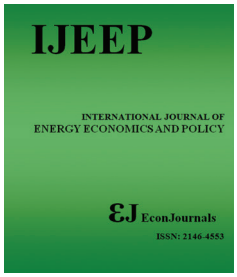

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Investigation of the Features of Investment in the Development of Renewable Energy Sources: Main Consumers, Legal Regulation, Equipment, Rates and Delivery

Ekaterina V. Nezhnikova[1]*, Irina V. Okhremenko[2], Oksana V. Papelniuk[3]

[1]Peoples' Friendship University of Russia (RUDN University), 117198, Moscow, Miklukho-Maklaya Street, 6, Russian Federation, [2]Plekhanov Russian University of Economics Volgograd branch, 400131, Volgograd, Volgodonskaya St., 11, Russian Federation, [3]National Research Moscow State University of Civil Engineering, 129337, Moscow, Yaroslavskoye shosse, 26, Russian Federation.*Email: nezhnikova_ev@pfur.ru

ABSTRACT

This study aims to examine some peculiarities of investing as one of the most important aspects of renewable energy sources development in Russia. Within the framework of this study, a comprehensive analysis of statistical data and analytical indicators reflecting the current state of renewable energy of the Russian Federation was carried out. The results of the conducted research show that, despite the considerable reserves of traditional energy resources, there has been a lively competition in the renewable energy sector in recent years; the goal is obtaining the right to implement projects and receive return on investment through a support mechanism. On the basis of the study of the experts concerning the Russian energy market and the existing mechanisms for RES support, the authors conclude that opinions of the market participants are divided. Consumers and power supply companies stand for the abolition of the current support mechanism after 2024. Investors claim the need to extend the existing support measures but with changes in conditions and parameters.

Keywords: Renewable Energy, Renewable Energy Sources, Alternative Energy
JEL Classifications: E22, P48

1. INTRODUCTION

The use of renewable energy sources (RES) has increased significantly in recent years due to a number of advantages.

- First, from the point of view of energy security, RES can provide opportunities for diversification of fuel mixtures, which is most relevant for an economy that depends on the import of fossil fuels.
- Secondly, with the widespread use of renewable sources, it is possible to reduce the impact on the environment (reduce CO_2 emissions per unit of gross domestic product (GDP) and reduce air pollution).
- Thirdly, for more active use of RES, economic considerations may be worthwhile. As International Economic Association (IEA) notes, "the development and use of RES can become a part of integrated strategies aimed at more sustainable economic growth (often called "green growth"). RES are actively used in packages of measures to restore the economy in response to the global economic downturn (International Energy Agency, 2013).
- Fourth, RES can be one of the most effective tools for solving the problem of access to energy.

These reasons led to the adoption of specific policies aimed at promoting the development of RES in various regions of the world. RES have already had a significant impact on energy systems and are going to continue their growth within the energy complex and impact on the energy system, energy trade and energy security.

RES are very diverse in nature and are used in various fuel markets: Biogas competes in the gas fuel market, while bioethanol and biodiesel do the same in the liquid fuel market, wood pellets – in the solid fuel market, solar and wind energy – in the electricity

market. These factors can influence the RES sector, as well as various sectors of energy systems.

The need to meet energy demand and environmental sensitivity prompts the authorities to plan further investments in generating facilities based on renewable sources (International Energy Agency, 2012).

At present, significant progress has been made in financing renewable energy technologies. World investments in the development of renewable energy are approximately two times higher than investments in the extraction of fossil fuels (McCrone, Moslener, d'Estais and Grüning, 2017). At the same time, global investments in the development of RES in 2016 reached a minimum since 2013 and amounted to 241.6 billion US dollars (excluding large hydroelectric power stations), which was 23% less than in 2015.

The decrease in investments did not affect the volumes of capacity commissioning: The growth of new capacities was 9% compared to 2015; in 2016, these objects produced 138.5 GW of new energy, which was 9% more compared to 2015. A significant factor in the fall in investment volume was a decrease in specific capital costs (equipment cost) in solar energy.

According to Eric Solheim, the Head of the United Nations Environment Program, now there is a situation that is attractive for investment, when the interests of investors and society coincide contributing to life improvement for everybody (UN Environment, 2017).

