Московский экономический журнал. № 12. 2022
Moscow economic journal. № 12. 2022
Original article
УДК 338.26.01
doi: 10.55186/2413046X_2022_7_12_706

ENERGY SAVING AND ENERGY EFFICIENCY IN THE SYSTEM OF STRATEGIC PRIORITIES OF THE ENERGY POLICY OF THE RUSSIAN FEDERATION IN HISTORICAL RETROSPECTIVE

The article was published with the financial support of the 2021 Russian Science Foundation grant No. 22-28-00787 «Formation of the hydropower complex in Kabardino-Balkaria in the 20–30s of the 20th century: plans, preparation, implementation»

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Abstract. The article presents the interim results of studies aimed at a historical assessment of the transformation of approaches to solving the problems of saving

energy resources, since increasing energy efficiency is one of the most important tasks of economic development. It should be noted that the scientific work on the study of the organizational and economic side of modern energy-saving measures does not meet the high demands of the state and society in the long term.

The possibilities of forming energy-saving behavior in educational institutions are directly related to understanding the goals and objectives of energy saving, the main directions for implementing the rational use of fuel, energy, water and other resources of the country's regions.

abstract. The article carefully examines the intermediate results of research aimed at the historical speed of transformation of approaches to solving the problems of saving energy resources, since increasing efficiency is one of the tasks of economic development.

The possibilities of forming energy-saving behavior in educational institutions are directly related to understanding the goals and objectives of energy saving, the main directions for implementing the rational use of fuel, energy, water, and other resources of the region.

Keywords: energy agenda, fuel and energy complex, energy efficiency, energy saving

The formation of Russian energy in the XX century Russia met the beginning of the 20th century on the wave of scientific and technological progress. The obsolete generation of steam power was replaced by electric power. The industrial-commercial «Society of Electric Lighting of 1886» in St. Petersburg signed a contract for the lighting of apartments in the apartment building-passage of the merchant Postnikov. So the first steam turbine power plant with a capacity of 1470 kW gave current. By 1895, 99 German and Belgian investors invested in Russian energy, which is explained by preferential taxation of foreign concerns.

Over the ten years of the twentieth century, foreign companies increased investment in their electrical subsidiaries by 205%.

Attempts to create a program for the centralization and unification of the country's energy system of that time were repeatedly raised at the All-Russian Electrotechnical Congresses, but were not taken seriously, partly due to a misunderstanding of the problem, partly due to lobbying for foreign interests.

In April 1918 V.I. Lenin in his article «Outline of the plan of scientific and technical work» formulated the main idea of the electrification of Russian territories [1]. In the work “Tasks of the electrification of industry” Krzhizhanovsky, the idea was continued and developed, and the GOELRO plan was completed (Figure 1) [2].

