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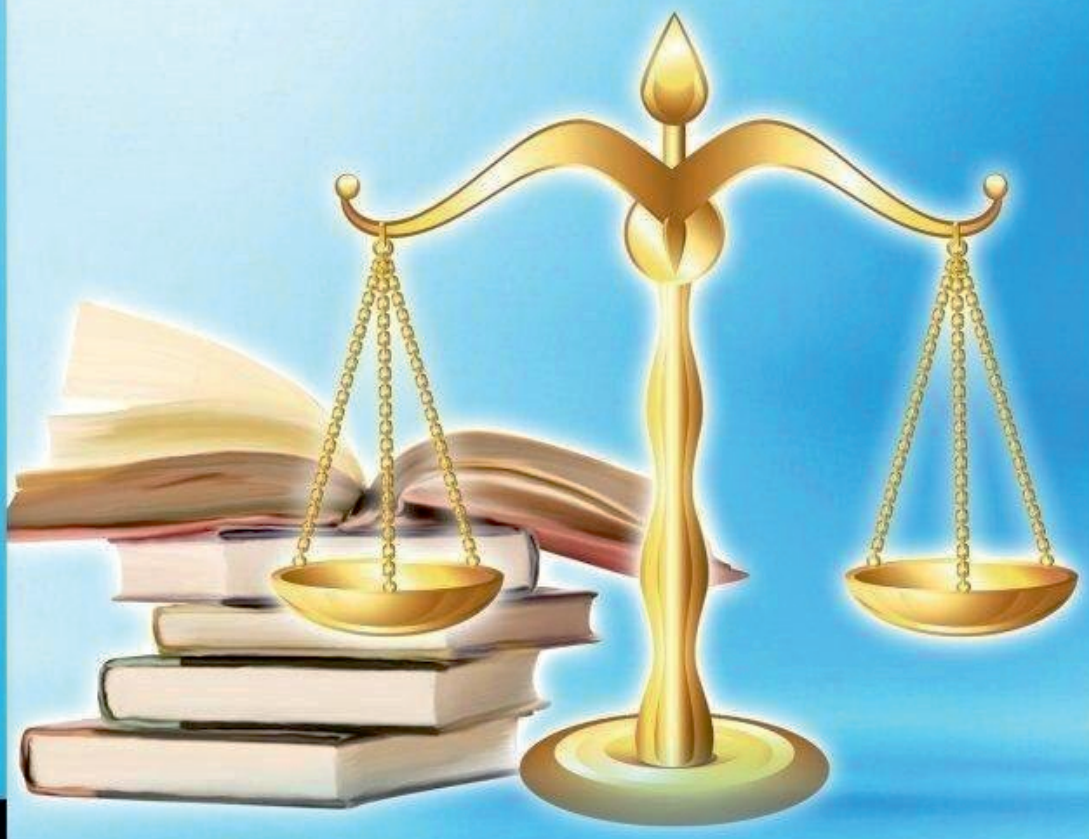

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КОНСТИТУЦИЯВИЙ ҲУҚУҚ. МАЪМУРИЙ ҲУҚУҚ. МОЛИЯ ВА БОЖХОНА ҲУҚУҚИ

ФУҚАРОЛИК ҲУҚУҚИ. ТАДБИРКОРЛИК ҲУҚУҚИ. ОИЛА ҲУҚУҚИ. ХАЛҚАРО ХУСУСИЙ ҲУҚУҚ

ЮРИСТ АХБОРОТНОМАСИ
ВЕСТНИК ЮРИСТА
LAWYER HERALD

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LEGAL ASPECTS OF LIBERALIZATION OF THE ELECTRICITY SECTOR OF THE REPUBLIC OF UZBEKISTAN

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ANNOTATION

On the liberalization of electricity trade, all countries that have embarked on the path of reforms have faced significant difficulties, since the electricity market is fundamentally different from the market for other goods. The peculiarities of electricity as a commodity, the level of development of the country's economy, various forms of ownership in the electricity industry, the political system of the country, the interests of individual production organizations (companies) leave their imprint on the model of the electricity market. The author expresses the problems of liberalization and competition policy, a market organization in the energy sector, and transition to the energy market in Uzbekistan. Of course, this problem requires a comprehensive study and analysis, so that the legal regulation in line with today's needs and enhance the effectiveness of reform of the electric power industry.

