoral specifications for the development of the fuel and energy complex of the Russian Federation.

2. Problem Statement

Putin (1999) wrote main theses that determined the development of the Russian fuel and energy complex for a fairly long period of 2000-2020. They mainly address the issues of strategy of the oil and gas sector, the extraction from which we will cite as an ideological platform for determining the future of the domestic fuel and energy complex and in general energy in the changed conditions.

3. Research Questions

Analytical collections (2018, 2019, 2020) describe analysis of the economic potential of mineral resources, the state of fixed assets and applied technologies in the mining complex gives reason to draw some conclusion about the importance and place of the mineral raw materials complex in the structure of the country's economy:

- Mineral raw material resources – the important potential for economic development of the country.
- Comprehensive assistance to development of domestic processing industry on the basis of the extracting complex – the main reserve of transformation of the Russian Federation in rather near future to the leading economic power.
- The analysis of the economic processes happening in the world demands full state support and creation on the basis of the resource-extraction enterprises of large financial and industrial corporations of an interindustry profile which could compete to multinational corporations of the West on equal terms.
- Development of the extracting complex has to be regulated by the state by purely market methods, at the same time the state has to contribute in every possible way to the development of processing industry on the basis of the extracting complex.
- The Russian economy in XXI pitch, but a last resort in his first half, apparently, will keep the raw orientation. The potential value of balance reserves of minerals of the Russian Federation allows to consider a mineral and raw complex as basis of sustainable development of the country in the long term. Presence of large natural and resource capacity of the Russian Federation causes her special place among the industrial countries. Resource potential at his effective use will become one of the most important prerequisites of steady inclusion of the Russian Federation in world economy.

4. Purpose of the Study

The most important goal of the natural resource policy is to ensure rational and efficient use of the natural resource potential of the Russian Federation in order to meet the current and future needs of the country's economy and exports.

5. Research Methods

Makarova et al. (2019), notes about strategic factor of the economic growth of the Russian Federation in the near future should be the structural restructuring of the national economy based on the existing mineral resources of the country in order to significantly increase its efficiency. A special difficulty of this task is that it is necessary to rebuild the industry and production structures, which in a long period developed in the conditions of a planning and distribution system and the development of trade and economic relations with a limited number of partners in regional blocs.

In the Russian Federation, therefore, it is necessary to implement such a principle of rational environmental management as an organic combination of market mechanisms for self-regulation and support for rational resource consumption and resource conservation.

In order to rationalize resource consumption, an appropriate organizational and economic environment is needed. The market mechanism, as already noted, is not in itself able to solve the whole set of problems under consideration, a number of contradictions, is eliminated through scientifically sound state regulation. We are talking about counteracting the monopoly behavior of large corporate structures, in some cases inhibiting innovation and violating environmental management standards, ensuring the purity of biosystems, blocking trends in environmental pollution, etc. In all developed states, it is environmental management that is most regulated (albeit far, but always effective) - regardless of existing forms of ownership of land and its subsoil, and forms of management.

In this regard, the strategic goal of public policy in the field of the restoration and protection of natural resources for the next decade is to achieve optimal levels of reproduction, unsustainable rational and balanced consumption and protection of all natural resources, aimed at improving the socio-economic potential of the country, the quality of life of the population, the realization of the rights of current and future generations to enjoy natural resource potential and a favorable environment, the strengthened economy of raw materials, materials, energy at all stages production and consumption, creating the basis for the transition to sustainable development, high responsibility in the adoption of various domestic and foreign policy decisions, aimed at realization of geopolitical interests and observance of national security of the Russian Federation.

It was a message aimed at achieving a balance in state-corporate cooperation for the development of the oil and gas industry of the Russian Federation. It sets out the views of the future head of state on the prospects for the development of the country's oil and gas industry. They determined the strategy of its actions, the main component of which was the bet on energy companies, the development of which is closely related to the implementation of the national interests of the Russian Federation.

The rise of the gas-chemical processing industry and the improvement of the competitiveness of products in the world market are becoming a national priority. They compensate for the dramatic decline

in production and the liquidation of many enterprises of related industries that worked for the development of the oil and gas chemical sector of the real economy during the dramatic period of Russian history. The ongoing restoration of competencies will increase industrial potential, form the latest clusters, corporations of an intersectoral profile that could compete with TNCs of the West, and accordingly increase the country's GDP.

