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SUSTAINABLE DEVELOPMENT OF THE ENERGY INDUSTRY OF UZBEKISTAN

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ABSTRACT

In Uzbekistan, HPP generation is counted as electricity produced from renewable energy sources (RESs).The energy sector is the most important sector for the economies of countries around the world. This sector also has a significant impact on the stability of the national economy. A large part of the national income of countries is formed in this sector. The investment factor is very important for this sector. In the Uzbekistan's economy, the energy sector is also a factor that has a positive impact on macroeconomic stability. Therefore, increasing the attractiveness of investment in this sector is the most pressing issue today. Therefore, this article analyzes the current state of development of the energy sector in Uzbekistan and the investment factor affecting it.

KEYWORDS: *Energy, Energy Sector, Economic Stability, Renewable Energy, Investment, Investment Attractiveness, Investment Projects, National Income, Public-Private Partnership.*

INTRODUCTION

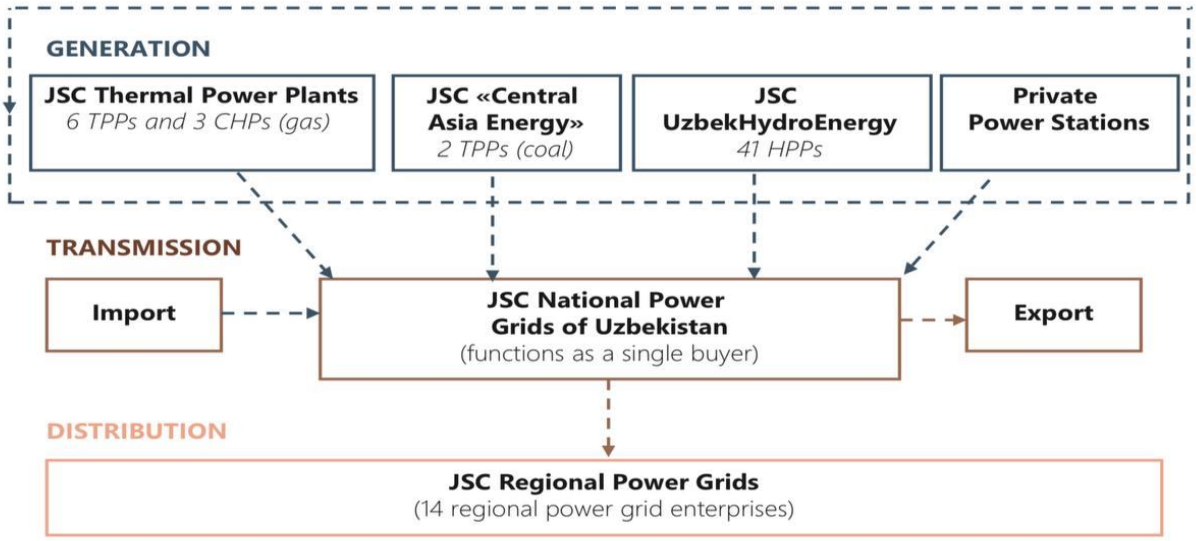
Today, the global economic situation is volatile. The positive impact of traditional industries on the economies of countries is diminishing. As a result of the emergence of new industries and their entry into the economy, the value added of the country's national income from some old industries is declining. In this case, it is necessary to identify the main sectors of the country and use them to stabilize the country's economy. In this context, it is also important to ensure the sustainable development of the sector by increasing the investment attractiveness of such sectors. In the context of Uzbekistan, one of such sectors is the energy sector. This sector plays an important role in the country's economy. A large part of the country's national income is formed in this sector.

The Republic of Uzbekistan is located in the Central Asia region and borders Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Afghanistan. Uzbekistan is one of two double-landlocked countries in the world, meaning that the residents of the country need to cross at least two national borders in order to reach a coastline. During 2010–2019 Uzbekistan's population grew by 21.1% and was 33.9 mln people as of 01.01.2020. The climate of the country is extremely continental, with clearly defined seasons. Uzbekistan is a resource-rich country with large reserves of natural gas, oil and coal. Natural gas represented 91.3% of primary energy production and 98.2% of the country's energy export in 2019, when Uzbekistan exported 20.1%

