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**SANCTION PRESSURE INFLUENCE ON ENERGY SAVING
PROCESSES AND INCREASE IN ENERGY EFFICIENCY**

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Abstract

Sanctions pressure from western countries caused a significant damage to the economy of Russia and exerted a negative influence on socioeconomic and innovative development, as well as on processes of energy saving and increase in energy efficiency. Due to the high level of power consumption of products of Russian manufacturers, energy saving and increase in energy efficiency can be considered as the most important priority of innovative development that should have a strategic character and penetrate all other priorities of the technological upgrade.

This article proves the statement that the activation of processes of energy saving and increase in energy efficiency due to widespread innovations will contribute to the development in the world market of competitive goods and technologies, at the same time exerting a considerable influence on solving the problems of import substitution and economic growth acceleration.

As a result of the conducted research, various scenarios of development of the Russian economy under conditions of the continuous sanctions pressure from western countries were developed, and their impact on processes of energy saving and increase in energy efficiency was assessed.

It is shown that the activation of processes of energy saving and increase in energy efficiency is necessary in case of any of the considered scenarios to enter a new level of the country development in the conditions of the pursued import substitution policy.

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Keywords: Innovations, sanctions, energy intensity, development priorities.



1. Introduction

In recent years, a serious negative impact on the development of the Russian economy is exerted by sanctions adopted by western countries. It should be noted that the sanctions did not achieve their political goals, however, caused considerable damage to the Russian economy (Okhotsky, 2016; Cooley, Stokes & 2018; Dong & Li, 2018; Spitsin, Mikhailchuk, & Chistyakova, 2018; Yevtodyeva & Danilin, 2018). That way, the year 2015 was the beginning of the Russian economy's adaptation to the consequences of the sanctions imposed in mid-2014, and to the subsequent fall in world oil prices. This double impact led to a reduction in national income and a fall in consumer and investment demand, with the result that real gross domestic product (GDP) in Russia decreased by 3.7% in 2015 (Statistics of the World Bank Group, 2018). It should be noted that in comparison with other developing countries, the decline of Russia's GDP goes at a faster pace. This is due to the sanctions pressure, as well as to the high dependence of the Russian economy on the export of hydrocarbons. The decline in world oil prices in mid-2015, which followed after a short growth in the beginning of the year, had postponed the expected recovery of the Russian economy.

During the difficult period of adaptation to the imposed sanctions, accompanied by a slowdown in the global economy and the decline in world oil prices, the Russian economy in 2015 was plunged into a deep recession, the peak of which was on the II quarter of 2015. The decline in GDP continued in 2016 as well. However, due to the measures adopted by the Russian government in 2016, the pace of recession has considerably slowed down.

Among other consequences of sanctions pressure on the part of Western countries, one can single out the growth of interest rates on loans, which is primarily due to the limited access of a number of Russian banking institutions to cheap credit products. In addition, we should highlight the growing outflow of foreign capital, which began in March 2014 and continues to the present. According to the majority of expert analysts, it was the outflow of capital from the country that became the most important reason for the growth of inflation, the reduction in the value of the ruble and, as a consequence, the deterioration of the financial state of the Russian economy (Pak & Kretzschmar, 2016).

2. Problem Statement

The research is focused on the solution to the problem of the choice of development priorities under the conditions of ongoing sanction pressure from the western countries which could give a kick start for innovative modernization of the Russian economy and would promote ensuring its competitiveness under modern conditions.

3. Research Questions

Research problems include assessment of the influence of sanction pressure from the western countries on the development of the Russian economy; identification of the place and the role of processes of energy saving and increase in energy efficiency from the position of innovative modernization of the Russian economy and the solution to the problems of import substitution; justification of need of activation of energy saving processes and increase in energy efficiency at various scenarios of ongoing sanction pressure from the western countries.

4. Purpose of the Study

The research objective is, first, assessment of influence of sanction pressure from the western countries on processes of energy saving and increase in energy efficiency of the Russian economy and, secondly, justification of need of their activation for the solution to the problems of import substitution in the Russian economy and acceleration of its economic growth.

