First steps of Renewable Technology in Russia

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Abstract. The article gives a brief analysis of some of the benefits provided by Renewable Technology, the ways in which they differ from traditional sources of electrical energy, an overview of the regulatory bodies and the general rules that govern the wholesale electricity market in Russia, the functioning of generation capacity of trading market. Then the mechanisms that exist to encourage market participants to accurately predict supply and demand will be outlined below. Finally, a short description of some other measures that maybe taken in the future to support the growth of the Russian Renewable Energy are to be examined.

1. Introduction

Non-traditional Renewable Energy Technologies ("NRETs") currently play a minor role in Russia’s electricity sector, and, in line with global practice and in the interests of diversification, the Russian Government is seeking to promote the use of such technologies in Russia.

For today as opposed to adjustment of oil price by OPEC+ the idea of more focusing on renewable "green energy" is gaining a new momentum in world. The main drivers became global energy companies. The idea if de-carbonization and "green economy" is in the air within the last months and received a new support from the world leading energy producing giants. After BP which announced in August, 2020 its new priorities on changing its policy from oil- to a new integrated energy company based on "green energy", Shell also announced the similar strategy. BP is seeking to cut down production of carbon resources by 40% until 2030 and to abandon further financing of new projects and closing of the existing projects. The similar view Shell has set out for the future although it outlined only main strategies of transfer to the "green technology" while strategy in detail will be presented in the beginning of the next year. The company plans to significantly reduce the world biggest network of its gasoline stations and also to sell 10 out of 17 oil-refinary plants. Besides, "green bonds" are becoming more popular in the world financial market as a sign of strengthening of this trend. According to Bloomberg, in September 2020 the volume of “green bonds” issued achieved maximum level of 30 billion US dollars. At the same time new discussions of projects on "green hydrogen" are becoming more accrual. Goldman Sachs forecast an increase of this market by 2050 up to 10 trillion US dollars. According to the European Commission volume of generating facilities can increase up to 6 GW by 2024, 40 GW in 2030 and 500 GW by 2050. Total investments can amount to 400 billion euro until the end of 2030. Such huge plans reflect perspectives of significant increase of demand and supply in the near future [1-3].

In regard of this world trend we can try to understand the situation of development of "green energy" in Russia.
2. Materials and methods
The article uses such research methods as abstraction, analysis and synthesis, induction and deduction, and generalization. This study is based on the following information:

- FINAM the Russian financial information portal, Bloomberg Information Agency presented in public sources and media;
- Information of Rosstat (the Russian Statistic Agency) of 2013-2019;
- Analysis of the current Russian legislation laws governing of energy generation.

3. Results
3.1. Energy Consumption Balance.
As a result of population growth and diversification of the economy, an annual growth of approximately 2% in electricity consumption is expected during the foreseeable future, to about 1.492 TWh in 2030. This will require the Russian Federation to increase its installed power capacity by about 160 GW by 2030, at a cost of close to 27 trillion rubles (approx 850 billion US dollars). The Russian Federation has already a low carbon power sector, in which hydroelectric power stations play a major role due to availability of huge hydro resources. However, the anticipated energy demand will require major development of existing power resources. Unfortunately, the Russian Federation currently produces only 0.002 TWh from solar (photovoltaic - PV), wind, marine, geothermal and biomass energy (i.e. non-traditional renewable energy technologies or NRETs) that amounts is 0.28% of total volume of generated electric energy in Russia in 2019. Production of electricity from NRET sources is expected to grow to 5-6 TWh in 2020 and 35-61 TWh in 2030.

3.2. NRETs Available in Russia and Social Benefits Delivered by NRETs.
Despite the small share of investment in the renewable industry so far, when compared to the investment in traditional sources of energy, such major new developments in NRETs as photovoltaic (PV), wind, geothermal, biomass-based generation, marine energy, and small-scale hydroelectric power have been already implemented in Russia.

NRETs deliver significant benefits to Russian society, including the de-carbonization of Russian economy, long-term energy security and diversification of the Russian energy market, comparatively low maintenance costs, positive impact on local employment markets, positive impact on healthcare and environment, compact location and scalability, and attractiveness for investors. It is important that, unlike fossil sources, NRET sources are not vulnerable to fuel price volatility, which may have an additional impact on Russian long-term energy and social policy.

3.3. Specifics of NRET Comparing to the Conventional Sources.
NRET sources have significant differences from traditional sources, which may result in a considerable impact on the Russian energy system. Particular qualities of NRET that need to be accommodated by the regulatory include:

- The long-term costs of electricity generation from fossil-fuels relate to the continuous operation of generation plants’ facilities without interruption (fuel costs), while most of the costs for NRET sources are due to capital expenses in equipment;
- NRETs cannot always guarantee a continuous supply of electricity, as generation is only possible when the relevant resource is present and available to generate energy;
- The efficiency of NRET sources is dependent on their geographic position;
- NRETs deliver social and environmental benefits which are not easy to quantify in financial terms, and which are therefore usually not reflected in the market.

In order to accommodate these specific qualities of NRETs, mechanisms may in the future be implemented to compensate for the current biases, and/or the market rules may be changed altogether so that they provide a truly even playing field.
3.4. The wholesale electricity market in Russia – the general situation.