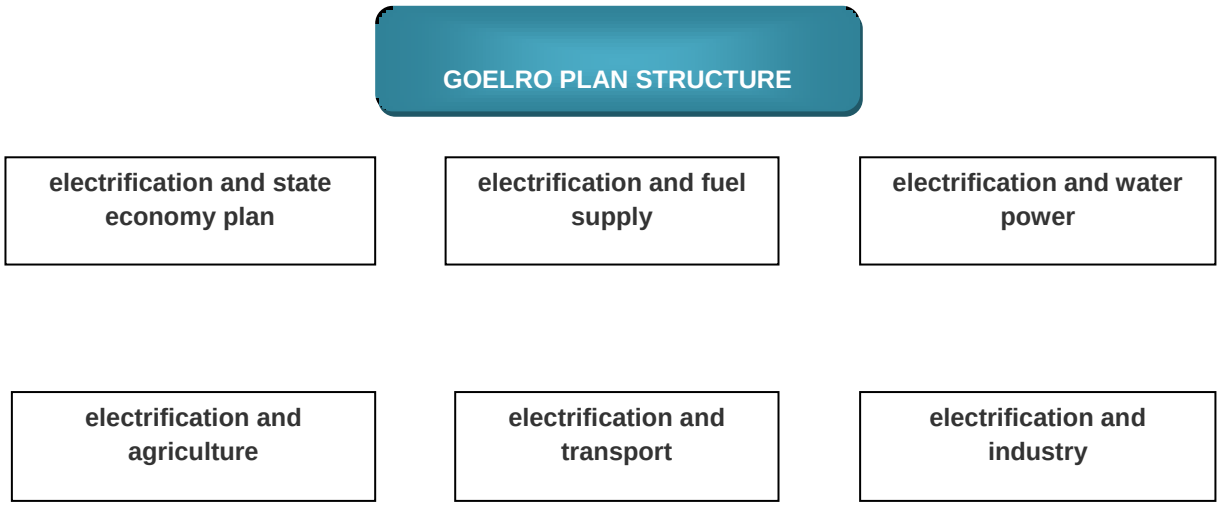

Figure 1. The content of the GOELRO plan (State Commission for Electrification of Russia) [3].

At the territory of Kabardino - Balkaria before the October Revolution there were only a few power plants with a total capacity of 70 hp. The largest of them were the power plant of the Prokhladnensky railway junction and the first power plant in Nalchik with a capacity of 14 kW. The facility was built at the Chinar timber processing plant in 1910. In 1903, a second, relatively powerful power plant (664 kW) was commissioned at the Prokhladnenskaya railway station.In the first decade after the revolution, small thermal and hydroelectric power stations were built on irrigation canals: Baksansky, Karagachsky, Kubinsky. The most powerful

HPPs were built in 1928 on the Lesser Kabardian irrigation system: Akbashskaya, with a capacity of 295 kW, and Kuyanskaya, with a capacity of 37 kW.

The construction of the Baksan hydroelectric power station was provided for by the GOELRO plan to supply electricity to consumers in Kabardino-Balkaria, the resort towns of Kavminvod and to electrify the Minvody-Kislovodsk and Minvody-Zheleznovodsk railway lines. Active construction work on the Sevkavkazenergopromstroy project began in 1930. The Baksan HPP changed the face of Kabardino-Balkaria and served as an energy base for the development of the national economy of the republic.

The energy program of the USSR after 1945 developed along the path of further centralization and the construction of the world's largest thermal and hydroelectric power plants. As a result, over 15 years, electricity generation increased 6 times compared to 1940 - up to 300 billion kWh. By 1967, the creation of a unified energy system of the European part of the country was completed (these are 600 power plants with a total capacity of 65 million kW).

According to the UN Statistical Yearbook. UN" in 1967, the accelerated development of the electric power industry of the USSR was named the main reason for the success of its economy. Without slowing down, in 1985 the power industry of the USSR entered the production of 1,544 billion kWh, bringing the total generation capacity to 315 million kW. In general, the 70-80s of the last century were characterized by scientific and technological achievements. For example, for the Center-Ekibastuz line, 60 units of unique equipment were designed, which made it possible to begin construction of the 750 kW interstate lines «USSR-Poland» and «USSR-Romania-Bulgaria».

In 1964, during the transfer of rural electrical networks to the state energy systems, the Kabardino-Balkarian electrical networks were created as part of Stavropolenergo.

Continuous electrification of the republic was carried out, 330 kV Prikumsk - Prokhladny, Prokhladny - Baksan overhead lines, 330 kV substations in Prokhladny and Baksan were built.

The intensive construction of hydroelectric power plants and the development of nuclear energy in the 1980s in the USSR are signs of a new time and optimistic forecasts. If in 1980 the share of nuclear power plants in the total generation was 5.6%, then in 1985 it was already 10.8%.

In 1987, the second birth of the Kabardino-Balkarian energy system took place. By order of the Minister of Energy and Electrification of the USSR, the Kabardino-Balkarian electrical networks from the REU «Stavropolenergo» are transferred to the direct subordination of «Glavyuzhenergo», and on October 1 they are reorganized into the Production Association of Energy and Electrification (POEiE) «Kabbalkenergo».

