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CONTENT

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UNITED ENERGY SYSTEM OF UKRAINE: TOWARDS INTEGRATION INTO ENTSO-E

One of the strategic aims of the government policy regarding the energy sector is the integration of the United Energy System of Ukraine (UESU) into the European Network of Transmission System Operators for Electricity (ENTSO-E). The joint work of the UESU and all-European energy system will increase the competition in the domestic energy market, create conditions for reducing electricity price, expand the opportunities for electricity exchange between neighbouring countries, etc. [1].

The UESU is a number of power plants operating on conventional and renewable energy resources, main and distribution networks, united by a common regime of production, transmission, and distribution of electricity. The UESU provides centralized electricity supply to domestic consumers, interacts with the energy systems of neighbouring countries, export and import of electricity.

The key parameter for the stable operation of the UESU is ensuring the balance between electricity generation and consumption. Balancing the energy system requires generating capacities, which can operate in different modes of operation: the basic mode, working with constant set capacity, and the maneuvering one, being able to change the amount of electricity generation. The peculiarity of the UESU is the excess of basic nuclear generation and the deficit of maneuvering capacities that creates significant challenges for its balancing. In recent years, the situation is complicated by intensive putting into operation solar and wind power plants, electricity generation based on which is difficult to predict and unstable, as it depends on climatic conditions, seasons, time of day, etc. One of the ways to solve the problems of balancing the UESU under the conditions of intensive development of green energy is the UESU integration into ENTSO-E.

ENTSO-E is a network of European electricity transmission system operators, which was established in 2009. As of 2021, ENTSO-E network unites 43 operators from 36 European countries [2]. The main objectives of ENTSO-E are to ensure the reliable operation, optimal management and development of the European electricity transmission system to ensure energy security and meet the needs of the internal energy market. In addition, as part of ENTSO-E, the members of energy systems perform power system security analysis, develop IT software standards, plan electrical network development, monitor compliance with European Union legislation, and implement innovative projects.

In June 2017, NEC "Ukrenergo" and ENTSO-E representatives concluded an agreement on the future integration of the UESU with the energy system of continental Europe. The cost of the project activities is 11.4 billion UAH, of which 4327 million UAH will be funded by the International Monetary Fund. The cost items of this project include the following components: power transmission network (4114 million UAH), formation of communication channels for the UESU technological management (2965 million UAH), performance of static and dynamic stability research (157 million UAH), "island" operation mode of the UESU (11.7 million UAH), compliance with the requirements of the Operational Handbook ENTSO-E (75.8 million UAH), measures to prepare the generation for joint work with ENTSO-E (4048 million UAH), as well as the certification of NEC "Ukrenergo" as the transmission system operator according to the Independent System Operator model (5 million UAH) [3].

The integration of the UESU into ENTSO-E has a number of advantages, the major of which are the following:

- demonopolization of the electricity sector;
- formation of transparent, stable, and reasonable electricity prices;
- modernization of old energy infrastructure, which includes decommissioning of obsolete units of coal and nuclear power plants;
- decarbonization of electricity sector, which will help to keep the global temperature at 1.5-2°C;
- ensuring the energy security by strengthening the reliability of the UESU operation, the possibility to receive emergency assistance from the energy systems of ENTSO-E countries, etc.

Thus, the synchronization of the UESU with ENTSO is an important step towards ensuring stable and reliable operation of the Ukrainian energy system, increasing its environmental friendliness and the ability to adapt to large-scale integration of renewable energy capacities.

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