

CURRENT STATE AND PROSPECTS OF TPP IN THE INTEGRATED POWER SYSTEM OF UKRAINE

Aliiev R.D., Shevchenko V.V.

National Technical University «Kharkiv Polytechnic Institute», Kharkiv

Determining the future of the electric power industry is possible only in the context of the real problems of the socio-economic development of each specific country. Modern problems and prospective tasks of the energy industry are the same for all countries: it is the search for new, environmentally friendly sources and technologies for generating electricity; continuous increase in electricity generation, increase in efficiency in its transmission, distribution and consumption, reduction of losses at all indicated stages [1]. The combination of growing energy consumption and the low specific density of electricity generation from renewable energy sources (RES) will not allow "green energy" to exclude other sources of energy production. But it is necessary to stop stations that harm the ecology of the planet (TPP-s, NPP-s). But at present, for the sustainable development of the electric power industry in Ukraine, as well as in other countries, in order to ensure energy independence, and hence security, it is necessary to build new units and maintain the NPP units that are already in operation. Nuclear power will remain the main source of electricity for the coming decades.

In support of this, it can be noted that on January, 2023, an agreement was signed on the development of technical documentation for the construction by the American company Westinghouse of the first two nuclear units of a new type with AP-1000 reactors at the Khmelnytsky NPP. (The contract between NAEK Energoatom and the American Westinghouse Electric Company for the development of a feasibility study for the construction of such two units was signed back in July 2022).

The date of commissioning of new NPP units is planned for 2030-2032. But electricity is needed now, not many years from now. Therefore, in order to ensure a sustainable energy supply to consumers until the start-up of new NPP units, until the creation of high-capacity plants that will operate from renewable energy sources, or until new types of energy sources (for example, controlled thermonuclear reactors) are brought to working condition, it is necessary to maintain TPP. The study of literary sources confirms the need for further operation of thermal power plants, which determines the relevance of carrying out work on the modernization of turbogenerators (TG) with a capacity of 200-500 MW, which operate at these stations.

It must also be remembered that in addition to generating electricity, TPP turbogenerators are mobile units for regulating the balance of active and reactive power in the power system, sources for ensuring the stability of its operation. The plans for the modernization of electrical equipment should include an increase in the power of the TG, provided that the overall and installation dimensions are maintained to preserve the existing foundation and auxiliary systems. To improve the safety of TG operation, it is also necessary to solve the issue of replacing hydrogen, which cools the internal volume of the generator, with air, taking into account changes in thermal characteristics due to an increase in turbogenerator power.