5. Research Methods

Based on the analysis of import substitution programs developed in recent years in various sectors of the Russian economy and the priority areas for the development of science, machinery and technology, the need to consider energy conservation and improve energy efficiency as the most important direction for the innovative development of the Russian economy was substantiated.

During the research, an assessment was made of the impact of external and internal factors on the development of the situation in the field of energy saving and improving the energy efficiency of the Russian economy. The scenario approach was used as the main method. Its application makes it possible to study the influence of various factors on the basis of modeling their possible dynamics on the activation of energy saving processes and improving the energy efficiency of the Russian economy. We have considered three possible scenarios for the development of the situation in the field of energy conservation and energy efficiency, depending on changes in both the external economic situation and internal factors of the Russian economy development, including basic, optimistic and pessimistic.

6. Findings

In order to restore the economy, the Government of the Russian Federation has taken counter measures that have made import substitution one of the priority directions of development under current conditions. According to experts, the volume of imports in some areas of the industry comprises a large portion: the share of imports in the machine tool industry is estimated at about 90%, in heavy engineering - 70%, oil and gas equipment - 60%, in the energy equipment - about 50%, in the agricultural machine engineering depending on the product category - from 50 to 90%, etc. In the civil aircraft construction, imports continue to dominate - more than 80% (Podmolodina, Voronin & Konovalova, 2015). The undertaken measures are reflected in the State Program "Development of the industry and increase of its competitiveness", and then in a number of other legislative acts.

Coming from various industries, import substitution programs are aimed at the development of Russian industrial production, the introduction of scientific and technological progress in production processes, and the development of innovative products (Misakov, Kuyantsev, Dikinov, Kazantceva, & Misakov, 2016). Particular attention in these documents is given to the need to create such import-substituting products, which would be more attractive in quality and price than their foreign counterparts, and at the same time are oriented not only to domestic sales, but also to exports abroad. At the same time, the main emphasis is made on the development of those industries that are capable of ensuring an increasing return (Osipov & Skryl, 2016).

It should be noted that the currently implemented program of import substitution in Russia aims to achieve the following goals by 2020:

- the creation of a full-fledged infrastructure for innovative enterprises;
- formation of effective demand support systems;
- the creation of new highly skilled jobs;
- complete modernization of technological base;
- finalization of the technical regulations and national standards;
- the completion of capacity building for the development on the world markets by increasing production efficiency and energy efficiency.

In our opinion, increase in energy efficiency is one of the most important areas of development, which can set a powerful impetus for innovative modernization of the Russian economy and promote its competitiveness under conditions of sanctions pressure (Melnik & Ermolaev, 2014; Anisimova & Zakirov, 2016; Melnik & Sadriev, 2014; Sadriev, 2016). This is due, mostly, to a high level of energy intensity of Russia's economy in comparison with that of other countries (Figure 01).