Russia is only at the beginning of the path of development of RES; alternative energy is still developing quite poorly and does not yet play a significant role in the country's energy sector. The share of renewable energy in the country's energy balance does not exceed 1% today but the industry in Russia is developing much faster than in other countries. The current program for supporting the construction of solar, wind generation and processing plants of solid municipal waste up to 6 GW creates a demand for investments of 1 trillion rubles (Why Does Russia Need Green Energy, 2017).

At present, Russia has established a regulatory framework and mechanisms to support RES. However, a significant barrier in the development of renewable energy in Russia is the low competitiveness of RES in comparison with traditional sources of energy. This is mainly due to high capital costs of creating alternative energy facilities and their limited efficiency.

Objects of renewable energy as objects of investment have a number of features that should be taken into account by potential investors.

2. LITERATURE REVIEW

RES become increasingly important in the energy balance of countries, as they can limit the impact of energy production on the environment and counteract the gradual increase in the cost of raw materials used in the traditional generation process based on gas or oil power plants (Beurskens, 2013).

The key role of investments in the development of renewable energy is confirmed by the research of the international scientific community.

Sadorsky (2009) studied the relationship between RES (wind, solar and geothermal energy, wood and waste) and economic growth in the panel structure of 18 emerging economies during the period of 1994-2003 and found that real GDP growth had a positive and statistically significant impact on the consumption of renewable energy per capita.

Wolde-Rufael (2012) analyzes the causal relationship between nuclear energy consumption and GDP. Yuksel (2010) and Baris and Kucukali (2012) analyze the development of renewable energy in Turkey and believe that, due to the potential for the use of RES, Turkey is working to develop clean and sustainable energy.

Marques et al. (2010) have analyzed the drivers promoting the use of RES in European countries and believe that the backstairs influence of traditional energy sources hinders the development of renewable energy.

Romano and Scandurra (2016) investigate the drivers of renewable energy investments in the group of countries of OECD including some developing countries and differences in countries that produce electricity. Using a large sample of 60 countries divided into three income groups, the authors identified factors contributing to investing in RES for selected groups of countries.

Gan and Smith (2011) identify key factors that can affect the proportion of renewable energy in total primary energy among OECD countries in general for RES and bioenergy in particular.

Masini and Menichetti (2012) offer and test a conceptual model to analyze the factors influencing investor decisions and the relationship between renewable energy investments and portfolio indicators.

The information gathered from the review of available literature is of crucial importance and serves as a useful resource for countries that develop, revise or update their own plans for the use of RES.

3. METHODS

In this paper, an analytical approach was used, based on the assessment of the current state of renewable energy in the Russian Federation. The data used in this study are taken from the databases of the International Renewable Energy Agency (IRENA), the IEA, Rosstat, ATS, Association NP Market Council, and others.

Within the framework of this study, a comprehensive analysis of statistical data and analytical indicators reflecting the socio-economic, political and environmental factors affecting investment decisions was carried out.

To identify the trends in development and investment in RES in Russia, the following indicators were selected:

- Installed capacity of RES in Russia by types of generation;
- Production of electricity from RES;
- Structure of end users.

4. INDICATORS OF RENEWABLE ENERGY DEVELOPMENT IN THE RUSSIAN FEDERATION

According to IRENA in 2016, the total installed capacity of RES in Russia has reached 52,865.7 MW, which was about 20% of the total installed capacity of electricity in the country. The volume of investments in creation of new generating capacities operating on the basis of RES is estimated at approximately 630 billion rubles.

The main sources of renewable energy in the energy system of Russia are bioenergy and large hydropower (Table 1).

Virtually the entire amount of the installed capacity of RES (51,318.4 MW) is hydropower. The country has more than 100 hydroelectric power plants with a capacity of more than 100 MW. The installed capacity of hydropower increased from 44,846 MW in 2006 to 49,802 MW in 2016. This is an average annual increase of about 496 MW. The large hydropower industry accounted for most of the additional capacity. In particular, this period has increased capacity of about 1 GW or more in the last few years.