of its produced natural gas. However, to meet the growing internal demand, Uzbekistan imports oil and gas condensate, coal, petroleum products, and electricity. In 2019 fuel imports were five times lower than exports. In 2019, the power market of Uzbekistan was unbundled into three parts: generation, transmission, and distribution. As of 01.01.2021, the total installed generation capacity amounted to 15.8 GW, of which 11.4 GW are from gas-fired power plants and CHPs owned by the state company JSC Thermal Power Plants, 2.5 GW – coal-fired thermal power plants (TPPs) under the management of JSC "Central Asia Energy" and 1.9 GW hydropower plants managed by the state company JSC Uzbek Hydro Energy. In 2021, there were 20 new power plant projects at different stages of development, with a total capacity of 7.0 GW and total foreign investments of USD 5.9 bln. As of January 2021, the strategic framework is based on the Green Economy Transition Strategy for 2019–2030 (Strategy) and the Electricity Supply Security Concept in 2020–2030 (Concept). The EBRD and Japan have also assisted the Government of Uzbekistan (GoU) with developing the Road Map for the Power Sector Low-carbon Energy Transition (Road Map), but the document has not been officially adopted. The Strategy's main goal is to achieve long-term sustainable economic development and to meet the country's goal under the Paris Agreement ratified by Uzbekistan in 2018. The main goal of the Concept is to meet the growing electricity demand (the deficit of which was estimated at the level of 9.4% in 2012–2019, and the annual demand growth until 2030 is expected at the level of 6–7%) and to ensure the balanced development of the power sector. The main purpose of the Road Map is to assist the Government of Uzbekistan in reaching the Paris Agreement goals. This document illustrates Uzbekistan's technical and economic opportunity to achieve a zero-carbon energy sector by 2050. According to the results of this modelling, the transition of the power sector to net-zero greenhouse gas (GHG) emissions requires USD 94 bln by 2050. This is the lowest level of required investments compared to other development scenarios. The legal framework for energy efficiency is represented by the Law on Rational Energy Use adopted in 1997. The Law's main goal is to create a general legal framework ensuring the conservation of national energy resources and the efficient use of energy and production capabilities. The latest amendments to the Law introduced in 2020 assigned the Ministry of Energy as the main responsible authority in the energy efficiency field. As of 01.01.2021, there were a number of energy efficiency programs and roadmaps in Uzbekistan: the Program of Measures to Further Develop Renewables, Improve Energy Efficiency in the Economy Sectors and the Social Sphere in 2017–2021 sets out an annual average decrease of 8–10% in energy intensity; the Road Map for Further Improving the Energy Efficiency of Economy Sectors and the Social Sphere and Developing Renewables stipulates the implementation of 36 activities, of which 21 are related to energy efficiency; and the Road Map on Improving Energy Efficiency and Achieving Energy Savings in Large Energy-Intensive Enterprises envisages 29 activities aimed at improving energy efficiency in energy-intensive sectors of the economy; Comprehensive Program for Digitalisation of the Power Sector of the Republic of Uzbekistan for 2019–2021. The institutional framework for energy efficiency includes multiple stakeholders. The Ministry of Energy has the leading role in the promotion of energy efficiency policies. However, there is a certain level of overlap in the industrial and buildings sector with other state authorities. The legislative framework in the field of renewable energy consists of the Law on the Use of Renewable Energy Sources adopted in 2019. The Law offers several financial incentives and preferences, including exemption of RES producers from all types of tax during five years starting from the date of their state registration. In addition, according to the Program of

Measures on the Further Development of Renewables, Raising Energy Efficiency in the Economy Sectors and the Social Sphere in 2017-2021, all consumers who are installing generation facilities at their premises (prosumers) benefit from guaranteed feed-in tariffs based on the official electricity prices for commercial consumers (after deducting the cost of transmission and distribution). Apart from the abovementioned, Uzbekistan plans to hold tenders and auctions for the development of RES in 2021–2022 according to the 'build–own–operate' model jointly with International Financial Institutions (IFIs) and conclude long-term (up to 25 years) power purchase agreements.Before 2019, Uzbekistan's power system functioned as a vertically integrated state company UzbekEnergo, which was responsible for the operation of the whole power system, including electricity generation, transmission, distribution and supply. Following the Decree of the President No. DP-4249 dated 27.03.2019 on the Strategy of Further Development and Reforming of the Electricity Sector of the Republic of Uzbekistan, Uzbekistan's power sector was unbundled into three parts in March 2019: generation, transmission and distribution.

