

The role of infrastructure in sustainable development

Aybika Imranovna Beksultanova^{1,*}, *Liza Junidovna Gaisumova*² and *Malika Abdullovna Sadueva*³

¹A.A. Kadyrov Chechen State University, Sheripov str., 32 A., Grozny, Russia

²Chechen State Pedagogical University, Kievskaya str., 33, Grozny, Russia

³Grozny State Oil Technical University named after acad. M.D. Millionshchikova, Kh. Isaeva ave. 100, Grozny, Russia

Abstract. Today, amid the COVID-19 pandemic, the sustainable development agenda is in focus from a new perspective. On the other hand, the issues of inequality, as well as the topics of transparency, effective interaction of various stakeholders to overcome common global challenges, are becoming more and more relevant. Infrastructure plays a key role in achieving sustainable development and has a direct impact on more than 80 % of the UN SDG targets. Through creation and use of sustainable infrastructure, it is possible to achieve the necessary economic, social and environmental results within the framework of the sustainable development goals. Sustainable infrastructure is an infrastructure that is planned, designed, built, operated or decommissioned in a way that ensures economic, social, environmental and institutional sustainability throughout the entire life cycle. The study analyzes the impact of infrastructure on sustainable development. The problematic issues of infrastructural development in Russia are identified, the current situation with the underfunding of infrastructure is shown. Considering the large role of investments for development of the infrastructure complex, state measures for development of this industry have been offered; the necessary conditions have been determined for a more complete involvement of the state in infrastructure.

1 Introduction

Development of public infrastructure is one of the key drivers of economic growth and requires significant investment to meet the ever-growing demand of the population. Nevertheless, to attract financing, new approaches to the construction and operation of infrastructure facilities are required, taking into account social and environmental factors, along with economic efficiency. Investors are increasingly paying attention to the infrastructure's ability to meet new challenges – large-scale environmental pollution, growing social problems (poverty, inequality, overpopulation), climate change, and a reduction in natural resources and biodiversity. 83 % of senior executives and investment professionals

* Corresponding author: adamovaaybika@mail.ru

expect higher shareholder value from these initiatives and tend to invest in sustainable, quality projects. Development of sustainable and quality infrastructure is an important component of economic growth. Such infrastructure is less exposed to climate risks, contributes to better lives, and is more efficient and profitable in terms of return on investment. Developed countries have long taken into account the factors of sustainability in implementation of infrastructure projects, and international financial organizations are developing their own policies to assess their sustainability. In addition, such infrastructure contributes to achievement of national and international development goals and strategies - the UN SDGs, the Paris Agreement, the QII principles, and etc. Russia, as a major player in the international arena, is also committed to the principles of sustainability, but is inferior to developed countries in the pace of their implementation and in the construction of sustainable infrastructure. Russia's focus on sustainability will spur economic development, improve people's living standards, and implement plans to preserve the environment and minimize climate impact. This task is also a priority in the framework of infrastructure development, in which the country faces two significant problems – a lack of investment and an insufficient level of quality and sustainability of facilities.

The issues of global sustainable development are attracting more and more attention of the world community and international organizations, they are recorded in the documents of the OECD, IMF, World Bank, WTO and in the reports of corporations. [10]

The concept of sustainable development (SD) on the international agenda emerged in the second half of the 20th century, when environmental and social problems became an obvious factor hindering sustainable economic development.

The SD concept was formalized as part of the work of the UN Commission on Environment and Development, also known as the Brundtland Commission. In 1987, the commission published the report "Our Common Future" and defined sustainable development. It is this formulation that is most used in defining the SD.

The sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs [1].

The SD takes into account social and environmental factors and aims to achieve economic growth through the provision of social well-being and preservation of the environment. That is why the concept is often presented as a trinity of economy, society and nature (see Figure 1). All three aspects are equal and balanced. The environmental aspect considers issues of the state of the environment, resource consumption, air pollution, water and energy use, and etc. The social aspect concerns the issues of the quality of life of people and their well-being; the economic aspect concerns the state of the economy, its opportunities and development.

2 Study Methodology

The paper contains the results identified in the framework of published reports and analytical materials of international organizations, specialized analytical publications, data from foreign and Russian news agencies, as well as interviews and articles by leading analysts and experts. The methods of the performed study contain theoretical and empirical parts, methods of description and supported by graphical methods of data illustration.

