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## **INTENSIFICATION OF ENERGY SAVING PROCESSES THROUGH WIDE IMPLEMENTATION OF INNOVATIVE TECHNOLOGIES BASED ON RENEWABLE ENERGY SOURCES**

Ukraine's energy security is extremely important in the context of growing energy demand, limited resources and climate change. Increasing prices for traditional energy resources and constant risks of energy dependence make energy conservation a priority for the country. One of the ways to solve this problem is the active introduction of renewable energy sources (RES), which can significantly reduce dependence on imports and strengthen energy stability. Modern technologies based on the use of solar, wind, hydropower and biomass open up prospects for increasing energy efficiency and sustainable development.

Large-scale introduction of RES at the industrial, commercial and household levels is an important step towards increasing the stability of Ukraine's energy system. The key directions of this process are the development of technologies that allow efficient use and storage of energy from renewable sources, such as solar, wind and bioenergy. In the conditions of modern challenges, where climate change, economic difficulties and the need for sustainable development are becoming the main issues, energy saving occupies an important place in the strategic goals of states. Fossil resources such as oil, gas and coal are being depleted and pose a significant threat to the environment. This encourages society to actively switch to renewable energy sources (RES), in particular solar, wind, hydropower and biomass, as promising alternatives capable of reducing dependence on traditional energy carriers, reducing the carbon footprint and increasing energy security.

Innovations and new technologies in the field of RES ensure a systematic reduction of energy consumption and increase the efficiency of energy-saving measures. They cover areas such as energy storage, network automation, building energy efficiency, and integration of intelligent systems. It is the development of these technologies that is a decisive factor on the way to an energy-efficient future.

### *Innovative solutions for energy saving and implementation of RES*

*Solar energy* . Solar energy in Ukraine has significant prospects due to favorable climatic conditions.

*Wind energy* . Ukraine has large wind energy resources, especially in coastal and steppe areas.

*Bioenergetics* . The use of Ukraine's agricultural potential makes it possible to produce energy from biomass, which reduces dependence on traditional sources. *Innovative approaches to energy storage and distribution*

Modern technologies ensure more efficient use of energy, reduce losses and make networks more flexible. They also contribute to the adaptation of RES to meet energy needs in various areas.

*Energy storage systems* . Hydrogen-based batteries and systems allow energy to be stored and used during peak loads, increasing supply reliability.

*Intelligent networks (Smart Grids)*. These networks allow energy consumption to be controlled by quickly responding to supply and demand fluctuations, reducing losses.

*Energy-efficient buildings* . Buildings with "green" technologies have a high level of thermal insulation, heat recovery systems and solar panels, which reduces energy needs.

*Development of electric mobility* . The transition to electric transport and the development of charging stations helps reduce carbon emissions and reduces dependence on traditional fuels.

### **Conclusions**

Large-scale implementation of RES is necessary to strengthen Ukraine's energy security, reduce dependence on traditional energy resources, and improve the environment. For the successful integration of RES into the energy system, it is worth:

- p to develop a national strategy for the development of RES, taking into account the needs of all sectors of the economy.
- to support innovations in the field of energy storage.
- to encourage foreign investments in RES.

The development of renewable energy sources is a critically important step for Ukraine's energy independence, which will also contribute to economic growth and environmental protection.

For the successful development of RES and energy saving, state support and investments are necessary. It is important to develop legislation that encourages enterprises to implement energy-saving technologies and RES, as well as support for scientific research in this area. The production and consumption of energy based on RES will not only improve energy independence, but also ensure an ecologically clean future, contributing to the reduction of energy costs and increasing economic stability.