Keywords: liberalization, electricity, unbundling, privatization, electricity generator, transmission network, distribution network, wholesale market, retail market.

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ЎЗБЕКИСТОН РЕСПУБЛИКАСИ ЭЛЕКТР ЭНЕРГЕТИКА СОҲАСИНИ ЛИБЕРАЛЛАШТИРИШНИНГ ҲУҚУҚИЙ ЖИҲАТЛАРИ

АННОТАЦИЯ

Электр энергияси савдосини либераллаштириш йўлига ўтган барча мамлакатлар катта қийинчиликларга дуч келади, чунки электр энергияси бозори бошқа товарлар бозоридан тубдан фарқ қилади. Товар сифатида электрэнергиясининг ўзига хос хусусиятлари, мамлакат иқтисодиётининг ривожланиш даражаси, электр энергетика соҳасидаги мулкчиликнинг турли шакллари, мамлакатнинг сиёсий тизими, айрим ишлаб чиқарувчи ташкилотлар (компаниялар)

манфаатлари электр энергия бозори моделини шакллантиришга ўз таъсири ўтказади. Муаллиф Ўзбекистонда энергетика соҳасини либераллаштириш ва рақобат сиёсати, энергия бозорига ўтиш муаммоларини ифодалайди. Ушбу муаммо бугунги кун талабларига мувофиқ ва электрэнергетикаси соҳасини ислоҳ қилишни ҳуқуқий тартибга солиш самарадорлигини ошириш учун ҳар томонлама ўрганишни ва таҳлил қилишни талаб этади.

Калит сўзлар: либераллаштириш, электр энергияси, ажратиш, хусусийлаштириш, электр энергияси генератори, электр узатиш тармоғи, электр тарқатиш тармоғи, улгуржи бозор, чакана бозор.

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ПРАВОВЫЕ АСПЕКТЫ ЛИБЕРАЛИЗАЦИИ ЭЛЕКТРОЭНЕРГИИ РЕСПУБЛИКИ УЗБЕКИСТАН

АННОТАЦИЯ

На пути либерализации торговли электроэнергией все страны, вставшие на путь реформ, столкнулись со значительными трудностями, поскольку рынок электроэнергии принципиально отличается от рынка других товаров. особенности электроэнергии как товара, уровень развития экономики страны, различные формы собственности в электроэнергетике, политический строй страны, интересы отдельных производственных организаций (компаний) накладывают свои отпечатки на модель рынка электроэнергией. Автор рассматривает проблемы либерализации и конкурентной политики, организации рынка в энергетическом секторе и перехода к энергетическому рынку Узбекистана. Всесторонне изучен и анализирован подход правового регулирования на соответствии нынешним потребностям и повышение эффективности реформ электроэнергии.

Ключевые слова: либерализация, электричество, разделение, приватизация, генератор электроэнергии, сеть передачи, распределительная сеть, оптовый рынок, розничный рынок.

It is known that in many countries of the world the energy market differs significantly in the composition of entities, the ratio of government intervention and competition, the order of price formation, but mainly focused on a single goal - the introduction of competition in electricity generation and sales.

From January 2020, a phased liberalization of the electricity market began, that is, a transition period began. As a logical continuation of the ongoing reforms in our country, taking into account the best aspects of international experience, in 2020 the Ministry of Energy of the Republic of Uzbekistan in cooperation with the Asian Development Bank and the World Bank is developing a competitive electricity market model. This is an important step in the further development of Uzbekistan, which is being truly renewed in our country, and will create the energy of the New Uzbekistan.

“Energy” is now a vast field, covering many different types of market participants (e.g. generators, network operators), technologies (e.g. coal, wind, nuclear but also batteries and smart grids) and business models (e.g. energy management services, energy advisory services, energy trading services).

According to Paul Joskow, Ghanadan and Williams, electricity has an unusual set of physical and economic attributes that significantly complicate the task of successfully replacing hierarchies (vertical and horizontal integration) with decentralized market mechanisms.