3 Study Results

A resilient region is more than a territory which is successful at economic development [11]. The infrastructure is influenced by numerous changes and trends: political, market and technological. However, sustainability issues such as population growth, increased natural

disasters, an increase in man-made disasters, a lack of resources and climate change are increasingly affecting its development and questioning the ability of traditional infrastructure to meet new challenges. The infrastructure, on the one hand, is a source of negative impact on the environment and society, on the other, it is an engine of economic progress and a way to achieve sustainable development.

However, the world needs more and more infrastructure, and the facilities that will be built now will determine the living conditions of future generations. That is why it is necessary to rethink approaches towards a more sustainable infrastructure that can adapt to changing conditions and contribute to solving global problems.

Infrastructure in Russia is faced with such problems as a lack of infrastructure investment, obsolescence of facilities and their mismatch with the changing needs of society and global trends in the field of sustainable infrastructure.

According to the Ipsos Global Infrastructure Index, only 27 % of the population is satisfied with the state of infrastructure in Russia. In Saudi Arabia, the figure is 71 %, in Japan - 50 %, in Germany - 45 % [2].

According to the Global Infrastructure Hub, by 2030 the country needs to attract over \$ 1 trillion to meet the growing need for infrastructure and achieve the UN SDGs, and by 2040 - \$ 1.8 trillion. At the same time, roads and energy are leaders in infrastructure investment deficit - over \$ 600 billion and \$ 77 billion, respectively.

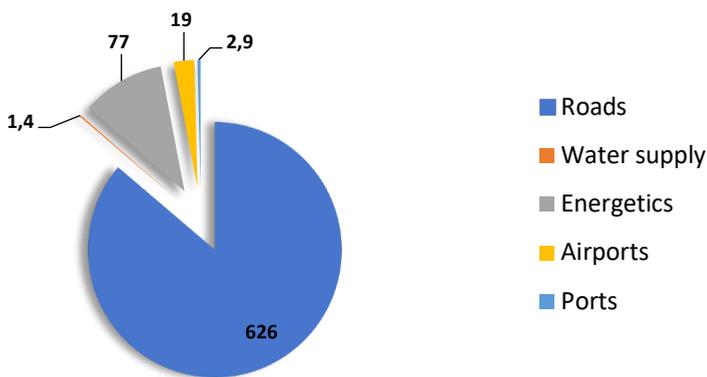


Fig. 1. Deficit of infrastructure investments in Russia by areas until 2040, \$ billion [3].

The urban environment does not match the growing demand for infrastructure, in particular, public transport systems are often located at a distance from residential areas. More than 40 thousand settlements with a total population of about 15 million people have no connection with the network of public roads with hard surface roads. At the same time, Russia participates in many international initiatives for sustainable development - the UN SDGs and the Paris Agreement. Some tasks and commitments for international SD initiatives are already linked to national development goals until 2030. However, these measures may not be enough to achieve the global sustainable development goals.

Energy is one of the leaders in greenhouse gas emissions in Russia. In 2019, the electricity and other related sectors were responsible for 54 % 34 of CO2 emissions.

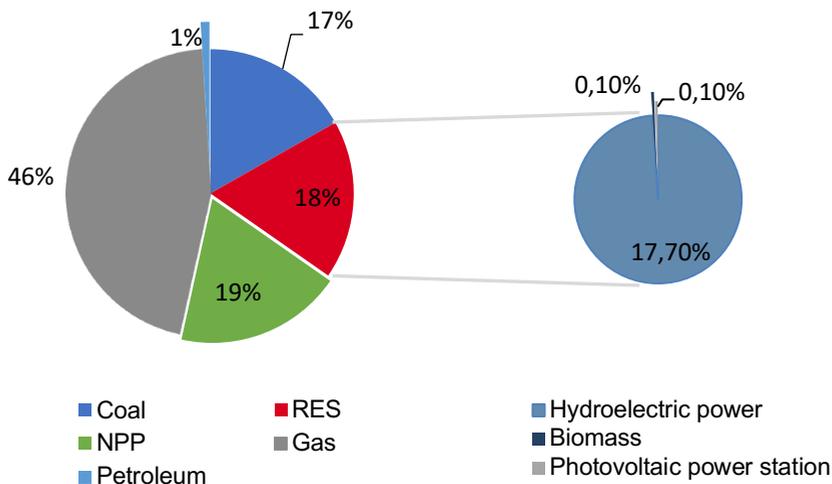


Fig. 2. Electricity production in Russia in 2019, % [4].

