A Progress to Meet SDG 7 in the Russian Far East

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Abstract

The paper is devoted to the analysis of Russia's experience and progress in achieving SDG 7 in the Far Eastern region. The author provides basic SDG achievement indicators officially adopted by Russia and analyses the SDG statistics published by the Federal State Statistics Service of Russia. In addition to assessing official statistics, the author examines the latest empirical data related to the development of energy sector in the Russian Far East. As a result of a study of recent trends in RFE's energy sector and attempts of Russian government and private/state-owned enterprises to counter the energy deficit in the RFE, the author comes to the following conclusions. Firstly, the analysis of statistical data demonstrates that the basic SDG 7 indicators in the RFE are stable and largely are showing positive dynamics. However, the significantly increased energy consumption represents a serious challenge for the implementation of Russia's energy strategy. Secondly, in order to deal with power deficit, the Russian government has initiated a number of reforms aimed at increasing state support for business, encouraging investment in the development of energy infrastructure, while in the area of power grid management, Russia is pursuing a centralization policy. Thirdly, the clean energy agenda does not currently dominate Russia's energy policy. Rather, a special attention is drawn to nuclear energy, and it is assumed that first nuclear power plants in the RFE will be built in the 2030s to compensate for the energy deficit in the region.

Keywords: sustainable development, SDG 7, energy, Russian Far East, nuclear energy **JEL classification codes:** O13, Q42, Q43, R58, H54

1. SDG 7 Progress Indicators as Adopted by Russia

In 2017, Russia began to provide official statistical information on SDG achievement indicators. The Federal State Statistics Service (Rosstat) was appointed as the body responsible for publishing the data and transferring it to international organizations.

Sustainable Development Goal No. 7 aims to ensure access to affordable, reliable, sustainable and modern energy for all. According to information, provided by Rosstat, Russia adopts the following indicators to demonstrate progress towards achieving SDG 7 (National set of..., 2024):

- By 2030, ensure universal access to affordable, reliable and modern energy services (measured as a) electricity consumption, billion kWh, b) electricity consumption per capita, kWh);
- By 2030, increase substantially the share of renewable energy in the global energy mix (measured as a) share of

renewable energy in power generation mix, %, b) installed capacity of renewable power generation facilities (not including hydroelectric power plants with an installed capacity of over 25 MW), MW);

- By 2030, double the global rate of improvement in energy efficiency (measured as energy intensity of GNP for the year preceding the previous one, kg of conventional fuel per 10 thousand rubles in constant prices of 2016);
- By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology (measured as investments in solar, wind and geothermal power generation).

At the same time, no specific targets for achieving the designated indicators were officially proposed. Therefore, it is only possible to track the dynamics of progress in achieving a particular indicator. In addition, since 2022, many Russian



Figure 1: Electricity consumption in Russia and the RFE, 2010 - 2022, billion kWh

Source: Compiled from the Rosstat data (National set of..., 2024)



Figure 2: Electricity consumption per capita in Russia and the RFE, 2010 - 2022, billion kWh

Source: Compiled from the Rosstat data (National set of..., 2024)

official agencies, including Rosstat, have stopped publishing statistics on a number of indicators. In this regard, Rosstat data related to statistics on energy consumption and other relevant indicators are also limited until 2022, which is a separate problem for analyzing the implementation of SDG 7.

Drawing on Rosstat data, the following observations can be made:

Electricity consumption in Russia has grown from 1026.6 billion kWh in 2010 to 1153.5 billion kWh in 2022, representing

a 12.3% increase. In the Russian Far East, the growth rate is significantly higher -29.6% from 2010 to 2022, when electricity consumption increased from 55.4 to 71.8 billion kWh.

On average, electricity consumption per capita in Russia increased by 10.5%, from 7114.8 to 7862.9 kWh between 2010 and 2022. In the Russian Far East, the growth rate is 2.8%, from 8797.7 to 9052.4 over the same period. Rosstat statistics also record a drop between 2017 and 2018, likely related to the inclusion of the Republic of Buryatia and Zabaikalsky Krai into the Far Eastern Federal District in 2018. These two



Figure 3: Share of renewable energy in power generation mix in Russia and the RFE, 2012 - 2022, %

Source: Compiled from the Rosstat data (National set of..., 2024)



Figure 4: Installed capacity of renewable power generation facilities in Russia and the RFE, 2012 - 2022, MW

Source: Compiled from the Rosstat data (National set of..., 2024)

entities became a part of the RFE, but remain connected to the UPS Siberia (Unified Power System). Overall, the electricity consumption per capita rate is higher in the RFE compared to Russia as a whole.