Hydropower is followed by bioenergy with a total installed capacity of 1,370 MW from 39 units. The average bioenergy power plant has a total capacity of 35 MW (IRENA, 2017). Excluding hydropower and bioenergy, the remaining renewable energy production capacities are distributed between solar, wind and geothermal ones: 86.7 MW, 78 MW and 10.9 MW, respectively.

In 2015-2016, 130 MW of RES were put into operation in Russia, and 140 MW were built in 2017, of which more than 100 MW were solar power stations, and 35 MW – the first large wind farm that is going to be launched in the near future (Ministry of Energy Is Waiting for Introduction of RE-Based Generation facilities in 2017 for 100 MW, 2017). In 2017, renewable energy capacity was built more than in the previous 2 years.

Practically from the very beginning, Russia has established its own industry in solar energy, from research to the production of solar panels and construction of generating stations. At present, Orskaya Solar Power Plant named after A.A. Vlaznev is the largest one in Russia with an installed capacity of 40 MW, as well as Sol-Iletskaya Solar Power Plant (25 MW) and Buribaevskaya SES (20 MW).

The installed geothermal power, mainly located in the eastern part of Russia, reached 78 MW at the end of 2016. One of the most important trends in the development of geothermal energy in the country is the construction of binary geothermal power plants. There are three large-scale geothermal power plants in Kamchatka: Two of them – 12 MW; and one installed capacity of 50 MW (Svalova and Povarov, 2015).

The total consumption of renewable energy in Russia in 2015 was 607,089 terajoules (TJ) per year. The largest share in this total volume (42%) falls on the industrial sector followed by real estate (30%), trade (18%) and transport (8). The consumption of RES by other industries is about 2% (Figure 1).

The main part of RES (more than 76%) is directed to the production of electric energy. In 2015, 461,646 TJ of energy produced by hydropower plants was used for electricity generation (Table 2). However, the share of other renewable sources in electricity production remains extremely low.

In the end use sectors, namely in real estate, industry and transport, the main source of renewable energy is bioenergy. About 82% of solid fuel is used for heating, mainly in buildings and in agriculture and industry as well.

Table 1: The installed RES in Russia in 2014-2016 (International Renewable Energy Agency, n.d.; International Renewable Energy Agency, 2017)

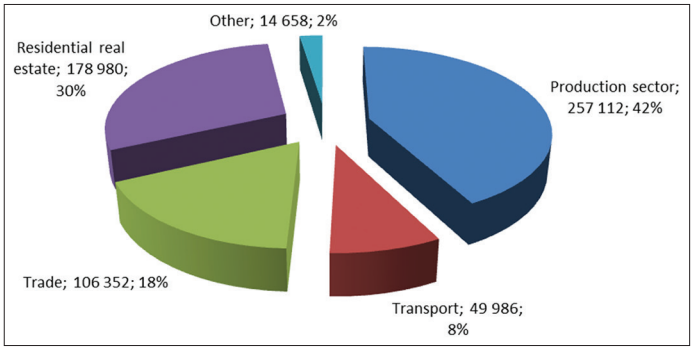
Type of RES	2014	2015	2016	Increase/decrease, %	
				2015/2014	2016/2015
Hydropower	50,845	50,987.8	51,318.4	100.3	100.6
Bioenergy	1,370	1,370	1,370	100.0	100.0
Solar energy	6.59	61.7	86.7	936.3	140.5
Geothermal energy	78	78	78	100.0	100.0
Wind power	10	10.9	10.9	109.0	100.0
Access of the sea	1.7	1.7	1.7	100.0	100.0
Total	52,311.29	52,510.1	52,865.7	100.4	100.7

RES: Renewable energy sources

Table 2: The use of renewable sources in the Russian Federation in 2015

Spheres of use	Hydropower	Wind	Solar energy	Solar thermal energy	Geothermal energy	Solid biofuel	Fuel pellets	Woody coal	Total
Total	461,846	16	172	29	1,411	142,106	458	1,051	607,089
Electricity	461,846	16	172	0	1,240	88	0	0	463,362
Heat	0	0	0	0	171	25,588	0	0	25,759
Direct use	0	0	0	29	0	116,430	458	1,051	117,968