These attributes include the following:

– an inability to be stored economically. The demand must be cleared with “just-in-time” production from generating capacity continuously at every location on the network. Network congestion, combined with non-storability, may limit significantly the geographic expanse of competition by constraining the ability of remote

suppliers to compete, further enhancing market power problems. Creating a set of complete markets that operate this quickly at so many locations without creating market power problems is a significant challenge.

– the short-run demand elasticity for electricity is very low and supply gets very inelastic at high demand levels as capacity constraints are approached.As a result, spot electricity prices are inherently very volatile and unusually susceptible to the creation of opportunities for suppliers to exercise market power unilaterally.

– loop flow introduces additional complex interactions between generators at different points on the network; offers unusual opportunities for suppliers to take unilateral action to affect market prices adversely; complicates the definition of property rights, and creates coordination and "free-riding" problems.

– compatible market mechanisms are required for procurement and effective operation of "ancillary services" that are difficult to design. Moreover, the combination of non-storability, real-time variations in demand, low demand elasticity, random real-time failures of generation and transmission equipment, and the need to continuously clear supply and demand at every point on the network to meet the physical constraints on reliable network operations means that some source of real-time "inventory" is needed to keep the system in balance. "Standby" generators that can respond very quickly to changing supply and demand conditions generally provide this "inventory", though demand-side responses can also theoretically provide equivalent services as well. As a result, traditional constraints on price increases such as demand response, consumer defection, supply substitution, and potential entry are naturally weak in electricity markets [1, P.548-558].

– A lack of substitutes. For most products, there are ready-made analogs that can be used if the supply system for the required product is imperfect or its prices are high. The threat of switching to a similar product due to the high price and low availability of manufacturers as a disciplining factor. For many purposes, electricity has no ready-made substitutes, and even where substitution is theoretically possible, consumers, because of the electrical equipment they use, are hostages to electricity;

– a vital role in modern society. Ensuring the functions of modern society depends on the uninterrupted supply of electricity. Failure of the electricity system will lead to immediate and dangerous effects on welfare and the economy, as the accident of 2003 distinctly demonstrated it. For most products, market failure can be mitigated by substitutes and stockpiles, but this is not possible for electricity. As a result, the demand for electricity in the short run cannot be easily regulated through price changes;

– electricity is a standard product. In a connected network, electricity is a standard product. Connecting to another supplier will not result in "better" electricity, so markets are exceptionally priced and developed by those who profit more from cheaper electricity, just as negotiation skills and energy lead to prosperity. If the market is functioning well, then prices will inevitably go down to marginal costs of the short term, too insufficient to warrant new investments;

– environmental impacts. The environmental impact of electricity generation should be added to the traditional list of special factors. Electricity generation plays a key role in greenhouse gas emissions, and those trying to deal with climate change should focus on the electricity sector (and transport). The market does not meet expectations for emission reductions, besides, market mechanisms are no more than one of many instruments, not the final solution to be used[2,P. 815-844].

The electricity system of the Republic of Uzbekistan is undergoing big changes at present. This sector is important in ensuring sustainable economic growth and public welfare. Therefore, Uzbekistan continues to undertake measures to enhance the legal and institutional framework of the country's energy sector. On March 27, 2019, the President of the Republic of Uzbekistan Shavkat Mirziyoyev signed the Resolution "On strategy for further development and reform of the electric energy sector of the Republic of Uzbekistan". The Resolution introduces significant changes into the structure of energy administration of Uzbekistan by reorganizing or liquidating certain existing bodies and establishing new entities. Large-scale measures are being taken to modernize the industry, increase energy capacities and secure uninterrupted supply of electricity to consumers[3].

Domestic demand for energy resources is determined by the expected dynamics of economic development, changes in the structure of the economy and the level of its specific energy intensity. Reducing the specific energy intensity of the economy is the main task of the energy policy of Uzbekistan, without which the energy sector will inevitably restrain the country's socio-economic development. Production of electricity increased at 2.6 per cent from 2012 to 2019 per annum on average. However, the demand for electric power was not fully satisfied; the deficit was about 9.4 per cent of demand.

Nowadays, the Government of the Republic of Uzbekistan approved the "Concept Note for ensuring electricity supply in Uzbekistan in 2020-2030". This Concept Note on the provision of electricity in the

Republic of Uzbekistan in 2020-2030 was developed to satisfy growing demand in the Republic of Uzbekistan and ensuring further balanced development power sector based on international best practices and modern trends in the development of electricity industries globally[4].

