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Risk of renewable energy sources development in the oil and gas industry in the context of COVID-19

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ABSTRACT

The global climate problem of climate warming has led to the active development of renewable energy almost all over the world. Many European countries and international corporations are already striving for carbon neutrality.

This article analyzes the current trends in the development of the renewable energy sources industry in the world and in Russia, assesses the applicability of renewable energy sources in the oil and gas industry and the impact of the coronavirus crisis on the perspectives for renewable energy. The analysis of the indicators of the volumes of commissioning of generating capacities for 2020 is given, the obstacles encountered in the development of the industry due to the unstable global situation are considered.

The article also discusses investment in renewable energy by oil and gas companies and their transformation under the influence of the renewable energy sector, as well as the participation of Russian companies in this transformation and their long-term prospects in relation to renewable energy.

KEYWORDS:

renewable energy sources, renewable energy, generating capacity, greenhouse gases, oil and gas companies, carbon neutrality, solar and wind energy, present value levelized cost.

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1. ANALYSIS OF RENEWABLE ENERGY DEVELOPMENT IN THE WORLD AND IN RUSSIA

One of the main factors in the development of renewable energy in the world is the global problem of climate change. For Russia, the climatic threat is even more urgent than for other countries, since over the past 40 years, climate warming has been happening here on average 2.5 times faster than in other parts of the planet [Mitrova and others, 2020b].

It should be noted that the fight against climate change and the reduction of the carbon footprint for Russia are not priority areas of development and are not supported at the state level as in other countries[1].

Climate regulation is currently in its early stages of development. In the intensive scenario of the draft strategy for low-carbon development of Russia, the goal is to reduce greenhouse gas emissions by 2050 to 52% of the 1990 level, while the leading countries are already striving for carbon neutrality and are confidently moving towards the net zero goal.

To prevent the growth of greenhouse gas emissions and climate change, the following measures are applied [Mitrova and others, 2020b]:

- energy consumption is reduced (for example, by improving energy efficiency);
- low-carbon energy is used (from solar, wind, bioelectric power plants, hydrogen technologies, etc.);
- ways of capturing and storing carbon are developing.

Russia has also the potential to reduce greenhouse gas emissions to zero, it can be achieved by improving energy efficiency or using renewable energy resources, which our country is abundant in.

Today, the share of Russia in global greenhouse gas emissions is about 5%. In the 1990s, greenhouse gas emissions in the country decreased significantly, then until 2008 they increased slowly and reached about 1.5 billion tons of CO_2-equivalent. Almost a half - 47% - of anthropogenic greenhouse gas emissions in the Russian Federation derive from the electric power and heat supply sector, 43% of emissions are provided by industry, fuel combustion in the transport sector, as well as methane emissions during the extraction and transportation of fossil fuels[2].

The dynamics of changes in greenhouse gas emissions around the world is shown in Fig. 1. Contrary to expectations, global carbon dioxide emissions in 2019 did not increase for the first time and remained at the level of 33.3 Gt [Nevelsky, Overchenko, 2020].

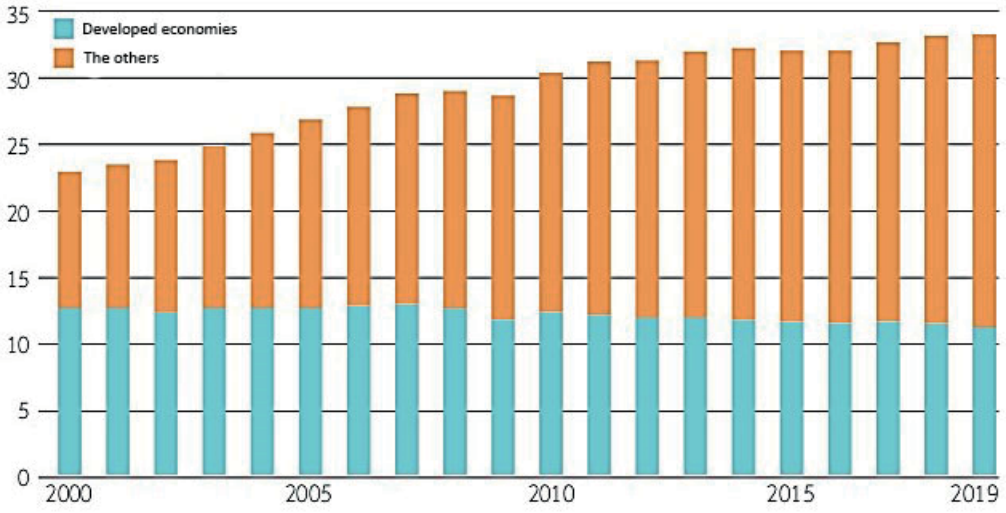
Companies and their alliances are increasingly emerging around the world seeking to achieve complete carbon neutrality. There are already 263 global companies that have signed the global RE100 initiative, some of them have already switched to renewable energy sources throughout the entire production chain. Similar obligations were undertaken by 4,050 companies and 1,930 organizations - they are members of NAZCA The Global Climate Action (for comparison: in May 2020, their number was 3,778 and 1,334, respectively)[3].