Figure 1: The structure of the end users of renewable energy



5. LEGAL REGULATION OF INVESTMENTS IN RES IN THE RUSSIAN FEDERATION

In the energy strategy of Russia until 2030, approved by the Government Decision No. 1715-r of November 13, 2009, a target indicator of electricity generation based on RES is set at the level of 4-5% by 2020, with the exception of large hydroelectric power plants. With the inclusion of large hydropower, the target figure rose to 20%. These levels also had to be maintained at least until 2030 (between 2008 and 2030, domestic electricity consumption is going to double to 1,740-2,164 TWh/year). This goal will require the full development of renewable energy capacities by 2020 at the level of 15-25 GW (depending on the composition of the mixture) and the total generation of about 80-100 TWh per year by 2030 (International Finance Corporation, 2011).

The development of the market for RES (solar, wind and small hydropower with an installed capacity of up to 25 MW) is established by the Federal Law No. 35-FZ of March 26, 2003 "On Electric Power Industry." This law provides support measures to stimulate electricity production using RES both in the wholesale and retail markets.

Since 2009, when the government decided to accelerate the development of RES, a number of related measures were developed. In particular, a set of normative legal acts has been developed to support the development of RES, which consists of:

- Compensation for qualified production capacities for the production of RES with a capacity of up to 25 MW for the costs of their connection to the energy system (Resolution of the Government of the Russian Federation No. 850, 2010);
- Sale of capacity under an agreement with qualified RES generating electricity using RES (Resolution of the Government of the Russian Federation No. 449, 2013);
- Obligations of distribution companies to purchase energy received by qualified renewable energy facilities at regulated tariffs for compensation of energy losses (Resolution of the Government of the Russian Federation No. 47, 2015).

An important step in creation of the current regulatory framework for renewable energy in Russia was Resolution No. 449 about the incentive mechanism for the use of RES. This document establishes a regulatory framework that will make investments in RES financially viable. The Resolution provides for a specific source of income for investments in RES, which should, at least for a certain number of RES projects, ensure equal conditions for the production of thermal energy.

The document provides for a completely different approach to supporting RES and differs from the support mechanisms used in most other countries where support is provided.

This is a completely different approach as compared to the approach used in most existing support mechanisms in other countries where RES-E is promoted through electricity generation (MWh), rather than the installed capacity (MW or MW per month) of renewable energy installations. The cornerstone of the new capacity scheme is the "capacity agreement," which will allow investors to ensure the return of their investments in projects in the field of RES through guaranteed solvent payments for 15 years. In order to be eligible for these agreements, manufacturers go through the auction process.

The administrator of the trading system organizes an annual tender and is responsible for the selection of investment projects in the field of RES. One of the conditions for applicants is the proof of the availability of funds equivalent to 5% of capital costs. Previously, a guarantee was required from an energy company with 2.5 GW of assets but later they had a choice to take a letter of credit from a certified bank.

In addition, to be eligible for support, any renewable energy project should ensure the use of components of process equipment that are at least partially produced or assembled in Russia (requirements for local content). The purpose of these measures is to stimulate economic activity in the field of RES and create jobs in this developing sector.

It is important to note that the wording of Resolution No. 449 presupposes the right of investors in the area of renewable energy within the capacity program to receive sufficient revenues to recover expenses. This right is in accordance with the general principle of Russian tariff legislation, according to which energy tariffs should be economically justified and should not force operators of energy capacities to work at a loss (Leontiev, 1995).

According to the Resolution No. 449, investment costs are determined on the basis of requests of investors of projects of RES submitted for participation in competitive admissions excluding official donations (for example, compensation for technological connection costs for installations of 25 MW) (Resolution of the Government of the Russian Federation No. 449, 2013).

Resolution No. 449 indirectly grants investors the right to recover investment costs specified in their applications, along with a certain return on investment (ROI), as well as standard operating costs.

Capacity prices are calculated on the basis of these constant operating costs. Thus, investors can try to maximize revenues by controlling the operational costs of their projects. For renewable energy projects after January 1, 2017, ROI is 12%.