The Russian wholesale electricity market is regulated by the Federal Law "On Electricity Generation" No. 35-FZ dd. 26.03.2003 with amendments made by the latest law - Federal Law No.471-FZ dd.27.12.2019 "On introduction of amendments to the Federal Law "On Electricity Generation " in the part of development of Micro generation ", Government Resolution No. 643 of 27 February 2010, and the Wholesale Market Trading System Accession Contract. Both buyers and sellers of electricity and generation capacity are required to sign this contract in order to participate in the wholesale market. The new amendments were devoted to micro generation that implies NRET.

As in a number of other countries, the wholesale electricity market in Russia includes trading in electricity, and trading in generation capacity. In order to purchase electricity, an entity must first of all purchase the necessary amount of generation capacity. The main participants in the wholesale market are generating companies, importers / exporters of electricity, retail companies, grid companies and major consumers of electricity. The rules governing the wholesale electricity market discussed in this section also refer to Micro generation, and apply to all wholesale buyers and sellers of electricity, including electricity from NRET sources.

3.4.1 Regulatory Bodies. The Ministry of Industry and Energy has overall responsibility for the electric power sector, and the following bodies oversee specific aspects of this market:

- Market Council: a non-profit council of participants in the wholesale market. The market Council supervises the operation of the market, certifies electricity producers and develops the various standard agreements and other documents used in this market;
- System Operator: a 100% state-owned open joint-stock company which oversees the physical operation of the electricity transmission system;
- Administrator of Trading Systems: an open joint-stock company which regulates the wholesale power and capacity market and facilitates electricity trading on standard terms between sellers and purchasers;
- Center for Financial Settlements: a closed joint-stock company which acts as an intermediary for payments on the wholesale market.

3.5. New measures for stimulating the Russian renewable energy sector.

On 28 May 2013 the Russian Government adopted Regulation No. 449, effective from 11 June 2013 (the "RES Standard"). The RES standard includes: (a) rules for calculating RES capacity payments; (b) a methodology for calculating the share of generators’ capital expenditures which shall be covered by RES capacity payments; and (c) a methodology for calculating the component of the capacity price that will allow RES generators to cover their capital and maintenance expenses.

The RES standard also introduces changes to: (a) the Qualification Rules for RES generators, as provided in Government Regulations No. 426, dated 3 June 2008; (b) the Regulations of the Ministry of Economical Development No. 438, dated 5 June 2008; and (c) the Rules for the Electricity and Generation Capacity Wholesale Markets, provided in the Government Regulations No. 1172, dated 27 December 2010.

Under the Federal Law "On Electricity Generation ", there are two main methods the Russian Government can use to promote the RES sector: cross-subsidizing electricity prices; and subsidizing generation capacity prices. The RES Standard deals primarily with the second of these methods: selected RES generators may be eligible to receive pre-set capacity payments for up to fifteen years after the launch of new RES generating facilities, to help them cover their capital expenditures related to the construction and maintenance of such facilities, and provide them with a prescribed level of return on their investment. The new RES Standard also provides for certain incentives for localization of RES equipment and for competition between RES projects. The first of the above methods is designed to cover the RES generator’s on-going costs and profit, but the details of this method have not yet been fully worked out.
The RES Standard entitles a qualified RES generator to recover a prescribed level of return on its capital investment, which will be calculated using the base level of return (14% for projects selected before 1 January 2015 and 12% for projects selected thereafter) adjusted to reflect the current rate of return on long-term state debt (against a reference rate of 8.5%), and the repayment of the capital itself over a 15-year term [4-6].

4. Discussion
Although a solar energy (PV) is recognized as having the highest level zed cost of energy and as being at present probably the closest to full commercial viability, because of the geographical position of Russia and its large territory wind energy would appear to have the most potential on a national scale. Other NRETs may have greater potential in particular regions of the country. Moreover, speaking about the range of application of the RES Standard, the capacity payment system established by the RES Standard currently applies only to solar, wind and small-scale (less than 25 MW) hydroelectric projects, despite the fact that the Qualification Rules for RES generators (Government Regulations No. 426, dated 3 June 2008) provide for a wide range of RES. Other projects, including biogas projects, are not currently covered by the RES Standard unless they could be referred to Microgeneration that is a general definition in the latest amendments to the Law for NRET [7-8].

5. Conclusion
As mentioned above, the Russian Law "On Energy Generation" contemplates that the Russian Government may establish feed-in tariffs for electricity calculated based on the equilibrium price of electricity plus a regulatory premium which will be established by the Government. However, there are no specific plans to introduce such feed-in tariffs in the nearest future.

The Ministry of Energy, as part of its support for the NRET program, has prepared a draft decree that regulates the retail market for alternative energy. According to this draft, the Federal Tariff Service will make recommendations for setting tariffs in the sector. It will allow suppliers of electricity from renewable energy sources to sell energy to territorial grid organizations (TGO) that are not connected to the Unified National Electric Grid at approved prices within approved price ranges. According to new amendments to the law producers of electricity from NRET sources will be able to declare their own generating capacity, be given a rate and sell the electricity they generate to the TGO at such rate. In this case, the TGO will not have the right to refuse to enter into contracts with suppliers of electricity from NRET sources (who have generation capacity) from NRET sources. The volume of sold electricity will be determined by the guaranteeing supplier. Tariffs will be formed based on the size of investment capital, operating costs, loans and accrued interest, as well as a rate of return of invested capital, fixed at certain percent per annum.

The Russian Government has announced that it is now creating a single NRET development map to better estimate the potential of the country’s green energy resources. The map should contain detailed information on the current and future NRETs and an analysis of the territory of the Russian Federation from the perspective of availability of all kinds of renewable resources.

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