Also at the end of 2019, the EU Green Deal legislative initiative was presented to achieve complete climate neutrality. At the same time, another 65 countries, 10 regions, 102 cities, 93 companies announced similar goals with a deadline of 2050[4].

The RES industry is one of the fastest growing in terms of investments. Forecasts show that by 2050, up to 77% of all investments in new generating capacities in the electric power

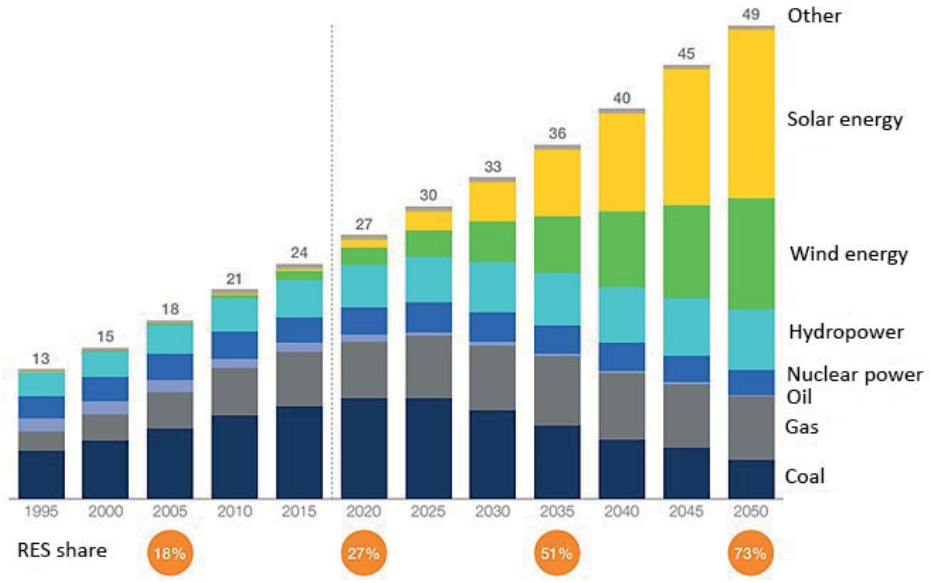
[1] Main directions of the Russian Federation Government activity for the period up to 2024. URL: http://static.government.ru/media/files/ne0vGNJUk9SQjlGNNsXlX2d2CpCho9qS.pdf.
[2] The same source.
[3] RE100: The world's most influential companies, committed to 100% renewable power. URL: http://www.there100.org/.
NAZCA. The global climate action. URL: https://climateaction.unfccc.int/
[4] European Council meeting (12 December 2019): Conclusions of the Meeting of states and governments of the EU member states heads. URL: https://www.consilium.europa.eu/media/41768/12-euco-final-conclusions-en.pdf.
COP 25. Climate Ambition Alliance, Annex II. URL: https://cop25.mma.gob.cl/wp-content/uploads/2020/02/Annex-Alliance-ENGLISH.pdf.

Fig. 1. Emissions of greenhouse gases in the global energy sector
(Gt CO_2-equivalent per year)



Source: [Nevelsky, Overchenko, 2020].