The basic purpose of liberalization is to increase efficiency of the energy sector through facilitating market competition.Generally, the term energy sector liberalization includes measures aiming at the restructuring of the energy sector, the introduction of competition and the removal of other controls.

J.P. Painuly noted the following specific measures:

- creation of separate entities for generation and distribution in the electricity sector;
- entry of private sector companies;
- removal of controls on energy pricing, fuel use, fuel import, capacity expansion etc.;
- institutional measures such as specialized regulatory bodies[5, P.73-89].

Therefore, in-network industries, such as the energy sector, the liberalization process generally aims at achieving three main results concerning the vertically integrated incumbent: (i) ensure non-discriminatory access to the network (i.e. third party access); (ii) separate the networks from the commercial activities of the vertically integrated companies owning them; (iii) promote competition by ex-ante regulation [6, P.8].

The Concept Note for provision of the Republic of Uzbekistan with electricity in 2023-2030 defines mid-term and long-term objectives and directions for the development of the power sector in the country, priorities, and benchmarks as well as arrangements aimed at ensuring the efficiency and effectiveness of the government's energy policy at different stages of practical implementations guaranteeing the achievement of planned goals. The key goal of this Concept Note for the provision of the Republic of Uzbekistan with electricity in 2023-2030 is to satisfy the increasing demand for electrical power at competitive prices as well as the dynamic development of the power sector in the Republic of Uzbekistan through modernization and reconstruction of existing power plants, construction of new generating assets using energy-efficient power production technologies, improvement of power metering systems, fuel diversification and development of renewable energy sources.

An increasing number of countries take actions to secure their electricity supplies and prevent potential black-outs by introducing capacity mechanisms. Capacity mechanisms are measures that offer additional rewards to capacity providers in return for maintaining existing capacity or investing in new installations to generate electricity [7,P.98-105].

The standard steps of reforms include five interdependent elements:

- unbundling;
- privatization;
- wholesale competition;
- retail competition;
- and regulated or negotiated third party access in transmission and distribution.

The basic structure of the modern electricity system consists of the physical infrastructure for electricity generation,transport, and distribution on the one hand, and an organized electricity market on the other, where energy is exchanged between various market participants.

In a liberalized market, electricity generation is separated from transmission system operation. The transmission grids are operated by national transmission system operators, which are responsible for ensuring that the supply of electricity meets demand at each instant of time. Distribution networks are managed by distribution system operators connecting the consumers to the transmission grid and the energy generators feeding into the transmission grid. Energy from renewable sources is more and more often fed directly into the distribution network.

Both developed and developing countries have employed the standard package of reforms but with differing degrees of conviction and varying success. Reform outcomes vary according to the depth of liberalization, industry conditions at the start of the reforms, and the motivations for reform.

The first step of reforms is unbundling the incumbent vertically integrated monopoly power utility into multiple producers of electricity (generators) or gas and retail suppliers that can trade with each other. The process of unbundling is complemented by the selling-off (privatization) of the different entities produced by unbundling because the competition is considered unlikely to develop properly if the entities are under common ownership.

Unbundling is the separation of natural monopoly transportation segments from other potentially contestable elements and the establishment of regulated third party access to transportation networks. The physical grid

consists of energy generators which can be very different in terms of capacity, energy source, modes of operation, etcetera. For example, the energy generators range from very small (5 kW for a residential solar photovoltaic system) to very large (nuclear power plants or hydroelectric dams with a capacity of several GW), can be privately or publicly owned, and generate electricity from numerous sources, both renewable and conventional[8].

There are different forms and degrees of separation of the transmission activities from energy generation and supply activities which may be implemented:

– Accounting unbundling - the vertically integrated company may freely operate its activities within the value chain, although separate accounts for the transmission/distribution company need to be prepared.

– Management unbundling: this is additional to the accounting unbundling. It requires that the management of the network business be separate from the management of the remainder businesses of the energy company.

– Legal unbundling or independent system operator approach: a separate legal entity is established in which all activities of the network system operator are transferred to. A clear and detailed regulation is required to effectively implement this form of unbundling.