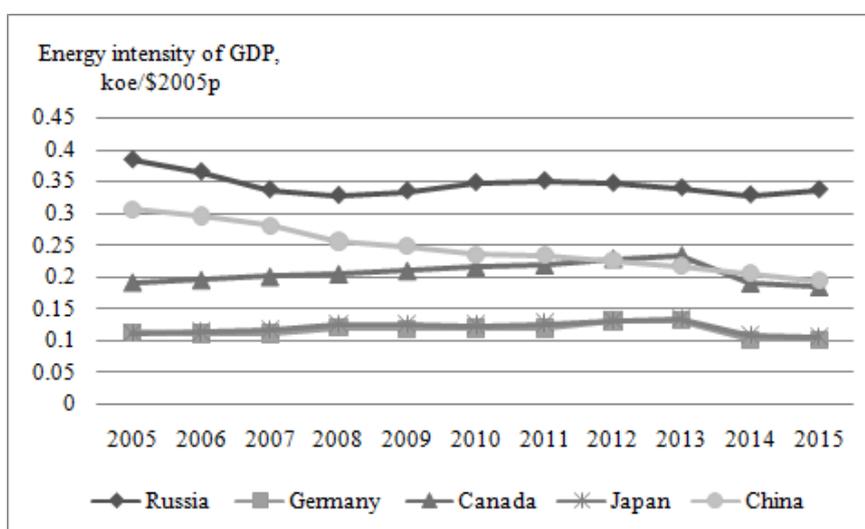


Figure 01. Dynamics of energy intensity of the economy of Russia and other countries of the world (Statistics of the Global Energy Statistical Yearbook, 2018)

Moreover, the role of system generation of energy saving and the role of increase of its energy efficiency can be traced to the approved priority areas of science, technology and engineering in the Russian Federation, including the industry of nanosystems, information and telecommunication systems, life sciences, environmental management, transport and space systems.

Due to the high level of energy intensity of the Russian economy the energy saving and energy efficiency, in our opinion, may be considered as a top priority for innovative development, which should carry the system generating character and permeate all the other priorities of technological modernization (Table 01). Only total concentration of efforts on increase in energy efficiency will boost the process of development of energy-efficient technologies competitive on world market. These technologies, along with the nano-, bio-, information and nuclear technologies should become basic in a new technological structure of the world economy. Working on these priorities can make a significant contribution to solving the problems of import substitution, in accelerating economic growth and improving the competitiveness of products manufactured by domestic producers.

Table 01. Place of energy saving and energy efficiency in the system of priority directions of development of science, technology and engineering in the Russian Federation

№	Priority directions	Reflection of energy saving and energy efficiency issues in the priority directions of development of the Russian economy
1	Information and communication systems	1. Creation of compact power sources for long-term power supply of the digital off-the-shelf software. 2. Development of algorithms and software for the intelligent energy networks. 3. Development of the software implementation of energy-system programs, "Energy-Efficient House" and "Energy Efficient City".
2	Environmental management	1. The creation of new materials with new, most off all, energy-saving properties. 2. Creation of integrated energy-saving technologies for processing difficult for processing natural and technogenic mineral raw materials.
3	Transport and Space systems	1. Development of new stand-alone power systems and resources to support the orbital and interplanetary manned and unmanned missions. 2. Research and development of wireless power transmission technology for transportation and space carriers. 3. Development of means and systems for increase in energy efficiency on rail, road, air, sea and inland water transport. 4. Development of efficient storage of electrical energy, adapted for use on vehicles.
4	Nanosystems	1. Creation of fuel cells and catalysts based on nanotechnology, in order to make innovative energy carriers. 2. Development of multi-core processors based on photonic nanoswitches, which increase carrying capacity of interchip connections under reduced energy consumption. 3. The creation of new materials for alternative energy sources in nanotechnology. 4. Creation of super powerful ceramic magnets based on nanotechnology for the production of highly efficient electric-power equipment and its components.
5	Life sciences	1. Creation of biofuels and biomass components, energy bioaccumulation, high-tech equipment for the production of heat and electricity from a variety of biomass sources.

Despite the undertaken measures, sanctions pressure from Western countries continues to have a significant negative impact both on the economy in general and the situation in the sphere of energy saving and energy efficiency, which is reflected above all in the growth of energy intensity of Russia's GDP when compared to a decrease of it in other countries. Let us consider several possible scenarios of the case development in the coming years, including the baseline, optimistic and pessimistic (Table 02).

Table 02. Comparative characteristics of the scenarios for Russian economy development and their impact on the revitalization activity in area of energy saving and energy efficiency

№	Scenarios	The main characteristics of the scenario
1	Baseline	- GDP growth at 1.1% in 2017 and 1.8% in 2018. - Lifting of sanctions in 2018. - Mid-investment activity of Russian companies. - Low possibility to attract foreign investment. - Reducing energy consumption in the implementation of the program of import substitution through the expansion of investment opportunities in companies.
2	Optimistic	- GDP growth of 2% in 2017 and in 2018. - Lifting of sanctions in 2017. - High investment activity of Russian companies. - Middle opportunity to attract foreign investment.

