

Section 2

**IMPLEMENTATION OF SMART GRID TECHNOLOGIES IN THE
POWER SYSTEM OF UKRAINE**

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Relevance. Over the past 30 years, energy consumption has increased by 45% and is expected to increase by 70% in the next 15-20 years. This is accompanied by rising energy prices due to limited mineral reserves. Therefore, it is necessary to pay immediate attention to reducing energy consumption. Many developed countries are developing energy-efficient solutions to improve the competitiveness of their products.

Ukraine is particularly interested in developing energy efficient solutions as the country's electricity consumption efficiency is very low. The fastest and most cost-effective way to reduce energy consumption is to improve the production, distribution and use of electricity by building an intelligent power system. This system includes smart generation, flexible distribution, consumer-side management, smart facilities, and electric transportation. The power supply systems of the future (so-called «smart grids») are already being actively developed by the world's technological leaders (primarily the United States and China, Japan and South Korea). The Smart Grid concept [3] is designed to solve such global energy problems: power supply reliability, power system management, and the development of alternative energy sources.

Purpose. Optimization of power consumption, improvement of quality and reliability of power supply based on information technology.

Principal provisions. The implementation of smart grids requires the equipment of industrial controllers that, in addition to their primary purpose, can transmit data and have access to the Internet, use renewable energy, and act as a consumer regulator.

The Smart Grid concept emerged after the accidents in the US and Fukushima power grids and aims to transform the outdated power supply system. The smart grid will allow power companies to manage the entire grid, consumers to use power efficiently, and the government to create a smart energy infrastructure. This reform will also improve energy security and confidence in electricity supply, and improve the environmental situation.

In the conditions of Ukraine, the construction of intelligent power supply system's faces many obstacles, namely: contradictions in the requirements of the for Electrical Installations (PUE) and the International Electrotechnical Commission (IEC), the lack of measurement and monitoring systems (quality of electrical energy, reactive load compensation, etc.), Manufacturing Execution Systems (MES) and Building Management Systems (BMS), and regular

electricity audits. At present, electricity consumption is constantly increasing due to the construction of powerful shopping and entertainment centers, the expansion of industrial infrastructure, the development of urban electric transportation, and the proliferation of electric vehicles. the proliferation of electric vehicles.

To successfully implement a smart grid, Ukrainian authorities should adopt legislation, promote standardization of SCADA systems, consider bi-directional power transmission, and implement building management systems. It is also important to adopt international standards in the design and manufacture of electrical equipment.

Conclusions. It is crucial to promptly enhance the regulatory framework to align with European and global standards. This involves revising energy-related laws and regulations, especially establishing a legal structure for integrating smart electricity transmission systems.

Simultaneously, fostering an environment conducive to smart electricity transmission infrastructure development is essential. This encompasses encouraging investments in new technologies that promote a flexible electricity distribution system. Additionally, facilitating active consumer participation in electricity management and utilization is paramount.

Furthermore, exploring the integration of various energy facilities and consumers into a unified smart grid is vital. This network should facilitate data exchange and programmatic management across all levels, ensuring a more efficient and resilient energy supply in response to increasing demand and energy fluctuations.

List of references

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