– Ownership unbundling: the vertically integrated company is mandated to sell its network assets to third parties who are not active in the generation or sale of energy [9, P.5-69].

Electricity generators come in various sizes, starting from rooftop solar panels or small waterwheels (with a generation capacity starting from around 1 kW) to large hydroelectric dams, nuclear or coal power stations (with capacities of several gig watts). Generators are rated by their generation capacity, that is, the maximum power they can produce. Firm-capacity generators can be switched on or off on demand. Variable-capacity generators are dependent on factors like wind or sunshine and are, therefore, only able to generate certain amounts at certain times. Generators also differ concerning the flexibility with which they can be operated. Some generation technologies, such as nuclear, are well-suited for producing a stable amount of electricity over longer periods, while others can change production more rapidly to adapt to fluctuations in electricity demand and production from variable sources. Hydro-power is the most flexible (only a few seconds to switch on or off); gas and (to a lesser extent) coal offer some flexibility (minutes to hours, depending on technology and operation); while nuclear is the least flexible form of generation technology. Coal and natural-gas generators use fossil fuels – the remains of living organisms which have been subjected to geological processes over millions of years. Fossil and nuclear fuels are non-renewable: their reserves are expected to last tens to hundreds of years. By contrast, renewable energy sources are available year after year over a very long time. The burning of fossil fuels and biomass (such as trees) for energy releases carbon dioxide (CO2), while the growth of biomass removes CO2 from the atmosphere. Nuclear and renewable energy sources are considered low-carbon energy sources.

There are different energy generation technologies linked to different energy sources.

In the Republic of Uzbekistan thermal power remains one of the main sources of power generation in the country, and its development based on the use of energy-efficient technologies shall ensure the power sector's overall sustainability.

Currently, available generating capacity totals at 12.9 GW, including Thermal Power Plant - 11 thousand MW, or 84.8 per cent; Hydro-Power Plant - 1.85 thousand MW, or 14.3 per cent; consumers' generators and isolated plants' capacity is over 133 MW or 1 per cent. The eleven Thermal Power Plants, including three Combined Heat and Power Plants, are the main source of power generation. The capacity of modern energy-efficient generating units is 2825 MW or 25.6 per cent of aggregate Thermal Power Plant capacity. In order to increase the efficiency of TPPs during the construction of new power plants operating in base-load conditions, the use of combined-cycle technologies with generator efficiency over 60 per cent shall be the preferred approach. Implementation of 13 projects is envisaged in 2020-2030 including 6 projects for construction of new TPPs with an aggregate capacity of 3.8 thousand MW, 6 projects for expansion of existing TPPs increasing their capacity by 4.1 thousand MW through the construction of CCGTs, GTs, and a coal generator, as well as 1 project for modernization of generators 1-5 at the Novo-Angren TPP increasing capacity by 330 MW. 10 As a result, the total installed TPP capacity shall reach 14.7 thousand MW by 2030, generating 70.7 bln kWh per annum (1.3 times increase compared to 2018). Projects will also be implemented to expand the Navoi TPP with the construction of the third 650MW CCGT to be commissioned in 2023-2024, and the fourth CCGT of the same capacity to be commissioned in 2024-2025. Expansion of Talimarjan TPP with the construction of the third and the fourth CCGTs with a total capacity of at least 900MW is planned for 2023-2024. Construction of a 1300MW TPP utilizing CCGT technology is planned in Kashkadarya or Surkhandarya regions to be

commissioned in 2025-2026. Construction of regulating power plants to compensate peak loads in the power system, with a total capacity of around 1,200MW, will be accomplished using gas turbine (50-100MW) and gas piston engines. It is expected that in 2020 investors shall be identified for construction of two regulating power plants with capacity of 200- 300MW. The said power plants shall be commissioned in 2021-2023. Development of coal generation shall involve the construction of a new 150MW coal generator at Angren TPP (Phase 2) as well as phased modernization of existing generators at Novo-Angren TPP with year-round combustion of coal as well as reduction of harmful atmospheric emissions. The development of co-generation units for heat and hot water supply in cities shall be accomplished mainly through the integration of medium capacity GT units. In particular, a 17MW GT shall be commissioned at Ferghana CHPP in 2020 and two GTs with a total capacity of 54MW shall be delivered in 2022 at Tashkent CHPP. Obsolete and worn TPP assets shall be decommissioned as new generating assets are brought online. The total capacity of the equipment to be decommissioned that is beyond its economic life shall reach 5.9 thousand MW by 2030.