Therefore, regional administrations and management teams of fuel and energy companies, in our opinion, should be inclined to synchronize actions. It should be noted that in the oil and gas industry, relative to each of its segments, there are a lot of unfinished projects, the effectiveness of which is quite controversial, but at the same time they take over resources, personnel, and restrain the general movement forward.

The success stories of the global energy companies that emerged in the twentieth century will never be repeated. They are associated with the past and present of energy companies that compete with teams in foreign markets, and the rise of which is associated with the names of famous big business leaders. They ensured the sectoral recovery of the oil and gas industry in the modern period, prioritized strategies that will prove effectiveness in the coming decades up to a new round of a radical change in the energy future.

Despite the increasing uncertainty in the world about the future of energy, and the emergence in crisis periods of the so-called "black swans" - situations of a sharp and economically unmotivated decline in energy prices, strategy becomes the only right decision.

As Kulapin (2018) notes,

Modern energy technologies to increase the efficiency of traditional industries and renewable energy will form the basis of a new economic system that seeks to reduce the anthropogenic impact on the climate. Russian companies have accumulated competencies in the development of such technologies and the necessary potential to occupy a niche in emerging high-tech markets. (p. 20)

According to the main conclusions of the Forecast for the Development of Energy in the World and the Russian Federation 2019, prepared by INEI RAS together with the Center for Energy of the Moscow School of Management SKOLKOVO, which we supplemented with the author's vision, a key direction for the development of world energy is identified, which is projected on the development of the domestic oil and gas industry. Under the influence of global changes in energy policy and the development of innovative technologies, the world is entering the stage of the fourth energy transition to the widespread use of renewable energy and the phasing out of some hydrocarbon fuels. However, the pace of these changes and the rate of transition are relative, since the uncertainty of the development of the economies of whole countries and their lack of readiness for such a technological leap, joining the climate protocols hinders the development of modern civilization (Chernikov, 2012).

Despite the rapid development of renewable energy sources, which will theoretically provide 35-50% of world electricity production and 19-25% of total energy consumption by 2040, it is necessary to have reserve volumes of hydrocarbon sources in stock, which with the help of distributed-type power plants can guarantee the functioning of economies and the safety of life of entire countries. Of all types of hydrocarbon fuels, only gas is able to increase share in the global energy balance from 22% to 24-26%.

Draft energy strategy of the Russian Federation up to 2035 (2019) in general strategy for the development of the Russian fuel and energy complex based on ES-2035 involves the formation of two scenarios, conventionally called "lower" and "upper," and determine the range of possible changes in the parameters of TEB and the main indicators of the development of energy sectors. The forecast estimates of opportunities and risks of domestic energy development are based on. Going beyond this range can be a determining indicator of the need for additional measures or a revision of the strategic priorities for the development of the fuel and energy complex. Both scenarios assume:

- Maintaining as a stable basis of world energy of hydrocarbon fuels, with a gradual increase in the share of RES in world and national TEBs;
- The long-term nature of the policy that was initiated in 2014 by a number of states that is discriminatory against the Russian Federation and the Russian fuel and energy complex;
- The predominantly evolutionary nature of world scientific and technological development.

Key prerequisites for scenarios include:

- GDP growth of the Russian Federation from 2019 to 2035 by an average of 2.3% annually - in the lower scenario, and by 3% - in the upper scenario;
- Growth of electricity consumption by 2035 by 1.23 - 1.28 times to 1370-1420 billion kWh (in the lower and upper scenarios, respectively), including due to electrification of railway transport and the spread of electric vehicles;
- Increase of domestic consumption of energy resources by 6-10% (with containment of its growth due to realization of potential of energy saving and improvement of energy efficiency);
- Moderate, taking into account the increase in the efficiency of internal combustion engines and the increase in the share of road transport using gas-powered fuel and electricity, an increase in the consumption of automobile gasoline (by 3-4% compared to the base level) and diesel fuel (by 5-8%) in the first stage of the Strategy implementation. At the second stage, due to an increase in the total vehicle fleet and the intensity of freight transportation, growth may amount to 17-27% and 9-15%, respectively;
- The increase in the consumption of GMT in transport by 4 times by 2024 and by 15-19 times by 2035;
- Development of electric energy storage technologies to equalize the load schedule in order to improve the technical and economic performance of the UES of the Russian Federation and isolated power systems (up to 20 GW by 2035 in the upper scenario).

