Current issues of resource and energy savings in the domestic oil and gas complex.

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Abstract. The paper deals with the effective implementation of resource and energy saving policy in the oil and gas complex of the Russian Federation (RF). Modern regulatory and legal framework is analyzed. The key features of the new "Energy Strategy until 2035" are identified. The development of the modern oil and gas complex of the Russian Federation is analyzed. Justified the problems of direct and indirect effects of the efficiency of resource and energy saving in the oil and gas industry of the Russian Federation, focusing on the problem of metrological provision of domestic oil and gas industry. Promising technologies in the field of geological exploration, as well as in the field of oil and gas production, aimed at improving the efficiency of the resource and energy saving process in the oil and gas complex are proposed.

The organization of an efficient process of resource and energy savings today is the one of the priorities of the real sector of the domestic economy. This process is considered as one of the main sources of accelerated economic growth. Increasing competitiveness, economic security and sustainable socio-economic development of the country, as well as raising the level and quality of life is not possible without an effective implementation of building energy and resource saving. The key element in this situation is the process of effective modernization of the technological development of the domestic economy through the effective transition to environmentally responsible consumption of the domestic resource base. The results of solving this problem will ultimately determine the place of Russian society among the world's economically developed countries with trans.

Practice shows that, despite the fact that this issue is relevant for the past ten years, up to now a full realization of the potential energy and resource saving in the domestic economy is not involved to the full. Thus, according to the Russian Federation Ministry of Energy (RF), the energy savings potential in the final sectional key industries RF until 2020, an average is about 200 million tons of reference fuel (toe) \cite{1}. The leaders are the electric power industry (42 million toe), housing and utilities (33 million toe) and the oil and gas complex of the Russian Federation (21 million toe) \cite{1}. Paradoxically, the barriers that impede the organization of an efficient energy and
resource saving process in the domestic economy have long been known – the lack of motivation, the lack of adequate experience in financing resource and energy saving projects, the insufficient organization and coordination, and the lack of information [2]. Nevertheless, it must be noted that today a fairly extensive regulatory and legal framework has been created in the questions of increasing resources and energy efficiency of the domestic economy. The main documents include: The Federal Law No. 261 of November 23, 2009 “Energy Saving and on Increasing Energy Efficiency, and Amendments to Certain Legislative Acts of the Russian Federation”; the federal and departmental target programs; the government Russian program "Energy efficiency and energy development"; regional and municipal programs of energy saving and energy efficiency increasing and a number of others.

Separately, the "Energy strategy of Russia till 2030" approved by order of the RF Government, dated 13.11.2009 should be selected. It provides the organization of the most efficient natural energy resources utilization, as well as the effective realization of the energy potential in order to ensure sustainable growth of the domestic economy and improving of economic development. This strategy is based on the previous “Energy Strategy of Russia for the period until 2020”, and includes such areas of the state long-term policy as the organization of budget efficiency, the organization of energy security and energy efficiency of all sectors of the domestic economy based on principles of environmental policy.

The high volatility of the global energy markets over the past five years has led to the fact that already in 2014 a new draft of the “Energy Strategy until 2035” was approved, which was supplemented and revised in February 2017. Despite the fact that the "Energy Strategy 2035" is successive in relation to the previous one; nevertheless, a number of additions appeared in it [3].

At first, the emergence of new divisions on emerging new challenges for the Russian energy sector, considering the main strategical accents; tax subsections tax, customs and tariff policy, the energy sector; environmental, social policy subsections, human capital in the energy sector and separately added the subsection of the high-level hydrocarbon processing.

At second, the forecast data regard to socio - economic development of the Russian economy, were revised because of the availability of a temporary slowdown in economic activity and, as a result the decline in domestic consumption of energy is projected, and also the average annual decline in the rate of growth in the 2013-2035.

Finally, in the new version of the strategy, the great attention is paid to the process of global energy markets transformation in the post-crisis period. Here are the issues of reducing global primary energy consumption, a shift in global demand towards developing countries, where the presence of the Russian Federation is problematic due to a number of factors, as well as a decrease in demand in traditional for the Russian Federation markets. Noting the important role of non-traditional hydrocarbon sources, also the accelerated development of renewable energy sources [3].