Fig. 2. Structure of electricity production by fuel type (trillion kWh)



Source: Global energy perspective 2019. URL: https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2019#.

industry will be made in renewable energy projects, mainly in the development of wind and solar energy, in energy storage technology[5].

The leading countries in the development of renewable energy sources are, first of all, states that are limited in fossil resources and which need to ensure their energy security. In many countries, measures to support the RES industry are taken at the state level.

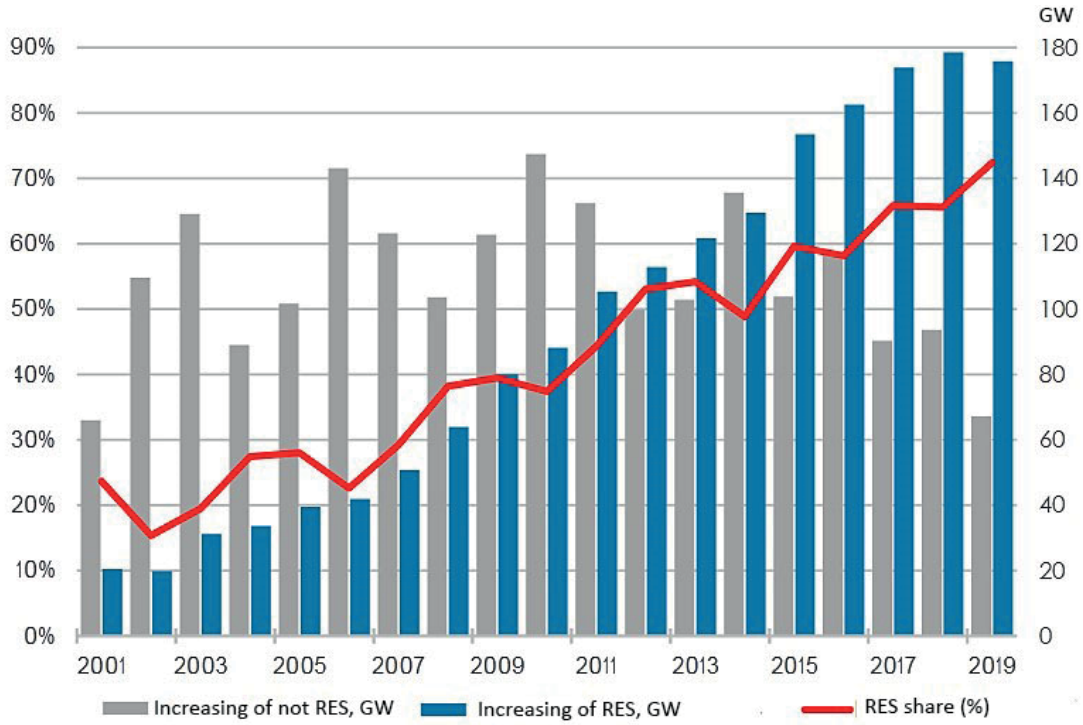
Renewable energy development trends can be traced by the structure of electricity production using different types of fuel, shown in Fig. 2.

The share of renewable energy sources in electricity production increased from 18% in 2005 to 27% in 2019. At the same time, according to forecasts of the McKinsey consulting company, this trend will continue: the share of renewable energy will grow to 51% by 2035 and to 73% by 2050. This growth is driven by a decline in the use of energy sources such as coal or oil.

The share of renewable energy sources in new installed capacities - in the construction of new power plants - is shown in Fig. 3.

[5] BloombergNEF. New energy outlook 2019: Executive summary. URL: https://about.bnef.com/new-energy-outlook/.

Fig. 3. Dynamics of the annual increase in RES capacities



Source: Renewable capacity statistics (2020). March. URL: https://www.irena.org/publications/2020/Mar/Renewable-Capacity-Statistics-2020IRENA.

According to the results of 2019, the installed capacity of solar energy in the world reached 629 GW, during the year, almost 115 GW of photovoltaic plants, a record for the industry, were built. The largest volume remains in China - 30 GW, the USA - 13 GW and India - almost 10 GW of solar power plants. Installed worldwide photovoltaic systems are currently capable of covering about 3% of the world's electricity demand[6].