Thus, despite the small scale, the mechanism for supporting wholesale generation gains momentum and continues to attract investors. For the period of 2013-2017 years, there were selected with the help of tenders (Department of Trade of AO "ATS," n.d.):

- 105 solar energy projects with a total planned installed capacity of 1,704.2 MW;
- 78 wind energy projects with 2,452 MW of planned installed capacity;
- 7 small hydropower projects with a planned capacity of 120.2 MW.

The mechanism for supporting renewable energy generating units operating in the retail market is presented in Resolution No. 47. This document introduces a number of changes and clarifications into earlier regulations that described various aspects of the emerging retail energy market.

In accordance with the Decree of the President of the Russian Federation No. 373 (2015) and the Government Resolution No. 941 (2015), the Federal Antimonopoly Service approved with its order of September 30, 2015, No. 900/15, guidelines for determining the price (tariff) for electricity produced by qualified renewable energy facilities. According to the instructions, the tariffs can be calculated by two methods:

- Before the return of invested capital – the indexation of the necessary gross revenues (NGR). On the basis of NGR, the transmission tariff is calculated, which, in turn, is an important component of the price of electricity for the end user.
- After the return of invested capital – the method of expenses reasonably and necessarily incurred.

Thus, Russia has created a general legislative and regulatory framework for the development of renewable energy, including:

- Targets for the development of RES until 2024;
- Rules of trade in the wholesale and retail markets;
- Accounting for the ROI capital as part of marginal capital expenditure, as well as accounting for changes in exchange rates in Russia to reduce the risks associated with fluctuations in the ruble against the US dollar;
- Mandatory qualification of renewable energy facilities participating in the electricity market;
- The obligation of distribution companies to purchase 5% of electricity losses in the networks of renewable energy facilities.

6. DISCUSSION

At present, there is no unambiguous opinion in the expert community about the feasibility and prospects for the development of renewable energy in the Russian Federation. Many market participants express their opinion in favor of the need to promote the development of renewable sources in the Russian energy sector.

For example, Semikashev (2016) notes a steady increase in renewable energy both in terms of installed capacity and in terms of investment in this area. He noted that due to the economies of scale, by 2015, wind and solar energy had become quite competitive with traditional energy and without the influence of donations.

Mamedov (2015) noting the importance of the climatic factor for Russia, expressed the idea of a wide application of RES in the areas of autonomous generation – in agriculture and in everyday life. At the same time, the expert notes that "for the successful implementation of the tasks set, there is a need for political will, state support, economic conditions and high prices for fossil fuels.

Porfiryev and Roginko (2016) suggest that a relatively small share of renewable energy investments in aggregate expected investments can become a limiting factor for a long-term growth (Nezhnikova et al., 2018).

At the same time, some experts point to the inefficiency of using renewable energy in the Russian energy sector in comparison with traditional energy generation methods. So, for example, N. Porokhova from ACRA believes that RES in Russia is unlikely to be competitive in comparison with traditional production even in the 2020s due to cheap fuel. In comparison with 2013, when this program was launched, RES became even less competitive in comparison with traditional energy due to the devaluation and multiple growth of investments in RES; this fact has aggravated the discussion.

Nigmatulin (2015) points out that there is no need to introduce RES in Russia due to the large number of traditional alternatives. In his opinion, although RES are the subject of scientific interest, the main attention should be paid to the high cost of electricity, inefficient technologies for the production of energy from gas, modernization of facilities for replacing coal with gas, etc.

Anikieva E., a representative of the Ministry of Economic Development of Russia, speaking at the round-table meeting called "Prospects for the Development of Renewable Energy in Russia after 2024," has suggested that now there are a number of mechanisms that form excessive costs for investors. They include: Some increased requirements for the transit of capacity, reliability and safety of wind energy facilities, as well as the need for the transport infrastructure of the wind energy facility to meet the requirements of public roads (Analytical Center under the Government of the Russian Federation, 2017).

One of the serious obstacles to the development of renewable energy is the high demands placed on investors in terms of localization of generating equipment. Moreover, it is impossible to have success in the competition and getting payments for capacity supply agreements (CSA) without the necessary percentage of localization. For example, in 2015-2016, the target value of the degree of localization of components for wind installations was 25%, in 2017, it was at the level of 40%; in the beginning of the year – 55%; in 2019-2024, it will be up to 65%.