Based on the above, let us disagree with the thesis about the lack of information today aimed at organizing an efficient process of energy and resource saving in the domestic economy. Modern Russian legislation provides for a number of effective methods and mechanisms for stimulating energy and resource saving processes in the real sector of the economy (concessional lending and taxation, financing and co-financing processes for returning and non-refundable energy and resource saving measures, tariff policy, etc.). Certainly, solving the problem of efficient resource and energy saving, as well as increasing energy efficiency is a long-term one, however, for the real sector of the Russian economy, today this is a chance to switch to a model of sustainable advanced development, which in practice will provide:

- increasing the level of welfare of the population on the basis of accelerated economic growth;
- rate of state’s energy security on the basis of reducing dependence on export of hydrocarbon resources;
- development of innovative, knowledge-intensive sectors of the Russian economy;
- a comprehensive solution of social and environmental problems in energy-intensive industries;
development of a model of socially-oriented businesses in accordance with the concept of sustainable development to it.

The analysis showed that although the foregoing, a number of experts [4,5], the authors of which are solidary work indicate to a number of problems in the Russian economy industry associated with low levels of extraction and processing depth of hydrocarbon resources; reduction in the quantity and quality of exploration; the significant deterioration of the geological and climatic conditions of new hydrocarbon fields; a high degree of depreciation of fixed production assets; the lack of highly developed energy infrastructure in a number of backbone regions engaged in the extraction and processing of hydrocarbons [5]. All these moments predetermine the conduct of further research in the framework of this work, regarding the topical issues of resource and energy conservation in the domestic oil and gas complex.

Modern oil and gas complex of the Russian Federation is a kind of donor of the domestic economy. It plays a significant role both on internal and on external (global) energy markets. For more than twenty years, the development of the domestic oil and gas complex has fully determined the quality and dynamics of the socio-economic development of our country. Today - this is one of the most competitive economy industries in the context of world economic relations. Oil and Gas are the main Russian export goods. In general, the dynamics of the Russian economy development on the state oil and gas complex, because more than 70% of hydrocarbon exports generate more than 40% of federal budget. The efficiency of the Russian oil and gas complex functioning, determines the basis balance payments at domestic economy, the backbone element of supporting the national currency. Its development closely interacts with many sectors of the real sector of the Russian economy, largely determining their development trends in the near future. The oil and gas complex of the Russian Federation is the source of “maximum investment multiplier effects”, creating and stimulating, a high level of demand for goods and services of interdependent industries in practice.

For example, in Norway, the multiplier size is 1.65, in the USA is about 2, in Australia is more than 2. The domestic multiplier of the oil and gas industry is practically comparable to the US and is 1.9, which “corresponds to the level of oil-producing industrialized countries” [7]. Today, Russia is one of the leading oil and gas world powers. So by the end of 2015, the Russian economy ranked first place in oil production, ahead of its rival Saudi Arabia by almost 30 million tons [8]. However, by the end of 2016, it went down to the second line of the countries rating in oil production, nevertheless remaining in the TOP-3 countries, the leaders in oil production for the year.

The last ten years, the dynamics of oil prices, is influenced by the economic crisis and is determined by a number of factors, among which the most important are the world growth retardation the development of alternative energy, the technological innovation in the field of oil production, the high volatility of demand and supply in the hydrocarbon markets (Figure 1).
Fig. 1. Dynamics of prices on futures contract for Brent oil (MOEX, USD per barrel) [10]

During the economic crisis of 2008-2009 the average annual price of oil fell by almost 40%, exposing the problems and failure of the Russian economy in the system analytics and forecasting the behavior of industrial markets. The fall in oil prices on the world markets triggered the domino effect of the Russian economy. Sharply decreased foreign exchange earnings from the sale of hydrocarbons, the rise in price of money is occurred, the inflow of foreign capital in the form of investment is decreased, the rates of economic growth are reduced and the same with the level of internal revenues. However, in 2011 prices returned to the pre-crisis level, which was a catalyst for the regeneration of placement of funds in recoverable and unconventional sources of hydrocarbons. Thus, according to the results of 2013-2014, the trend of “overproduction” of hydrocarbons was already clearly observed, and in 2015, supply exceeded demand, and led to the fact that in the first half of 2016, the world oil prices reached to a multi-year minimum of $ 28 a barrel mark. Brent [10]. However, in the second half of 2016 thanks to the efforts of OPEC countries and the largest oil exporters, the price adjustments occurred, as a result in a barrel of oil at the end of 2016 and at the beginning of 2017 is cost $ 48-57 [10]. At the end of 2017, oil rose in price by 22%, largely agreement by OPEC + contributed to this [10]. In the first half of 2018, world oil prices had a positive trend, reaching a maximum of 82.73 dollars per barrel in September, but the dynamics of October-November of the 2018 year are worrying, since the beginning of October the price of Brent has increased by 28% [10]. Despite the fairly high prices prevailing on the world markets, today, there are a number of problems in the domestic oil and gas complex, the solution of which will predetermine the further development of the Russian economy. Practice shows that these problems are directly or indirectly related to the issues of improving resource efficiency and energy saving in the oil and gas complex of the Russian Federation.