The reason for the continued growth in demand for electricity from renewable energy sources is a decrease in its present levelized cost of energy analysis (LCOE). For a solar or wind power plant, this value (maximum LCOE - $ 54 / MW * h) in recent years is less than for the cheapest coal ($ 66 / MWh), nuclear ($ 118 / MWh) and even a gas station ($ 150 / MWh)[7]. Thus, the commissioning of solar and wind power plants on an industrial scale is becoming more and more preferable in comparison with the construction and operation of traditional generation facilities.

The foundations for the development of renewable energy in Russia and the corresponding targets in the legislation appeared in 2009[8]. In 2013 and 2015, renewable energy sources support mechanisms appeared for the wholesale and retail markets. At the same time, the first targets were adopted for the volume of commissioning of capacities of generating facilities operating on the basis of renewable energy sources (Fig. 4).

In the first quarter of 2020, 362 MW of generating capacities were commissioned, of which a quarter are solar power plants. For comparison: in 2019, 594 MW were commissioned and all of them are solar.

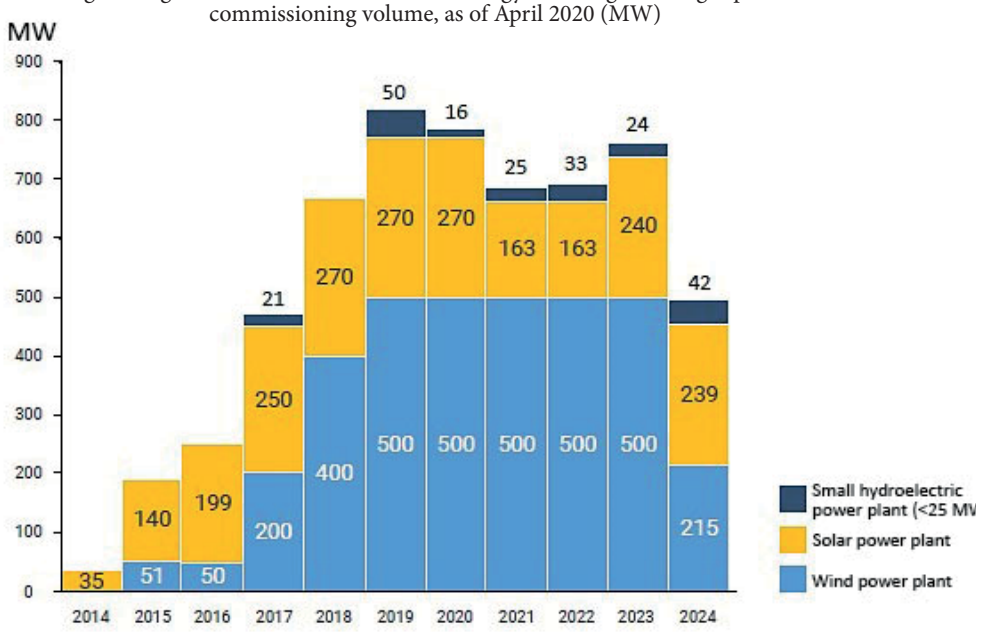
Thanks to the mechanism for guaranteeing the return of investments in RES - power supply agreements (RES), a renewable energy cluster has already been formed in Russia: the total capacity introduced by the mechanism for stimulating the development of RES in the Russian wholesale market is 2.1 GW (including power plants in Crimea), or 0 , 7% of the total installed capacity in the RF. Given the extension of the renewable energy support program after 2024, this figure will continue to grow[9].

2. THE IMPACT OF CORONACRISIS ON THE PROSPECTS FOR THE RENEWABLE ENERGY DEVELOPMENT

The spread of the coronavirus infection COVID-19 has caused a global crisis that has resulted in major changes in the global economy and energy markets.

