NEW TRENDS IN ENERGY PRODUCTION AND CONSUMPTION

Maksym Bilenko

Faculty of Electric Power Engineering and Automation,

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

In recent decades, the global energy sector has undergone rapid transformation caused by technological progress, environmental challenges, and the need for sustainable development. Traditional fossil-fuel-based power generation is gradually being replaced by renewable energy sources such as solar, wind, and hydro power. This shift is not only technological but also systemic, influencing how energy is produced, distributed, and consumed (Anderson, 2022, p. 54). Thus, the purpose of this paper is to describe how new technologies and renewable energy sources are changing the way energy is produced, distributed, and used, making modern power systems more sustainable and efficient.

The growing share of renewables leads to decentralization of the power grid. Instead of large, centralized power stations, smaller distributed energy systems are emerging, supported by intelligent control and energy storage technologies. Consumers are increasingly becoming "prosumers" – both producers and consumers of electricity. This trend creates new challenges for grid stability and efficiency (Kovalenko, 2023).

Digitalization also plays a critical role in modern energy systems. Smart meters, Internet of Things (IoT) devices, and artificial intelligence enable more precise demand forecasting and load balancing. As a result, energy consumption becomes more flexible and environmentally responsible (Lee & Brown, 2024).

In conclusion, the changing world of power generation and consumption

represents a fundamental transition toward sustainability, efficiency, and technological integration. Future energy systems will rely on innovation, storage optimization, and real-time data management to meet the growing global demand while reducing carbon emissions.

References:

1. Anderson, P. (2022). Global trends in renewable energy development. *Renewable Energy Review*, 9(1), 50–60.

2. Kovalenko, O. (2023). Detsentralizatsiia ta rol prosumeriv u suchasnykh enerhetychnykh systemakh [Decentralization and the Role of Prosumers in Modern Energy Systems]. Zhurnal enerhetychnoi polityky [Journal of Energy Policy], 18(2), 112–120. [in Ukrainian]

3. Lee, J., & Brown, S. (2024). Digital technologies and smart grids for sustainable power management. *Energy Science and Technology*, 22(3), 88–97.