In Russia, 18 % of the electricity generated comes from renewable energy. In the period 1990-2019, the share of renewable energy production (12 %35) increased due to the growth in the generation of hydroelectric power plants. Only two market players produce 98 % of the installed capacity of all HPPs - RusHydro and EuroSibEnerg, which is 18.6 % of the total capacity of the country's energy system (264 GW).

The total generation of solar energy in Russia is 2.1 GW. The main player in the solar energy segment in the Russian electricity generation market is the Hevel group - by the end of 2021 the company plans to produce 1 GW of energy in the country. Hevel owns at least 10 solar power plants, with a total capacity of over 900 MW as of August 2020. Other relatively large players in the niche include Solar Systems Group, Solnechny Veter (part of T Plus) and Bugulchanskaya SPP (part of Fortum).

In the wind energy segment the leaders are Fortum and Rusnano - the capacity of power plants is over 1800 MW. Another example of a wind energy company is No-36 Our Vision // Enel 37 Investment in Infrastructure: Environment // InfraOne TRANSPORTATION The transport sector has a lower environmental impact than energy. According to the monthly ESG ranking of Russian companies by the RAEX-Europe agency, Russian Railways, NovaWind, part of Rosatom, have become the leaders in the transport sector in terms of ESG factors. Its assets include the Adyghe wind farm with an installed capacity of 150 MW. Enel has also invested in new wind energy projects in the Rostov Region and Stavropol Territory with an installed capacity of 90 MW and 71 MW, respectively36. Other niches of alternative energy are almost not represented on the Russian market. In the Kamchatka Territory, there are two geothermal power plants - Mutnovskaya and Verkhne-Mutnovskaya (Kamchatskenergo) with a total capacity of 62 MW, the only mini-CHPP Bely Ruchey in the Vologda region (6 MW) operates on biomass, the degassing station of the SMW landfill Novy Svet-Eco in the Leningrad Region (2.4 MW), biogas - two stations in the Belgorod region (3.6 and 0.5 MW) 37.

The transport sector has a lower environmental impact compared to the energy sector. According to the monthly ESG ranking of Russian companies by the RAEX-Europe agency, Russian Railways has become the leader in the transport sector in terms of ESG factors.

An example of the development of transport infrastructure to achieve SDG 9 is construction of the Europe-Western China road route, one of the key projects of One Belt - One Road Initiative. This is a transcontinental expressway with a total length of 8,445 km, which will pass through China, Russia and Kazakhstan and thus connect the Chinese port of

Lianyungang with St. Petersburg in Russia. It is assumed that the road route will take about 10 days instead of 30-50 days by sea. Another example is the construction of a highway along the China-Western Europe route (2000 km). Highway Meridian 38 will create a new transport route Ural region - South of Russia, relieve the federal roads M5 Ural and M7 Volga and improve transport accessibility between the regions of Siberia, the Urals and the Krasnodar Territory.

4 Discussion of Results

In connection with the above results, it can be concluded that the low level of infrastructure provision of the territory (country, region) hinders investment activity and, in general, the process of placement and development of productive forces, leads to additional costs for creating an initial production and technical base. Therefore, when making investment decisions, one shall take into account the existing infrastructure potential of the territory (Paley, 2017).

One of the tools for implementation of the Spatial Development Strategy in terms of overcoming the infrastructural "disruption" of the country's territory is the comprehensive plan for modernization and expansion of the main infrastructure for the period up to 2024 approved by the Government of the Russian Federation [6], including 11 federal projects in the field of modernization and expansion of transport and energy infrastructure. In addition, at the federal level and in the regions (constituent entities of the Russian Federation), targeted investment programs are being formed, including priority infrastructure projects. For example, the volume of financing of the federal targeted investment program in 2020 will amount to about 800 billion rubles [7], and the regional targeted investment program of Moscow - about 500 billion rubles [8].