[6] Snapshot of global PV markets 2020. International Energy Agency Photovoltaic Systems Program. URL: https://iea-pvps.org/wp-content/uploads/2020/04/IEA_PVPS_Snapshot_2020.pdf.
[7] Lazard: Levelized cost of energy analysis (LCOE 13.0), 2019. URL: https://www.lazard.com/media/451086/lazards-levelized-cost-of-energy-version-130-vf.pdf.
[8] Order of the Russian Federation Government from 08.01.2009 No. 1-p "Main directions of state policy in the field of increasing the energy efficiency of the electric power industry based on the use of renewable energy sources for the period up to 2024" (as amended on 18.04.2020). URL: http://docs.cntd.ru/document/902137809.
[9] REDA: Russian Renewable Energy Market: Current Status and Development Prospects (2020). Newsletter. May.

Fig. 4. Target indicators of the renewable energy sources generating capacities commissioning volume, as of April 2020 (MW)



Source: REDA: Russian Renewable Energy Market: Current Status and Development Prospects (2020). Newsletter. May.

At the same time, the pandemic has further pushed countries towards achieving carbon neutral energy targets to rebuild their economies hit by the coronac crisis. During the quarantine period, production decreased, demand for cars and fuel, as a result, decreased greenhouse gas emissions.

The fight against coronavirus infection has led to an increase in the use of renewable energy sources by 1.5%, with a parallel decrease in demand in other sectors (by 3.8% in the first three months of 2020). According to analytical centers Ember and Agora Energiewende, by the end of 2020, renewable energy became the largest electricity producer in the European Union's electric power industry: the share of coal, gas and oil decreased to 37%, while wind, solar, hydropower and biomass provided 38% of the total production volumes by 10% [Zhuravleva, 2020].

The growth dynamics of RES generating capacities is shown in Fig. 5.

Thus, the volume of commissioning of RES facilities in 2020 is estimated at 167 GW, which is 13% less than in 2019. Under the influence of the coronavirus, the pace of development of the renewable energy industry in the world has slowed down. For safety reasons, a number of projects were postponed: in China, the production of components for solar modules and wind turbines and the supply of equipment around the world were temporarily stopped. But already as of the end of the second quarter of 2020, the largest innovative manufacturer of photovoltaic modules JinkoSolar presented the results of the production of solar modules: deliveries reached 4.5 GW, which is much more than in the first quarter of 2020 and in the second quarter of 2019. The company also announced plans to increase the production capacity of modules to 30 GW by the end of 2021. At the same time, its closest competitors LONGi and TrinaSolar are also increasing production volumes.

In terms of electricity generation in the first quarter of 2020, wind and solar energy occupied the leading positions, for example, in Germany they were in first and second places. At some moments in Italy, Austria, Belgium, the share of wind and sun reached 60–70% in energy generation [Sidorovich, 2020]. However, it should be noted that over the 9 months of 2020, cases of negative electricity prices more than doubled in Europe compared to the previous year. The high share of renewable energy generation and reduced demand due to COVID-19 in the first half of 2020 made the market more volatile.

Considering that the commissioning of generating capacities in 2019 in the world consisted of almost 75% of renewable energy sources (mainly solar and wind power plants), it was they who could suffer the most. However, investments in the electricity sector depend on the energy policy of a particular country. So, in European countries, a course towards sustainable development has been chosen, therefore, a long-term continuation of the energy transition is expected and investment in renewable energy sources will continue.

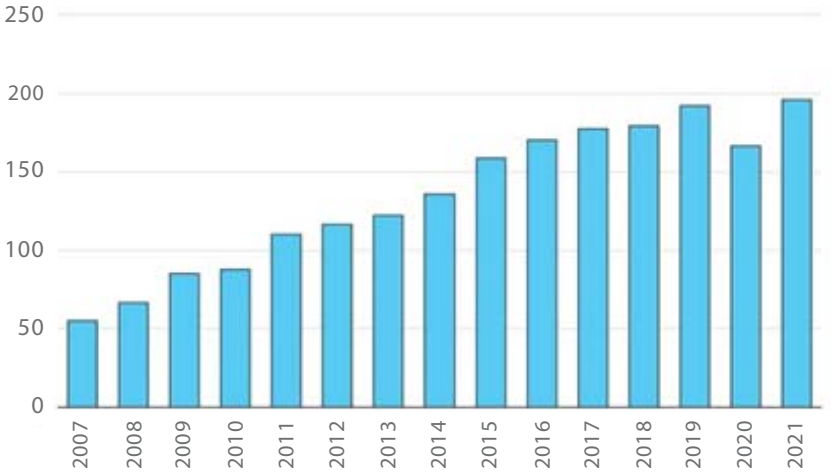
No significant changes are forecasted in the structure of electricity generation in Russia: natural gas dominates in the energy balance, the price of which is regulated by the state. However, there are also prospects for the development of RES in the country[10] [Mitrova and others, 2020a].

