

УДК 621

Mykyta Pavlov<sup>1</sup>, Nataliia Zhukova<sup>2</sup>

<sup>1</sup>student of group E-312 NU “Zaporizhzhia Polytechnic”

<sup>2</sup>PhD (Philology), associate professor NU “Zaporizhzhia Polytechnic”

## **ENERGY EFFICIENCY OF RESIDENTIAL BUILDINGS IN UKRAINE: MODERNIZATION OR NEW DESIGN**

Today, the issues of using renewable energy sources and reducing the impact on the natural environment are the most pressing around the world. Improving the energy efficiency of residential buildings is one of the ways to reduce the consumption of heat and electricity.

Improving the energy efficiency of residential buildings can achieve various goals. The first is to reduce operating costs for the building owner. This can save up to 60% on electricity and heat bills. Over a long period of time, it will produce incredible savings. The second goal, which is achieved by improving energy efficiency, is to save natural resources. An energy-efficient building maintains a comfortable temperature inside, at different temperatures outside, without significant heating or cooling costs.

A negative aspect of an energy efficient building is its higher price compared to a conventional building. Depending on the materials used in construction, the price can increase by up to 13%.

In Ukraine, the majority of the housing stock is represented by old buildings. Their design was based on mass production and low cost. As a result, the energy efficiency of buildings constructed before the 2000s is 10 to 20 times worse than that of residential buildings built in the EU countries of similar years. In our country, the construction of energy efficient buildings is just beginning to develop compared to European countries, where the construction of such buildings has been popular for decades. The main reason why the construction of energy efficient houses is not developed in Ukraine is that a unit of living space in an energy efficient house is 8-13% more expensive than in a house of traditional construction. In this regard, many organizations find it more profitable to invest in the construction of “energy wasteful” residential buildings, thereby generating higher income.

Modern energy efficiency programs in Ukraine and Europe involve the use and development of new construction materials for residential construction. The use of energy-efficient materials for residential construction helps to save raw materials and reduce the subsequent costs of heating and maintenance of the buildings themselves. The selection of energy-efficient building materials and modern technologies for their installation allows for a building that requires less energy to heat than a conventional building. Sometimes these savings amount to 60-80%.

In Ukraine, panoramic windows have recently gained popularity. They look spectacular when viewed from the outside, but we must not forget that any windows are unnecessary heat losses, and panoramic windows are not particularly effective for energy saving.

However, there are ways to compensate for these losses. For example, it is possible to use more expensive facade materials that have better thermal insulation characteristics. This increases the cost and operating costs of the building's occupants, and also complicates the design. The most effective solution is to use double-glazed windows with a small area. They have low thermal conductivity characteristics and a relatively low cost compared to panoramic windows with similar parameters. Efficient glazing allows you to save on other building systems such as heating and ventilation and reduce operating costs.

In summary, the greatest savings in electricity and heat can be achieved in buildings that were planned as energy efficient at the design stage and use modern energy efficient materials in their construction. Modernization of already constructed buildings will be costly and will not bring significant savings.