The collapse of the USSR led to a sharp decline in investment in the industry until 2000. At the same time, the conservation of stations, the construction of which was already underway, was observed. Russia met the beginning of the 21st century at a decline in the development of the electric power industry and the need to rethink the experience of the past, form new approaches to the use of renewable energy sources and search for new safe and affordable ways to extract it.

Current state and prospects for the development of the fuel and energy complex of Russia in the 21st century

The task of implementing Russia's energy policy today is the most efficient use of natural energy resources and the potential of the energy sector for sustainable economic growth, improving the quality of life of the country's population and helping to strengthen its foreign economic position.

The main internal challenge lies in the need for the country's energy sector to play its most important role within the framework of the transition to an innovative path of economic development envisaged by the concept. Guaranteed satisfaction of domestic demand for energy resources must be ensured taking into account the following requirements: provision by Russia of welfare standards corresponding to the developed countries of the world; achievement of Russia's scientific and technological leadership in a number of important areas that ensure its competitive advantages and national, including energy, security; transformation of the structure

of the country's economy in favor of less energy-intensive industries; the transition of the country from raw material export to resource-innovative development with a qualitative renewal of the energy sector (both fuel and non-fuel) and related industries; a rational reduction in the share of the fuel and energy complex in the total volume of investments in the country's economy with an increase in the absolute volume of investments in the energy sector necessary for the development and accelerated modernization of this sector and the growth of the scale of its activities; the need to improve energy efficiency and reduce the energy intensity of the economy to the level of countries with similar natural and climatic conditions (Canada, Scandinavian countries); consistent limitation of the load of the fuel and energy complex on the environment and climate by reducing emissions of pollutants, dumping contaminated wastewater, as well as greenhouse gas emissions, reduction of production waste and energy consumption.

The energy sector should contribute to the reproduction of human capital (through the development of energy infrastructure and the provision of energy goods and services at socially affordable prices, ensuring the sustainable reproduction of highly qualified personnel and improving the quality of life of the country's citizens, including those employed in the energy and related sectors), as well as facilitate the transition to a new spatial development model based on the balanced development of energy and transport infrastructure.

The main external challenge lies in the need to overcome the threats associated with the instability of world energy markets and the volatility of world energy prices, as well as to ensure the contribution of the country's energy sector to improving the efficiency of its foreign economic activity and strengthening Russia's position in the world economic system. This means that the following must be ensured: achieving sustainable results of foreign economic activity in the fuel and energy complex in the face of increased global competition for resources and sales markets; minimization of the negative impact of the global economic crisis and its use for a radical renewal and diversification of the structure of the economy in favor of less energy-intensive industries, stimulating the transition of

the Russian energy sector to accelerated innovative development and a new technological order; increasing the strategic presence of Russia in the markets of high-tech products and intellectual services in the energy sector, including through the deployment of globally oriented specialized industries; geographic and product diversification of Russian energy exports in the context of stable and expanding supplies of energy resources to the world's largest consumers; rational reduction in the share of fuel and energy resources in the structure of Russian exports, the transition from the sale of primary raw materials and energy resources abroad to the sale of products of their deep processing, as well as the development of the sale of petroleum products produced at foreign refineries owned by Russian oil companies; development of large nodes of the international energy infrastructure on the territory of Russia, carried out using new energy technologies.

The need for an adequate response to the most important internal and external challenges of long-term development, combined with the existing problems in the energy sector, forms the goals and objectives of the strategy. The corresponding risks are subject to consideration in the system of strategic priorities and guidelines, as well as in the process of phased implementation of strategic planning documents in the energy sector (Figure 2).

The goals of the state program «Energy Development» are reliable, high-quality and economically justified provision of the needs of the domestic market for energy carriers, energy and raw materials on the principles of energy saving and energy efficiency, as well as the fulfillment of obligations under foreign contracts.