It should be noted that the spread of coronavirus infection was accompanied by a drop in oil demand with the emerging crisis of the oil industry. From January to mid-April 2020, the price of Brent oil had fallen 3.5 times, and futures were sold at a negative price for the first time. But despite low oil prices, renewables remained the most attractive.

In general, the fall in prices in fossil fuel markets does not have a radical impact on the electricity industry because:

[10] IEA: The Covid-19 crisis is hurting but not halting global growth in renewable power capacity, May 2020. URL: https://www.iea.org/news/the-covid-19-crisis-is-hurting-but-not-halting-global-growth-in-renewable-power-capacity.

Fig. 5. Increase in generating capacities of renewable energy sources (GW)



Source: The COVID-19 crisis is hurting but not halting global growth in renewable power capacity. 2020. May. URL: https://www.iea.org/news/the-covid-19-crisis-is-hurting-but-not-halting-global-growth-in-renewable-power-capacity.

- technologies for generating electricity based on renewable energy sources are no longer so expensive, and costs are decreasing annually (as early as 2016, solar and wind energy became cheaper than traditional energy in 30 countries of the world);
- trends show that investment in RES in recent years is higher than in fuel energy, and there is no direct connection and correlation with changes in prices for fossil sources;
- coal generation is losing its role for environmental reasons;
- an increase in the share of oil and oil products in power generation is unlikely [Zhuravleva, 2020; Mitrova and others, 2020a].

As a result, the efficiency of RES projects will not decrease in comparison with traditional generation, but it may even increase.

3. TRANSFORMATION OF OIL AND GAS COMPANIES UNDER THE INFLUENCE OF THE RES SECTOR DEVELOPMENT

The RES market attracts investments, including from oil and gas companies. Currently, the most emitting oil, gas and power companies are already actively setting targets to reduce carbon dioxide emissions and investing in low-carbon projects. By investing in renewable energy, international oil and gas companies are diversifying the market and entering the power generation market.

Shell, Total, ENI, Equinor and BP in 2018 made about 3-5% of their investments in renewables. At the same time, on average, oil and gas companies allocate only about 1% of total investments for these purposes. Equinor develops offshore wind energy, Repsol, Total and ENI develop solar energy, and Shell and BP develop biofuels[11].

Shell, Total announced their transformation into power companies in the long term. BP and Total have announced their intention to achieve zero carbon emissions by 2050 at the latest. Equinor plans to set similar indicators by 2030 [Sidorovich, 2020].

These global trends began to appear in Russia as well. Russian companies do not set the goal of actively promoting renewable energy sources, but, for example, develop such projects to meet their own needs in electricity.

For example, at the end of 2019, LUKOIL announced its long-term strategy, within the framework of which it plans to achieve zero CO2 emissions, and in March 2020, it presented the report "Main trends in the development of the global liquid hydrocarbons market until 2035" with a statement on the start of development of its own climatic strategies to achieve carbon neutrality by 2050, similar to European companies[12].

In the autumn of 2019, "Tatneft" Company presented principles for preventing climate change and accounting for greenhouse gas emissions in its policy on industrial safety, labor and environmental protection.

Several Russian companies, including "Gazprom", "Rosneft", "Tatneft", LUKOIL, "Surgutneftegaz", NOVATEK, have joined the Climate Change Financial Disclosure Working Group, which provides TCFD reporting on climate risks for business.