		- A significant reduction in energy consumption while creating a favorable investment climate.
3	Pessimistic	<ul style="list-style-type: none"> - GDP growth of 0.51% in 2017 and 1.7% in 2018. - Lifting of sanctions in 2018 - Low investment activity of Russian companies, major investment by the state program of import substitution. - Low possibility to attract foreign investment. - Reducing energy consumption in the implementation of the import substitution program

The baseline scenario originates from the scenario for the Russian economy, developed by the World Bank. It assumes the existence of the sanctions imposed until 2018. In this case, the recovery of the Russian economy will be long enough and complicated, so the predicted positive GDP growth attains to only 1.1% in 2017 and 1.8% - in 2018, respectively. Investment growth will remain weak for several reasons.

First, the slow recovery of the Russian export demand coupled with lower raw material prices will limit the investment opportunities in exporting industries. Second, the decline in real income will weaken domestic demand. Third, economic sanctions will continue to limit access to capital and foreign direct investment, increasing the negative impact of weak demand. As a result, investment activity recovery will be slow, with the rate of investment growth reaching positive values not until 2017.

Event development by the specified scenario will require activation of energy saving and energy efficiency activities. In our opinion, this is due to the implementation of the import substitution program, which aims to support the release of competitive products both on the Russian and world markets. Due to the high energy intensity of the Russian economy decline in the share of energy costs is one of the most important factors in ensuring the competitiveness of the products manufactured by Russian producers. This is especially true now, as the level of energy efficiency of products is becoming one of the main factors to which consumers pay attention under the conditions of growth in electricity and heat prices. Therefore, to enter the world markets, it is necessary that the values of the Russian products energy efficiency at least do not exceed the foreign values.

The optimistic scenario envisages the lifting of sanctions as early as in 2017. At the same time, according to World Bank estimates, the GDP growth is expected to be 2% in 2017 and in 2018. In these circumstances, the Russian producers will have more opportunities to attract investment by creating a favorable investment climate in the economy. However, achieving these goals requires a major breakthrough in the field of energy conservation and energy efficiency. In addition, ensuring the future sustainable economic growth will require the development of Russian innovative products and technologies that are superior to and ahead of the best foreign products and technologies. The Russian manufacturers, in order to ensure their competitiveness under these conditions, will have to quickly intensify innovative activities designed to create products with the values of energy efficiency indicators at the level of Western models. Only in this case can we expect the market demand for Russian goods and technologies.

Event development by the pessimistic scenario suggests that the sanctions will remain until the end of 2018. In all that, due to the preservation of relatively low hydrocarbon prices in the world markets, the growth of GDP will be only 0.5% in 2017 and 1.7% - in 2018. Due to the conservation of unfavorable external conditions and a lack of investment opportunities in the sphere of energy saving and energy efficiency of the Russian economy, the situation is not likely to change as significantly as in the baseline scenario. However, the implementation of import substitution programs will require the adoption of

additional measures, in order to reduce the energy intensity of the Russian economy. If the reduction of energy consumption rates will be insignificant, such developments could put into question the achievement of the goal of reducing energy intensity of GDP by 40% in 2020.

7. Conclusion

The study allows us to make the following main conclusions.

Firstly, because of the high level of energy intensity, produced by Russian manufacturers, energy saving and energy efficiency can be taken into consideration as a top priority of innovative development of the Russian economy, which should be of system generating character and permeate all the other priorities of technological modernization.

Second, activation of energy saving processes and energy efficiency, primarily due to the widespread introduction of innovation, will contribute to the development of competitive products and technologies, thus providing a significant impact on the solving of import substitution and economic growth problems. In all that, the activation of the processes of energy saving and energy efficiency is needed in the development of events under any of the scenarios considered, thereby forming the demand for innovations to enter a new level of technological development of the country in terms of pursued import substitution policies.

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