The objectives of the Program are to meet the needs of the domestic market in a reliable, high-quality and economically justified supply of electricity; increasing the efficiency of production, extraction and processing of hydrocarbon resources to meet domestic and external demand for them; increasing the efficiency of production, extraction and processing of raw coal to meet domestic and external demand for them; promotion of innovative and digital development of the fuel and energy complex. The objectives of the subprogram «Energy saving

and energy efficiency improvement» of the state program of the Russian Federation «Energy Development»: improvement of the management system that ensures the effective implementation of state policy in the field of energy saving and energy efficiency, reducing the energy intensity of the economy of the Russian Federation.

Subprogram tasks:

- development of the institutional environment as a set of legal, organizational, managerial, financial and material and technical conditions that stimulate and ensure the emergence and implementation of initiatives and measures in the field of energy saving and energy efficiency;

– stimulating the attraction of extra-budgetary investments in the implementation of measures (projects) in the field of energy saving and energy efficiency;

– formation of an environment for comprehensive information support for energy saving and energy efficiency improvement at all levels of government structures and society.

The strategy defines the goals and objectives of the long-term development of the country's energy sector for the coming period, priorities and guidelines, as well as the mechanisms of the state energy policy at certain stages of its implementation, ensuring the achievement of the goals set. During the implementation of the Energy Strategy of Russia for the period up to 2030, approved by the order of the Government of the Russian Federation of August 28, 2003, the adequacy of most of its most important provisions for the real process of development of the country's energy sector was confirmed, even in the face of sharp changes in external and internal factors that determine the main parameters of functioning fuel and energy complex of Russia.

The strategy reflects the expected results of the implementation of Russia's energy strategy for the period up to 2030; main trends and forecast estimates of the socio-economic development of the country, as well as the interaction between the economy and energy; prospects for demand for Russian energy resources; the main

provisions of the state energy policy and its most important components; prospects for the development of the fuel and energy complex of Russia; expected results and the system for implementing the Strategy.

The quantitative parameters of the development of the economy and the energy sector are subject to clarification in the process of implementing the envisaged measures.

The main goal of the energy policy remains the effective use of the large-scale natural and industrial energy potential of Russia for the development of the country's economy and improving the quality of life of its population. This implies not only the reliability and cost-effectiveness of the supply of fuel and energy resources to all consumers, but also the provision of financial support for the country's economy on the way to its investment and innovative renewal.

Realization of the set goal is possible through the solution of the following program tasks of the energy policy: priority provision of energy security and economically justified domestic demand for energy resources; building up the energy potential and maintaining the sustainable development of the country's economy through the export of fuel and energy resources; ensuring the innovative development of the economy and energy with a subsequent radical reduction in the share of the energy sector in the structure of the reproduction of the country's economic potential.

Within the framework of the development line, three stages are distinguished, the terms of which are presented rather conditionally and can be adjusted in the process of implementing ES-2030:

Stage 1 (2006-2010) - resource and investment development;

Stage 2 (2011-2020) - investment and innovation renewal;

Stage 3 (2021-2030) - innovative development.

Table 1 shows the stages and details of the goals of the energy strategy until 2030.

The main instruments (mechanisms) for the practical implementation of the goals and priorities of the country's energy policy at all stages are:

– legislative and regulatory framework for the functioning and development of the energy sector of the country's economy and relations in the energy sector, which ultimately forms the Energy Code of the Russian Federation;

– tax, price, customs, antimonopoly, investment and innovation policy of the state;

- improving the relationship between the state and economic entities of the fuel and energy complex, including increasing the state's share in the main energy funds in order to create conditions for the country's energy security; further development and improvement of market forms of management in the energy sector and civilized energy markets.