A high level of localization leads to an increase in the cost of production compared to the factory price of large vendors. Obviously, the creation of a localized production requires a large initial investment, which is allocated to a relatively small amount of production.

Foreign companies insist on lowering the localization threshold, explaining this by the fact that it is impossible to start production

from scratch; it takes a certain amount of time, it is necessary to solve a lot of technical issues, and they need additional support. However, the government is interested in reducing its risks and, therefore, it is necessary to exclude the use of non-localized equipment without the deployment of production in Russia.

One of the most promising mechanisms for eliminating these contradictions is a special investment contract (SPIC). In accordance with such a contract, the company assumes the obligation to localize, and the government allows the company to deliver a certain part of the components from abroad, recognizing them as localized, but at the same time, according to the contract, starting from a certain time the company should start production of this equipment in the territory of Russia. If the company does not fulfill these requirements, then the SPIC is broken off with it, and the company is subject to serious fines as a company with unconfirmed localization. The SPIC mechanism allows the vendor, the investor to comfortably localize complex technological production, and to make the localization process transparent for the government.

According to most market experts, RES can give a significant benefit for isolated areas reducing the payback period of projects, reducing the price of electricity and the amount of budget donations allocated to purchase fuel for diesel power plants.

While the cost of projects for the production of solar and wind energy in recent years has been declining, in Russia, the costs remain above the world average. This is partly due to the relatively recent introduction of these technologies in the country, while higher costs are also partly due to the characteristics of the country (for example, large territory requiring long-distance transportation of equipment, which in turn increases costs).

Currently, renewable energy projects are supported by CSA (CSA RES, lifetime until 2024) in the European part of Russia, the Urals, and Siberia. At the same time, tenders for all the planned projects have already taken place, and the prospects for further support of the sector remain unclear. In this connection, the question arose of extending the mechanisms of support for RES with lifetime until 2024.

Experts of the Association called "NP Market Council" note that the current scheme for selecting RES investment projects does not justify itself, and they have taken the initiative to curtail the current system of supporting the domestic alternative energy sector since 2024.

The current system for the support of RES is based on the right of suppliers with such capacities to charge an increased fee from consumers. Thus, RES investors return capital expenditures. The selection of such projects goes through competitions for the allocation of certain energy generating capacities from 2013 onwards. The main criterion is the lowest capital expenditure per unit of capacity.

In particular, in order to attract new players to the industry and increase production of equipment, it is necessary to increase the selection of projects to 10-15 GW. But this will lead to a significant increase in the burden on consumers. In turn, the rate for reducing the cost of renewable energy due to the economies of scale "has been unjustified."

The position of the "Market Council" on the abolition of alternative energy support after 2024 is shared by the Association of Guarantee Suppliers and Power Sales Companies. First Deputy Director of the Association, E. Fateeva, expressed the opinion that RES, at the end of the support period, should work according to the same rules as other market entities.

It should be noted that the point of view about the inexpediency of extending after 2024 support measures with the conclusion of CSA in the wholesale market is shared by the majority of consumers and energy sales companies.

In turn, representatives of investors opposed this development. So, Deputy General Director of OAE OTEK Rosatom E. Askerov noted that this was the only possible way of large-scale support. Subsidy assistance of RES in the Russian Federation decreases every year and turns into an increasingly competitive channel (The System of Support of Green Energy in Russia Can Radically Change, 2017).

Analysts of the corporation Hevel, Russia's largest solar energy company, believe that by supporting the development of renewable energy, the equilibrium price for electricity is reduced through cost-accounting applications. According to the company, when the program is renewed by renewable generation, consumers will save 100 billion rubles by 2035 annually.

The Association of Solar Energy Enterprises says that the price for the capacity of the SES (2.5 million rubles per 1 MW per month) is already below the price for HPP capacity (3 million rubles per 1 MW per month) and nuclear power plants (4 million rubles per 1 MW per month); taking into account new parameters for renewal of RES – even lower than the capacity of new thermal power plants.

Most companies investing in RES are in favor of a balanced set of support measures, including both the extension of the CSA in new, more competitive conditions and measures to support the consumer demand for renewable energy – creating conditions for the development of microgeneration, direct contracts for green energy and capacity, soft loans.