1. The deterioration of the state of the domestic mineral resource base of hydrocarbons, in view of the decrease in the current proven reserves and the rate of their reproduction, which makes it imperative to organize work to convert the country's high oil and gas potential into active hydrocarbon reserves.

2. The growth in the share of difficult-to-recover oil and gas reserves from their total number, which predetermines the introduction of innovative, resource-saving production technologies and the use of modern hydrocarbon solvent-slug injection.

3. Decrease of the average daily production rate of oil wells, due to the high depletion of hydrocarbon fields.

4. The backlog of domestic technologies and the high level of depreciation of the basic production assets of the Russian oil and gas complex.

5. The existing taxation system, as a result of which almost half of the company's revenue goes to paying taxes, which does not reduce the motivation to implement projects in the field of resources and energy saving [11].

6. The strong dependence of the domestic oil and gas complex on the global market for hydrocarbons.

7. Irrational organizational structure of the vertically-integrated companies, implementation of inefficient business processes, the low response rate to external factors, in view of the weak development of IT - technology, violation of uniform standards for storing and transmitting information.

8. Problems of metrological support of the oil and gas complex of the Russian Federation, due to the lack of "modern means of monitoring the parameters of technological processes in the production of oil and petroleum products and their sale abroad" [12]. This problem is due, firstly, to an outdated regulatory framework governing the issues of metrological support for the accounting of oil and petroleum products, as well as sanctions imposed by the European Union and the United States, implying a full-scale ban on the supply of new technology and specialized equipment in the field of extraction, transportation and processing of hydrocarbons.
Of course, each of the above problems is a topic for a separate study, but today we can offer a number of promising areas that contribute in practice to the effective realization of the potential of the resource and energy saving in the Russian oil and gas complex. According to specialists of the National Research University Higher School of Economics [13], within the framework of promising geological exploration technologies, it is necessary to consider “exploration of hydrocarbon deposits in 4D format high-resolution, and I compulsory visualization of the results”; “exploration of the offshore hydrocarbons deposits in the 3D/4D format based on submarine autonomous self-guiding devices by means of GPS / GLONASS navigation”; “data acquisition software big data of exploration based on the use of artificial intelligence. "In the field of advanced oil and gas technology, it is necessary "to create underwater robotic systems for hydrocarbon production, which are capable of operating under the conditional of the remote control in the automatic mode"; "To create means of continuous monitoring of the state of hydrocarbon fields reservoirs with the high resolution and computer processing of the received information with the 4D-visualization based on the obtained results"; "technology development of ice and seismically stable platforms for hydrocarbon production in arctic conditions"; "development of technologies for drilling wells, secondary opening productive strata"; "development of hydrocarbon production technologies from unconventional fields under abnormal conditions" and a number of others.

In general, we believe that today the state should pay close attention to the innovation and investment problems of the oil and gas complex, should contribute to creating additional potential opportunities for its participants, create a powerful incentive and help increase the motivation of market participants in addressing the priorities for the strategic development of the domestic oil and gas complex [14]. As priority measures, it is necessary to consider: issues of modernization of the industry through the introduction of innovative technologies in the processes of exploration, production and processing of hydrocarbons, in order to update the basic production assets and improve the efficiency of resource and energy-saving policies of oil and gas companies; issues of infrastructural nature, aimed at the formation of an integrated transport infrastructure covering the needs of all sectors; issues of reengineering of main, auxiliary and management’s business processes in the oil and gas sectors corporations; the question of creating a flexible, adaptive management model of oil and gas companies capable of quickly responding to changes in the external environment in the context of modern economic realities and trends in the development of the world oil and gas market.

Thus, timely decision of the above issues, in practice will contribute to the creation of a powerful economic mechanism, technological and legal mechanism, on the effective implementation of which will depend the further socio-economic development of the Russian Federation, the level and quality of welfare, development of foreign policy and strengthening the country's position in the world economy.

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