Power market structure



It is information illustrates that the JSC Uzbek Hydro Energy manages all HPPs, including 30 run of-river HPPs with a total capacity of 532 MW (4 large ones – 317 MW, and 29 small ones – 215 MW) and ten HPPs with reservoirs with a total capacity of 1.4 GW. The utilisation factor of the country's hydro performance potential is 27%. There are also block stations and isolated stations – their aggregate capacity was 133 MW, or 0.8% of the country's total capacity as of 01.01.2021.

The JSC Regional Power Grids is tasked with power distribution and supply to final consumers throughout the whole country. The company comprises 16 enterprises, including 14 regional distribution companies, the Electricity Metering Automation Centre and ENERGO-RES LLC. The Electricity Metering Automation Centre branch deploys an automatic electricity metering system throughout the country and manages the data processing centre. ENERGO-RES LLC functions as a single buyer of goods and materials for 14 regional distribution companies to

benefit from economies of scale and expense trimming. Currently, the JSC Regional Power Grids operates grids and substations of the following voltage:

- 35–110 kV – approximately 28.6 thousand km of lines and 1 626 transformers;
- 0.4–10 kV – approximately 224 thousand km of lines and 79 122 transformers.

It should also be noted that 62% of the distribution grids and over 50% of transformers have been in operation for more than 30 years. This is one of the factors contributing to the increased technical distribution losses.

The Strategy's main goal is to achieve long-term sustainable economic development and fulfill Uzbekistan's pledge under the Paris Agreement ratified by Uzbekistan in 2018. Overall, the Strategy sets out nine main goals for 2030, which are summarized as follows:

1. Reducing specific GHG emissions per GDP unit by 10% compared to 2010 levels;

2. Doubling the energy efficiency indicator and reducing the GDP CO2 intensity;

3. Bringing the RES share to above 25% of total power generation;

4. 100% access to modern, affordable and stable energy supply for all consumers;

5. Increasing the energy efficiency of industrial enterprises by at least 20%;

6. Widening the production and use of motor fuel and motor vehicles with improved energy efficiency and environmental performance and developing electric transport;

7. Improving the efficiency of water use in all economic sectors, deploying drip irrigation technologies on up to 1 mln ha of land, and enhancing the agricultural yield by 20–40%;

8. Achieving a neutral balance of land degradation;

9. Increasing the average agricultural productivity by 20–25%.

As for the first goal above, it should also be mentioned that, in October 2021, Uzbekistan updated its first NDC and increased its commitment to reduce specific greenhouse gas emissions per unit of GDP from 10% to 35% by 2030 compared to 2010 (see Section 7). Following the increased ambition of Uzbekistan, the Strategy is currently under revision and is to be extended until 2050.

The Concept's main goal is to meet the growing electricity demand, the deficit of which was estimated at 9.4% in 2012–2019. The Concept expects the following results by 2030:

- Phasing out obsolete power plants and increasing the generation capacity to 29.2 GW;
- Commissioning new wind power plants – 3 GW, solar PV – 5 GW, NPP – 2.4 GW;
- Increasing electricity production almost twofold or to 120.8 TWh;
- Reducing natural gas consumption from 16.5 bcm to 12.1 bcm and increasing coal consumption from 4.1 mlntonnes to 8.5 mlntonnes ;
- Privatising most generation capacities, except for HPPs and Nuclear Power Plants (NPPs);

- Reducing transmission grid losses from 2.72% to 2.35% and distribution grid losses from 12.47% to 6.5% of the input to the grid;
- Reaching the goals of improving environmental conditions and increasing energy efficiency.

It should also be noted that for energy efficiency, the Concept includes quantitative indicators only for the supply side (modernising generation and reducing losses). The document also highlights that the growing demand should be covered taking into account competitive prices and the dynamic development of the power sector.In recent years, consistent work has been carried out on integrated fuel and energyindustry development and energy source diversification to meet the ever-increasingdemand for energy resources.At the same time, however, inefficient geological explorations, investment projects andpricing have resulted in energy resource supply deficiencies and have worsened thefinancial situation of oil and gas enterprises.Thus, with an 8% increase in natural gas production over the last 20 years, productionby domestic enterprises fell 29%; confirmed natural gas reserves decreased 4% in2008-18; and the average replacement rate for natural gas reserves in the past 5 years was about 70%.