Oleg Barkin, the Deputy Chairman of the Board of the NP "Market Council", noted the need to change the objectives of the renewable energy support system after 2024. After 2024, the creation of economic conditions for improving the efficiency of RES of Russian production with its entry to a competitive level in the domestic market and with a view to foreign markets should be created.

The draft of the Energy Strategy of Russia for the period until 2035 specifies that the development of RES after 2024 should be carried out in a competitive environment, and support measures should be aimed primarily at stimulating the growth of efficiency of RES and their rapid achievement of network parity with the

traditional generation (Draft of the Energy Strategy of Russia for the Period up to 2035, 2015).

A special role in the development of RES should be allocated to the development of the domestic scientific and technical base and the development of advanced technologies in the use of RES, as well as to the expansion of production in the territory of Russia of generating and auxiliary equipment for RES.

The decision on the need for further application of the support mechanisms for RES could be taken after a thorough and objective analysis of the results of the implementation of the existing RES.

In the case when, based on the results of such an analysis, the Energy Ministry decides to cancel the subsidy and does not renew work for green generation under CSA, further research should be aimed at researching alternative options for promoting RES. According to experts of the "Market Council", it is possible to lower administrative barriers and to reduce the cost of financing renewable energy projects at the expense of development institutions, the National Welfare Fund or the Pension Fund of the Russian Federation with a yield at the key interest rate of the Central Bank for 15 years and state guarantees for loans.

When developing mechanisms for promoting the development of renewable energy in Russia, it is necessary to take into account the main feature of investing in RES projects. In renewable energy, the volume of investments falls at the beginning of the life cycle of a power plant. At the same time, there are practically no fuel costs and operating costs at RES facilities, which make up the bulk of the price of traditional power plants. This makes it possible to subsequently reduce the price of electricity.

The author agrees with the opinion of experts about the need to support the export of equipment for RES through state guarantees, subsidizing transportation costs and preferential export duties. Renewable energy needs to be supported not only by the energy market when the entire load falls entirely on the consumer but also through tax incentives, the provision of other preferences.

Further studies require the formation of institutions of green financing. The proposal of the Expert Council under the Open Government to create a "green state bank" is of interest. According to experts, it could be involved in financing environmental projects. In addition, the bank will be able to work with foreign funds and development institutions, which negates the effect of sanctions. An absolute participation of the government in the capital of the bank will allow it to be credited in international markets at a rate of 4-5% per annum (the rate for sovereign borrowers) and attract funds from foreign investors and partners (They Want to Create a "Green" Bank in Russia, 2017).

7. CONCLUSION

The increase in the cost of extracting hydrocarbons, coupled with the improvement of renewable energy technologies, creates prerequisites for the effective implementation of the latter, mainly for the energy supply of settlements and enterprises. This work is devoted to the study of the features of investing in RES projects in the Russian Federation, the results of which allow formulating the following conclusions:

- The growing interest in renewable energy projects allows talking about a change in the attitude of investors towards this branch, still poorly developed in Russia. If in 2015-2016, 43 RES projects with a total capacity of 975 MW were selected, in 2017, their number increased to 71 units with a total capacity of 2,221 MW. The volume of commissioning of renewable energy capacities in 2017 was 140 MW, while in the previous 2 years (2015-2016) this figure was 130 MW.
- An important role in the development of the sector was played by the consolidation of investors, equipment manufacturers, and developers, as well as mitigation of the requirements for the use of domestic equipment and the introduction of a mechanism to protect investments from foreign exchange risks.
- The current surplus of generating capacities in the country, a high cost of capital and unstable capital expenditures for imported equipment components limit medium and long-term investments in RES.
- At present, the state contributes to the development of investments in RES through the use of CSA, which guaranteeы investors ROI with a base yield of 12%.
- The opinions of market participants about existing RES support mechanisms divided. Large consumers favor the abolition of the scheme for supporting "green" generation according to CSA. This is due to the fact that to attract new players to the industry, it is necessary to increase the selection of projects, but this will lead to an increase in the burden on consumers. The suppliers implementing renewable energy projects according to CSA state that it is necessary to extend existing support measures, but with changing conditions and parameters.

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