Table 1. Energy strategy of Russia for the period up to 2030

Energy strategy of Russia for the period up to 2030	
Stages of development of the energy strategy for the period up to 2030 of the year	Specifying and detailing the goals of the energy strategy for the period up to 2030
1 Stage 1 (2006-2010)	resource-investment development formation and implementation of the necessary investments, creation of a reserve for the large-scale development and renewal of fixed production assets and infrastructure of the fuel and energy complex, development of the raw material base of the energy sector, improvement of the energy market and relations between the state and business
Stage 2 (2011-2020)	Investment innovative updating the implementation of the investment backlog in the development of the fuel and energy complex, the renewal and technological improvement of the main production assets of the energy sector, development of new promising hydrocarbon deposits, creation of a groundwork for a qualitatively new innovative level of energy technologies, completion of the market and organizational and ideological integration of Russia into the world energy space, innovative renewal of the industry by placing orders from the fuel and energy complex for new types of equipment and technologies necessary for the effective development of the country's energy potential.
Stage 3 (2021-2030)	innovative development obtaining an economic effect from the investment and innovation foundation laid at the previous stages in the form of new technologies, equipment and principles of functioning of the fuel and energy complex of Russia and related industries on an innovative basis

In order to improve state control over the state of the country's energy security and a clear division of powers between federal and regional authorities, it is necessary to develop a federal law «On Federal Energy Systems», within which the regulatory framework for the country's energy security and the responsibilities of federal and regional authorities for their provision.

The decisive ways to improve the energy efficiency of the economy are its restructuring in order to prioritize the development of sectors with low energy intensity, as well as the implementation of both the currently existing energy-saving technological potential (45% of total energy consumption) and the energy saving potential that will be the result of future scientific and technical progress.

The main mechanisms for the implementation of structural and technological energy saving should be:

– guaranteed access of all consumers to non-energy sources;

– market stimulation of the priority development of highly profitable and low-energy-intensive areas of the service sector (banking, communications, information, household, service, etc.);

– price incentives for energy conservation in communications;

– state incentives for energy conservation through the use of credit, tax, investment, tariff (in the sphere of natural monopolies) economic levers and legislative regulation of economic sanctions.

In order to form the necessary investment resources for the implementation of energy saving measures in all areas of economic activity, regional and federal targeted energy saving funds can be created using funds from energy supplying and energy consuming entities, budgetary funds of various levels, borrowed (credit) and equity funds.

In general, as a result of the implementation of the state energy policy and the formation of market mechanisms for energy saving, an increase in the consumption of primary energy resources in the country in the period under review should not exceed 35% of the growth rate of Russia's GDP.

The purpose of the Program implementation on the territory of the North Caucasian Federal District (NCFD) is to increase the reliability of supplying the NCFD with fuel and energy resources. The task of implementing the Program in the North Caucasus Federal District is to increase the reliability of energy supply in the region.

In order to accelerate the development of the territory of the North Caucasian Federal District, in accordance with the comprehensive plan for the development of the electric power industry, it is proposed to implement measures for the development of the main electrical network, justified in the scheme and program for the development of the Unified Energy System of Russia, to cover the prospective demand for electrical energy and capacity.

Also in order to ensure reliable power supply to consumers in the southeastern part of the unified energy system of the South of Russia, including the energy systems of the Republic of Dagestan, the Chechen Republic, the Republic of Ingushetia and the Republic of North Ossetia-Alania, in the conditions of the predominance of the installed capacity of hydroelectric power plants in the existing structure, the loading and duration of which is limited by reserves hydro resources, in 2019 it is planned to commission the Grozny thermal power plant with a capacity of 360 MW. In addition, in 2022 it is planned to put into operation a gas chemical complex for processing gas from the fields of the Northern Caspian in order to create a new high-tech production of high value-added products.

Let us summarize that the rational and efficient development and use of the energy potential is the main direction in the development of the electricity generating base of the republic.

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Для цитирования: Kuzminov P.A., Abanokova E.B., Shadueva E.Ch., Shibzuhova R.A. Energy saving and energy efficiency in the system of strategic priorities of the energy policy of the Russian Federation in historical retrospective // Московский экономический журнал. 2022. № 12. URL: https://qje.su/selskohozyajstvennye-nauki/moskovskij-ekonomicheskij-zhurnal-12-2022-9/