The lower scenario is essentially traditional and involves maintaining the course of the raw materials sector of the oil and gas sector without radically changing trends, preserving the sectoral proportions of the development of the Russian economy. It provides for a restrained economic growth rate based on the progressive modernization of the fuel and energy complex of the Russian economy with the conservative development of processing industries (Konoplyanik, 2018).

The upper scenario involves the achievement of the goals outlined in the Decree of the President of the Russian Federation "On National Goals and Strategic Objectives for the Development of the Russian Federation for the Period until 2024," a consolidated support for the potential of the fuel and energy complex in combination with a more optimistic forecast of world energy demand and prices.

All these scenarios involve the management of national energy security risks and the development of Russian energy sectors.

The adjustment of the strategies, doctrines, programs of the fuel and energy complex in the economic development of the Russian Federation will be carried out in order to implement the Paris Agreement, taking into account the officially accepted commitments to achieve a low level of greenhouse gas emissions by 2050 and the implementation of a national plan to adapt the economy to adverse climate changes.

When developing them, it is necessary to identify specific indicators and indicators that correspond to the trends in the low-carbon development of the fuel and energy complex, allow its industries to fulfill the main functions of providing the economy with energy needs, taking into account the ongoing changes in the formation of the inter-fuel balance, and reducing the carbon intensity of domestic electricity.

According to *infra ONE Research* analysts: "Infrastructure in Russia has been built unsystemically for several decades: a clear plan for the integrated development of territories is absent even by industry. There is also no single statistics and assessment of the state of infrastructure in the country, that is, the regions and federal authorities invest in transport, housing and communal services, energy, urban improvement, schools and hospitals, based on the needs of today. The planning horizon does not exceed two to three years, and approved development strategies are often not implemented".

As *Bushuev (2018)* notes, many territories with rich natural resources have not been developed for a long time by various industrial industries, due to lack of access to energy. The energy supply of large investment projects (construction of plants for the production of dry construction mixtures, cement, underground mine, development of a deposit of copper-plated ores, etc.) in the mineral-rich territories of the subregion of the Republic of Bashkortostan - Trans-Urals requires an increase in the generation of electric distributed capacities (*Investment infrastructure: 2018, 2019, 2020, 2020*). According to the Scheme and the program for the prospective development of the electric power industry, the increase in the need for electric load in the Trans-Urals by 2023 will be about 272 MW, which can be partially compensated by the introduction of solar power plants in a number of territories in the south of the Bashkir Urals, as well as through the construction of extensive distributed gas power facilities near industrial sites. This requires the development of a network component and generating sources. First of all, the construction of the PS-500 substation in the Sibay area, as well as the corresponding development of 220-500 kV electric networks, is in demand. The inclusion of this generation with the construction of relevant energy facilities in the Scheme and development program of the Unified Energy System of Russia, as well as the scheme of territorial planning of the Russian Federation in the field of energy will attract investments for the implementation of large projects in promising territories.

6. Findings

Tough planning in the energy sector in the face of geopolitical uncertainty is replaced by a smart-strategy process that requires constant adjustment of the trajectory of the oil and gas industries and the

companies representing them, the search for new tools to solve tactical problems. Their main competitive advantage is the existence of a corporate strategy that is effectively coupled with government or national projects and programmes.

One of the key scenario conditions in predicting the development of the domestic fuel and energy complex is the development of energy conservation and energy efficiency in energy consuming sectors. It is predicted that at an average GDP growth rate of 2.3 - 3% per year, due to the corresponding events, the average energy consumption growth rate will be 0.3 - 0.6. In particular, by 2035, it is expected to reduce the specific fuel consumption in transport by 13% in the lower and 15% in the upper scenario due to the optimization of ICE and the use of composite materials in mechanical engineering.

7. Conclusion

Thus, innovation and technological development becomes a strategic priority for Russian energy companies.

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