The state, the financial sector and business are the driving forces of an economy that is completely dependent on society and the environment. Society and the environment provide the resources necessary for development of the economy, which are converted into goods and services, private capital, waste and emissions. If the resources flowing into the economy are not properly regulated or are negatively affected and depleted, then the entire process of economic development is jeopardized.

All economic participants must be involved in achieving the SD. This is possible through the participation of the state, business and the financial sector in the process. Moreover, each of them plays a specific role - the state gives signals and creates conditions for conducting economic activity. The financial sector directs cash flows to the necessary activities, and the business implements the achievement of the SD in practice. In this way, the interaction of all three parties will allow achieving social and environmental results along with financial returns.

The state, including regional, socio-economic policy implemented today and in the foreseeable future is aimed at achieving the goals set in the Decree of the President of the Russian Federation of May 7, 2018 "On National Goals and Strategic Objectives for the Development of the Russian Federation for the Period up to 2024" national development goals, including: improving housing conditions; accelerating technological development and increasing the number of organizations implementing technological innovations; ensuring the accelerated introduction of digital technologies in the economy and social sphere; creation in the basic sectors of the economy, primarily in the manufacturing industry and the agro-industrial complex, a highly productive export-oriented sector, and etc.

Achievement of the set goals is possible only on the basis of the advanced development of infrastructure and the improvement of the entire management system of the infrastructure complex both in the country as a whole and in each of the constituent entities of the Russian Federation. This, in turn, will require not only competent and coordinated planning for the

creation, modernization and reconstruction of infrastructure facilities, but also the implementation by the authorities of control functions, monitoring the effectiveness of the implementation of the state regional policy in the field of infrastructure development.

In accordance with current Decree of the President of the Russian Federation of April 25, 2019 No. 193 "On Assessing the Effectiveness of the Activities of Senior Officials (Heads of the Highest Executive Bodies of State Power) of the CONSTITUENT ENTITIES of the Russian Federation and the Activities of Executive Bodies of the Constituent Entities of the Russian Federation", the list of estimated indicators includes those, which make it possible to directly or indirectly judge the effects obtained from activities related to the implementation of infrastructure projects:

- the number of highly productive jobs in the off-budget sector of the economy;
- labor productivity in the basic non-resource sectors of the economy;
- the number of families who have improved their living conditions;
- the level of housing affordability;
- the share of cities with a favorable urban environment;
- the quality of the environment;
- the share of regional highways and highways in urban agglomerations that meet regulatory requirements, taking into account congestion, etc.

Achieving sustainable economic development globally will require wise use of resources, technology, economic incentives and strategic policy planning at the local and national levels [9].

5 Conclusion

Sustainable development is increasingly becoming at the head of the global strategic agenda, and its achievement requires the joint efforts of economic actors around the world - states, financial organizations and businesses. At the same time, infrastructure plays an important role in achieving the SD and is a prerequisite for stable economic development. Its sustainability and adaptability are integral factors in the 21st century. The global market for sustainable infrastructure is actively developing - new instruments for green financing of projects are being formed (green, social, sustainable, blue, transitional bonds); international initiatives are being developed to stimulate sustainable infrastructure and standards for assessing its quality. At the same time, investors are increasingly taking ESG factors into account when making decisions. Russia is a part of the global system and cannot ignore the trends in the infrastructure market - the transition from traditional facilities to sustainable ones, which take into account economic, social and environmental aspects. The country is already implementing projects in the field of renewable energy, green transport and SMW, taking into account the aspects of sustainability in national development goals until 2030, and the green finance market is developing, including the growing number of green and social bond issues. In addition, initiatives are being launched to assess the sustainability of infrastructure projects, taking into account the best international SD practices. All this creates conditions for further taking into account the principles of sustainable development and infrastructure focused on obtaining positive economic effects in the long term, as well as meeting social and environmental challenges in the 21st century.

Therefore, the infrastructure makes it possible to achieve many of the tasks set for the world community and business until 2030. It contributes not only to economic development, but also to raising the standard of living of people, as well as reducing the negative impact on the environment – pollution of territories with waste and emissions and disruption of natural ecosystems.

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