Besides that, it is planned to carry out work on 62 projects, including the construction of 35 hydroelectric power plants with a total capacity of 1,537 MW and the modernization of 27 existing hydro-power plants with an increase of capacity by 186 MW. As a result, the total capacity of the hydroelectric power plants will be 3,785 MW by 2030, the volume of generated electric energy - 13.1 billion kWh per annum (2.2 times increase compared to 2019).

Despite the availability of huge solar energy potential, there are no industrial-scale Solar Photovoltaic Plants operational in the country. The wind energy potential, meanwhile, is not sufficiently studied, and, as a result, there are no operational industrial-scale wind farms. Special attention shall be paid in 2020-2030 to the development of renewable source-based generation, especially solar energy.

The development of renewable energy sources increased the need for integration of the electricity market: renewable energy sources are often geographically clustered and cheap renewable energy needs to be transported to regions with little renewable sources. The development of ‘smart energy solutions’ offers the possibility of ‘presuming’: the consumer is no longer a passive recipient but an active producer of energy for his consumption or for feeding it into the grid. The consumer can play a more active role apart from energy generation: ‘smart meters’ offer the possibility to introduce time-variant electricity pricing, i.e., pricing which reflects the scarcity of electricity at each moment of the day. Consumers could choose to have their electricity supply cut when the price reaches a certain cut-off value, whereas they could choose to use electricity (or store it) when the price is low and supply is abundant. We speak of prosumers in the energy system when energy users, with the aid of local production capacities such as solar panels or wind turbines, individually or collectively produce energy for their use or sale on the energy market through the local grid [10].

At the same time, the country is taking steps to develop a legislative framework conducive to the development of this sub-sector of the power industry. Thus, the Republic of Uzbekistan Laws “On the use of renewable energy sources” and “On Public-Private Partnerships” have been adopted and the “Regulation on the connection of businesses generating electrical power to the integrated power grid, including those utilizing renewable energy sources” was approved.

Producers of electric energy from renewable energy sources can connect to a single electric power system based on block stations, as well as on a competitive basis with an indication of the marginal cost of generated electric energy. A block station is a consumer electric station connected directly or through their electric networks to a single electric power system and included in the operational dispatch control system. The connection of consumers of electric energy to the local electric network of producers of electric energy from renewable energy sources is carried out on the terms of the contract[11].

Furthermore, the construction of medium-scale Solar Photovoltaic (1-20MW) Plants will be developed to produce electric energy for the own needs of industrial enterprises and industrial parks. When generating electric energy from renewable energy sources for own needs, obtaining permits is not required.

Special attention shall be paid in 2020-2030 to the development of renewable source-based generation, especially solar energy.

To achieve the development indicators of renewable energy, the target parameters of the annually commissioned capacities of renewable energy facilities in 2020-2030 have been determined, providing for the construction of 3 GW of wind and 5 GW of solar power plants. Creation of large scale wind farms with single site capacities ranging from 100 to 500 MW mostly concentrated in North-Western region (Republic of Karakalpakstan and Navoi region) shall be the main priority direction of wind power development. Currently, two pilot projects have begun on the construction of Solar Power Plants with a capacity of 100 MW each, in

Samarkand and Navoi regions on the terms of public-private partnership arrangements.

Under the Agreements, in 2021, investor companies will complete the construction and commission of the photovoltaic station. Per capita consumption is expected to reach 2,665 kWh per annum by 2030 and, compared to the actual consumption of 1,903 kWh in 2018, which features a 71.4 per cent growth. This rate is substantially lower than that of comparator countries in 2018 including Korea (9,711), PRC (4,292), Russian (6,257), Kazakhstan (5,133), and Turkey (2,637kWh).

Considering the rapid growth in the consumer's capacity to generate own power and supplying excess to the integrated power grid as well as in order to stimulate the development of domestic investment potential, a targeted program for installation of about 150 thousand solar PV plants (2-3kW capacity) and water heaters (200 liters on average) in 2-2.5 per cent households in 2021-2025 was approved. With residential renewables installations, it is expected that 4.3 per cent households' demand in the country, or about 800 million kWh, shall be satisfied thanks to the introduction of partially isolated renewable energy units.