Uzbekistan's State Statistics Committee carries out its activities in accordance with the Law on State Statistics of 12 December 2002, Presidential Decree No. PP-3165 of31 July 2017 on Measures to Improve the Activities of the State Statistics Committee of the Republic of Uzbekistan, and the Presidential Decree on Additional Measures to Ensure Openness and Transparency of the Public Administration, as Well as to Increase the Number of Statistics. The Statistics Committee has become active in international forums in recent years. It shares official national energy statistics with the International Energy Agency and is keen on adopting international methodologies. As a result, Uzbekistan released a pilot energy balance in 2019 following the United Nations Statistics Division's *International Recommendations for Energy Statistics* guidelines. Increasing amounts of energy data are also being published in the energy section of the statistics website in several user-friendly formats.

In 2006, the Cabinet of Ministers of the Republic of Uzbekistan approved the Rules of Performing Energy Inspections and Analysis of Fuel and Energy Resource Consumers. 54 According to these Rules, energy audits are mandatory in the following cases:

- Designing new and renovated buildings, technologies and equipment.
- Energy consumers with total annual consumption exceeding 2,000 tons of fuel equivalent or 1,000 tons of motor fuel.

In accordance with Decree No. DP-4422 dated 22.08.2019; the MoE is the body responsible for defining the procedure of organising the operation of energy auditors and monitoring the performance of mandatory energy audits. In addition, Decree No. DP-4422 provides for the following:

- Creating new professions and expanding quotas in higher education establishments for the following subjects: 'renewable energy sources', 'energy efficiency' and 'energy audits';
- Introduction of an energy management system in accordance with the international standard (ISO 50001) at all energy-intensive enterprises and organizations with state ownership by 01.01.2023.

According to the MoE, as of 01.01.2021, six higher education establishments had a department and a faculty for energy auditors, and 95 companies were internationally certified according to ISO 50001. This standard was also transposed onto the national standardization system under the number O'zDSt ISO 50001. Thus, Uzbek companies have the choice to carry out certification in accordance with a national or international standard. Given the relatively high cost of international certification, there is also a state support scheme for ISO 50001 certification in Uzbekistan. In particular, the Export Promotion Agency under the Ministry of Investment and Foreign Trade compensates all costs related to the ISO 50001 international certification of local companies.

To conclude, Uzbekistan with its immense renewable potential can meet the country's all energy demand using only renewable sources of energy. However, hitherto Uzbekistan cannot make use of its potential relying heavily on fossil fuels as a source of energy. This article has shed a light to main barriers that caused Uzbekistan to lag behind from its counterparts in terms of renewable sector developments. Hereafter, recently taken actions to improve the situation and future development plans and perspectives are presented.

Uzbekistan has now realized that there is a need to urgent actions to eliminate the above mentioned barriers that hindering the renewables sector from development. It can be said that first steps are already taken by creating the regulator in the market (Ministry of Energy) and unbundling the energy sector into generation, transmission and distribution. Recent Presidential Decrees and Resolutions about Uzbekistan's future plans on developing renewables sector can serve as a good hint for perspective investors and gives right direction by adding certainty into the market.

The recommendations for further developing the renewables sector and eliminating barriers can be:

- In the first place regulator should establish the legal framework stating all market rules and protecting the rights of independent power producers. This in turn, eliminates all market uncertainties;
- Instead of building large infrastructure projects from the government budget, Public Private Partnership agreements can be used to attract foreign investors;
- To decrease initial cost of the technology, the government should pay more attention to produce technologies within the country, as Uzbekistan owns all necessary components of renewable technologies;
- To make the project further attractive regulator should establish incentive programs for both households (feed-in tariffs, net metering, rebates) and large scale power producers (tax incentives, Renewable Energy Credits);
- To increase the qualification of the specialists in cooperation with international organizations (International Energy Agency, World Bank, Asian Development Bank) can be organized several technical assistance, trainings and master classes from highly skilled specialists.

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