The share of renewable energy sources in electricity generation mix in Russia increased from 15.3% in 2012 to 17.6% in 2022. In the Far East, this figure is higher, although its negative dynamics can be observed: from 34.8% in 2012 to 30.3% in 2022.

The installed capacity of renewable energy power generation facilities in Russia increased tenfold over the nine-year period from 2013 to 2022 – from 381 to 4,300 MW. In the RFE, growth rate is less impressive and amounts to only 284% – from 81.6 MW in 2013 to 313.2 MW in 2022.

Energy intensity of GDP, expressed in kg of conventional fuel per 10 thousand rubles in constant prices of 2016, decreased in Russia – from 80.3 to 74.5 over 2016 – 2022 period, which represents a 7.24% decrease.





Source: Compiled from the data of Rosstat (National set of..., 2024)



Figure 6: Investments in solar, wind and geothermal power generation, RUB mln

Source: Compiled from the Rosstat data (National set of..., 2024)

The last indicator relates to investments in the development of power generation using three types of renewable sources – solar, wind and geothermal power. This indicator has a positive trend, the volume of investments has grown from 1.5 million rubles in 2011 to 59.2 million rubles in 2022.

2. Recent Trends in the RFE Energy Sector

Although recent statistics are not available, some conclusions about current trends in the development of the energy sector in the RFE can be drawn from statements made by Russian officials. Thus, statistics cited in the report by Russia's Minister

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of Energy Sergey Tsivilyov at the Eastern Economic Forum in Vladivostok in September 2024 indicate a significant increase in energy consumption in the Far Eastern Region (New energy for the Far East..., 2024).

Over the past two years, annual electricity consumption growth rate in the RFE stands at 3.9% which is much higher than Russia's average 1.5%. At the same time, there are growing problems with the maintenance and modernization of the aging energy infrastructure. Wear and tear of power generation facilities in the RFE stands at 13%, Russia's average -9.5%. The degradation of the power grid assets is even more severe: wear and tear of power grids in RFE is up to 70%. As a result, there is a growing accident rate at both power generation facilities and power grids, poor power supply in certain areas. The electricity losses in the RFE energy system are estimated to stand at 10% (Russia's average is below 8%).

High energy consumption growth rate, coupled with the inadequate technical condition of power grids and generation facilities, have led to the fact that RFE is becoming an energydeficient region. The reason for this is the high rate of economic growth in the region. According to S. Tsivilyov, "in 2021, Russia surpassed the peak consumption of electricity of 1990 ... The Far East is developing at a much faster pace than Russia on average, and this is a good sign. The unified power system created in the USSR is no longer sufficient to implement Russia's economic development program. In energy-surplus areas, the energy infrastructure condition is a restraining factor for economic development" (Sergey Tsivilyov..., 2024). His assessment is supported by Aysen Nikolayev, head of Sakha Republic (Yakutia), who claimed: "the RFE energy sector no longer meets the pace of industrial growth today... after 2021, due to rapid industrial growth, consumption began to exceed electricity generation" (New energy for the Far East..., 2024).

These circumstances also had an impact on electricity supplies to China, the main electricity export destinations for the RFE. Electricity exports from the RFE to China peaked in 2022 at 4.6 billion kWh, since then it has suffered a 32% decline to 3.1 billion kWh in 2023. Exports for the period January - June 2024 stand at 3.52 billion kWh (Korochkina, 2024). In august 2023, Russia reduced electricity exports to China via the Amur - Heihe power line from 600 MW to 100-200 MW due to low water levels in RFE areas, frequent emergency situations, growing electricity consumption in RFE energy system (Russia and China..., 2024). The Amur – Heihe power line is still operating in a limited mode, and in the context of energy shortage in the RFE and the poor technical condition of transborder power grids, the prospects for restoring exports on a large scale also remain limited. Another obstacle to increasing electricity exports appears to be the tariff issue. Although in October 2023, China agreed to buy Russian electricity at a 7% higher duty (Mingazov, 2023), the volume of electricity imported from Russia remained at a relatively low level.

3. Private/State-owned Enterprise Efforts to Counter Power Deficit in the RFE

UPS Vostok (RFE's energy system) consists of 59 power plants with total installed capacity of 14.3 GW. According to the projections, provided by Fyodor Opadchyi, head of SO UPS (System Operator of Russian Unified Power System), electricity deficit in the RFE will stand at 10.7 billion kWh by 2030. This would require the construction of additional power generation facilities with an installed capacity of 1.6 - 1.9 GW by that period (Fyodor Opadchyi..., 2024). This target is reflected in the *Scheme and Program for the Development of Electric Power Systems for 2024-2029*, adopted in November 2023 by Russia's Ministry of Energy: by 2029 the required volume of installed capacity of additional power generation facilities for UPS Vostok is indicated as 1.935 GW (Scheme and Program..., 2023).