One prerequisite for effective competition concerns a particular feature of the electricity and gas sector - the network. The modern production is unthinkable without electric networks.

The physical grid, that is, the flow of electricity, consists of electricity generators and electricity-transport systems, which are usually subdivided into systems for transmission over long distances and systems for distribution to residential and industrial consumers of electricity.

The electric grid is a network connecting electricity generators and consumers via the transmission and distribution networks. The electric grid has two fundamental technical properties, which also have an impact on electricity markets:

1. The supply and demand of electricity in the grid must always be balanced, otherwise, failures will occur.
2. The flow of electricity in the grid cannot be controlled. It simply follows the path of least resistance, so that consumers receive electricity from mixed sources.

Transmission networks that carry electricity over long distances around the country or internationally at high voltages (typically 110 kV and higher); Distribution networks that run at lower voltages and supply the end-consumer, i.e., houses and businesses, with the electricity from the transmission grid.

High voltages, between 220 kV and 1 000 kV, are used for reducing transmission losses. Traditionally, transmission networks use alternating current, but the high-voltage direct current is emerging as an effective alternative. Transmission networks are run by transmission-system operators.

The electric grid is a network connecting electricity generators and consumers via the transmission and distribution networks. The electric grid has two fundamental technical properties, which also have an impact on electricity markets:

In Uzbekistan, the transportation of electrical power from generating sources is implemented using a network of 35-500kV transmission lines including 77 substations with an aggregate capacity of 22,830 MVA and 9 768km transmission lines. Transmission network is responsible for transportation of electrical power across the country's regions as well as international transit, export, import of electricity and facilitates interoperation with neighboring countries' power systems.

Transmission networks are owned by the state through the National Power Networks of Uzbekistan JSC – the operator of the system, and are not subject to privatization and/or external operation/management. The National Dispatch Centre of the National Power Networks of Uzbekistan JSC shall continue implementing centralized operational dispatch of all power plants as well as transmission and distribution grids. It is expected that by 2025, to increase power supply reliability, all power networks of the integrated power system shall be connected into a single 500kV grid. To facilitate speedy maintenance and, inter alia, reduction of operating costs and quick recovery of technical disturbances and deviations, the above projects shall integrate the following digitization and automation principles: to ensure real-time operation of systems for collection, processing, display, and backup of data on power generation, transmission, and distribution, and to optimize electricity flows and loads on generating assets, a phased integration of a SCADA system for technical management of dispatch and data acquisition; modern technologies like "Digital Substation" shall be integrated into the design and construction of new substations as well as modernization and reconstruction of existing ones. New standards governing the construction of multi-circuit overhead transmission lines based on IEC standards shall be introduced to reduce operating costs and land acquisitions during the construction of new backbone transmission lines.

Distribution networks take electricity from the transmission networks and distribute them to consumers. Distribution networks are managed by distribution-system operators, who connect consumers, install electricity meters, and communicate the consumption to the energy suppliers. Electricity from smaller renewable sources,

such as solar and wind, is generally fed directly into the distribution network. Distribution electric networks are used to supply electric energy to end-consumers and are characterized by fairly dynamic development, as well as a high level of technical losses.

Next to the physical distribution part of the electricity system, energy is sold on different markets with different market players. The market participants are the electricity generators, the transmission system operators and distribution network operators, electricity suppliers buying electricity from generators, and the consumers of this electricity.

The main priority areas for the development of distribution electric networks of the Republic of Uzbekistan include the reduction of technical and commercial losses of electricity during distribution and improving the reliability and quality of power supply to the consumers.

At the same time, there are several present including the following major issues:

– low electrical conversion efficiency (25-35 per cent) of Thermal Power Plant generators commissioned over 25 years ago and high fuel consumption rate compared to modern combined cycle processes (x2 times);

– high level of wear and tear in distribution grid and transformer infrastructure resulting in outages and lower quality of electricity;

– low throughput of most of existing transmission lines and transformers limits capabilities for supply of electricity to consumers in required volumes;

– low level of automation and digitization of power sector assets affects capacity to prevent and quickly eliminate technical issues.

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