As for the latest renewable energy projects implemented in Russian oil and gas companies, in 2019 "Gazprom Neft" built a solar power plant at the Omsk refinery, "Transneft" - in Chelyabinsk, LUKOIL - at the Volgograd refinery. In 2022, LUKOIL also plans to launch a solar station in Krasnodar. Wind energy still has great potential and prospects for the

[11] KPMG. Renewable energy sources as a new development step for oil and gas companies. 2019. December. The oil and gas industry in energy transitions // International energy agency, 2020. URL: https://www.iea.org/reports/the-oil-and-gas-industry-in-energy-transitions.
[12] LUKOIL: Main trends in the development of the global liquid hydrocarbons market up to 2035. URL: https://lukoil.ru/Business/Futuremarkettrends.

implementation of projects with the participation of oil and gas companies[13].

The experience of developed countries demonstrates that the introduction of RES is not always economically profitable in the short term, but with large-scale support at the initial stages from the state and from such large market players as oil and gas companies, this allows them to accelerate their development.

4. CONCLUSIONS

Trends analysis in the development of the RES industry in the world and in Russia shows a stable increase in the share of renewable sources in electricity production. More and more countries, companies, associations are committing themselves to low-carbon development, and today this is the main long-term trend in the global energy sector. At the same time, the development of the RES market around the world is uneven, but each region has its own incentives for the growth of this sector.

In addition to environmental reasons, the economics of such projects plays an important role in the development of the RES industry: the construction and operation of power plants based on RES are already more profitable than those powered by fossil fuels; this is confirmed by the annual decrease in the indicator of the present normalized cost of electricity LCOE.

The largest oil and gas companies are already taking part in the development of the RES sector in the world. Typically, these companies seek to increase their resilience in a changing market. Compared to them, Russian oil and gas companies are still on the beginning path, but for them participation in the formation of the RES market is also strategically important, since it will reduce the technological gap in this direction in the long term. It is also worth noting that the use of RES technologies at oil and gas facilities will give an additional push to the development of high-tech production in Russia.

At the same time, the crisis which arose in economy and industry will not have a radical impact on investments in the RES sector. The recovery of countries will take place in accordance with their own political choice, however, according to all forecasts, the global trend towards decarbonization and the predominant development and strengthening of the competitiveness of the RES will continue.

REFERENCES

1. Mitrova T., Grushevenko E., Kapitonov S., Melnikov Yu., Perdero A., Dobroslavskiy N. (2020a). *Koronakrizis: vliyanie COVID-19 na TEK v mire i v Rossii [Coronacrisis: The impact of COVID-19 on the fuel and energy complex in the world and in Russia]*. Moscow, Moscow School of Management SKOLKOVO.
2. Mitrova T.A., Khokhlov A.A., Melnikov Yu.V. (2020b). *Global'naya klimaticheskaya ugroza i ekonomika Rossii: v poiskakh osobogo puti [Global climate threat and the Russian Economy: In search of a special path]*. Moscow, Energy Center of the Moscow School of Management SKOLKOVO.
3. Nevelskiy A., Overchenko M. (2020). Global'nye vybrosy uglekislogo gaza perestali rasti v 2019 godu [Global carbon dioxide emissions stopped growing in 2019]. *Vedomosti*. URL: https://www.vedomosti.ru/business/articles/2020/02/11/822790-vibrosi-co2-2019.
4. Zhuravleva A. (2020). Tikhaya gavan' vetra i solntsa [Quiet harbor of wind and sun]. *Global'naya energiya [Global Energy]*. URL: https://globalenergyprize.org/ru/media-room/news/2020/06/2020.-safe-haven-of-wind-and-sunshine.
5. Sidorovich V. (2020). *Razvitie VIE v god Covid [Renewable energy development in the year of Covid]*. URL: https://renen.ru/razvitie-vie-v-god-covid/.

[13] AREDA: Russian Renewable Energy Market: Current Status and Development Prospects. Newsletter. May 2020. KPMG. Renewable energy sources as a new development step for oil and gas companies. 2019. December. The oil and gas industry in energy transitions // International energy agency, 2020. URL: https://www.iea.org/reports/the-oil-and-gas-industry-in-energy-transitions.

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