However, attracting private capital to the construction of new power generation is a major problem. The unfavorable investment climate in many areas of the RFE and the high key interest rate in Russia (21% as of November 2024) hinder the attraction of private investment, and state support instruments are needed to solve this problem. According to the Scheme and Program, in order to build new power generation facilities in different regions of Russia, it's planned to conduct a Competitive Selection of New Generating Facilities (COM NGO) - a mechanism for attracting investment in energy sector, which allows for the construction of power generating facilities in energy-deficient territories, the list and description of which is established by a decision of the Government of Russia (Scheme and Program..., 2023). However, in the case of the RFE, the Competitive Selection may not take place at all due to the lack of competition and the unwillingness of generating companies to participate in unprofitable projects. According to Deputy Minister of Energy Evgeny Grabchak, the Ministry plans to decide in 2025 whether the Competitive Selection will be held or whether those responsible for commissioning new power generation capacities will be appointed by the government (The Ministry of Energy..., 2024).

Another instrument for stimulating private enterprises to modernize old and introduce new generation facilities is the *DPM program* (Capacity Provision Agreement) – a state support mechanism that provides for the obligation of generating companies appointed by the Russian government to commission new power generation capacities within a specified time period, subject to guaranteed payment. The implementation of the DPM-1 subsidy program (finished in the 2010s) made it possible to introduce about 30 GW of new generating capacity throughout Russia (Bystrov, 2020), and, according to the statement made by Aysen Nikolaev at the Eastern Economic Forum in Vladivostok in September 2024, the extension of the DMP-2 program until 2031 could help compensate power generation shortage in the RFE (New energy for the Far East..., 2024).

Probably one of the most realistic options to introduce new generation capacities in the RFE is the construction of nuclear power plants. According to the draft General Scheme for the Electric Power Facilities Development until 2042, Russia plans to introduce 28.5 GW of nuclear generation during this period (Draft General Scheme..., 2024). The construction of the nuclear power plants is expected to be carried out by stateowned Rosatom corporation. In the RFE, Rosatom plans to construct two nuclear power plants are expected in Khabarovsky and Primorsky Krai, each with an installed capacity of 1.2 GW, operating on medium-sized reactors (600 MW). At the moment, there are no nuclear power plants in the RFE, and their construction represent a certain challenge, requiring a significant restructuring of the labor market in the region. As Alexei Likhachev, Rosatom CEO notes, "Ministry of Energy has already announced that it would like to launch one of these nuclear power plants [in the RFE] by 2032. We agree with this approach, although it will require a certain mobilization and public discussion... [the construction of a nuclear power plant] is a major boost to the development of the construction industry, the training of personnel in this region - we will need thousands of people to build and operate power plants" (New energy for the Far East..., 2024). On December 30, 2024, Russian government has finally approved the General Scheme for the Electric Power Facilities Development until 2042. According to the final version of the document, in the RFE, it is planned to build five nuclear power plants: large ones in Primorsky Krai (near Fokino) and in Khabarovsky Krai (near Evron); smallcapacity nuclear power plants in Yakutia and Chukotka, it is also planned to install a floating power unit close to Pevek, Chukotka. Thus, the construction of the nuclear power plant in Primorye will start in 2033 and by 2042, the plant will operate on two power units, each with a capacity of 1000 MW (General Scheme...6 2024).

Another problem in the energy sector of the RFE is related to the state of the power grid infrastructure. The experience of major blackouts in Primorsky Krai (2020; 2024) clearly demonstrated the wear and tear of power grid assets in the RFE. In this regard, the modernization and construction of new power grids is one of the most important priorities. Moreover, the construction of new power grids is also important because it represents another way to compensate for the power deficit, in addition to creating new power generation capacity. Thus, a key project for Primorsky Krai today is the construction of a new substation "*Varyag*" and the 500-kV transit transmission line "*Primorskaya Plant – Varyag*" with a length of 475 km, which will connect the northern and southern parts of Primorsky Krai. In conditions of power deficit, this line will provide power supply to certain areas of Vladivostok (currently experiencing a construction boom), as well as the future *Primorsky Steel Plant* – the expected supplier of products for the *Zvezda shipyard*, another major industrial facility in southern part of Primorsky Krai (Klimenko, 2024).

In the field of power grid management, the Russian government has initiated a reform aimed at power grid assets centralization. For more efficient power supply, consolidation of grid assets, development of abandoned power grids, and better funding transparency, amendments to the federal law "On Electric Power Industry" came into force on September 1, 2024, providing for the creation of system-forming territorial grid organizations (STSO). This reform involves the allocation of power grid assets from different companies and their transfer to a company appointed to the role of STSO. Starting from 2025, STSOs will operate in every region of Russia, and will become a kind of responsibility centers for power supply. As Evgeny Grabchak explained, "the large number of local power grid companies and their disunity have complicated interaction in elimination of emergency situations and maintenance of power grids, including abandoned ones. Now the functioning of the energy infrastructure will be centralized" (STSOs will be ..., 2024).

In the RFE, the role of STSO will be assigned to the *Far Eastern Distribution Grid Company* (DRSK), a subsidiary of *RusHydro*, major power generation company in the RFE. In order to comply with the new requirements of the legislation on STSO, *RusHydro* will also redistribute part of its assets and transfer its power grids to the control of DRSK. Thus, in 2025, the grid assets of *RusHydro's YakutskEnergo* company (engaged in both power generation and power transmission activity) are planned to be transferred to DRSK (STSOs will be..., 2024).

4. Conclusions

An analysis of the dynamics of the indicators used to evaluate progress towards achieving SDG 7 in the RFE suggests that they are experiencing stable, although not outstanding, growth.

The share of renewable sources in the energy mix of the RFE is quite high and amounts to 30%, which is higher than the Russian average, and the installed capacity of power generation facilities operating on renewable sources also increased over the past few years. Another positive trend is the decreased energy intensity of GNP. At the same time, the share of renewable energy sources in the energy mix of the RFE has decreased in dynamics of recent years, while electricity consumption is growing at a significant rate. Against the backdrop of rapid

economic and industrial growth, these circumstances have led to the emergence of a power deficit in the RFE, and this represents a challenge for the implementation of Russia's energy strategy.

In order to deal with power deficit, the Russian government has initiated a number of mechanisms and reforms aimed at increasing state support for business and encouraging investment in the development of energy infrastructure – for example, the DPM subsidy program, the extension of which until 2031 is proposed by local authorities in the RFE as possibly having a positive impact on attracting investment for the construction of new generation capacities. In the area of power grid management, the Russian government is pursuing a centralization policy aimed at transferring power grid assets to authorized companies selected to play the role of systemforming power grid companies (STSOs) in each region. In the RFE, the role of STSO will be transferred to DRSK, and in 2025 the redistribution of power grid assets of Far Eastern energy companies will begin.

The clean energy agenda does not currently dominate Russia's energy policy – moreover, sometimes it is presented in Russian official discourse as an obstacle to economic growth and even as a manifestation of Western neocolonialism towards developing countries (Sechin, 2024). The emphasis is mostly placed on developing coal, gas and hydropower generation (Sustainable Development Goals..., 2023). Special attention is drawn to nuclear energy, and it is assumed that first nuclear power plants in the RFE will be built in the 2030s to compensate for the energy deficit in the region.

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ロシア極東におけるSDG7達成に向けた進捗状況 (要旨)

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本稿では、ロシア極東地域におけるSDG7の達成に向けたロシ アの経験と進捗状況の分析に焦点を当てる。筆者は、ロシアが公 式に採択したSDG達成の基本指標を提示し、ロシア連邦国家統 計局が発表したSDG統計を分析する。公式統計の評価に加え、 筆者はロシア極東のエネルギーセクター開発に関する最新の経験 的データを検証する。

ロシア極東のエネルギー部門における最近の傾向と、ロシア政 府および民間・国営企業によるロシア極東のエネルギー不足への 対策を調査した結果、筆者は以下の結論に達した。まず、統計デー タの分析から、ロシア極東におけるSDG7の基本指標は安定して おり、概ね良好な動向を示していることが明らかになった。しかし、 エネルギー消費の大幅な増加は、ロシアのエネルギー戦略の実施 にとって深刻な課題である。

第二に、電力不足に対処するために、ロシア政府は、ビジネス

への国家支援の拡大、エネルギーインフラ開発への投資の奨励を 目的とした数々の改革に着手している。一方、送電網管理の分野 では、ロシアは集中化政策を推進している。

第三に、クリーンエネルギーの議題は、現在のところロシアのエ ネルギー政策を支配しているわけではない。むしろ、原子力エネル ギーに特別な関心が寄せられており、2030年代にロシア極東初の 原子力発電所が建設され、同地域のエネルギー不足を補うことが 想定されている。