



Problems of Increasing the Energy Efficiency of Residential Buildings

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Abstract: The article deals with the problems of improving the energy efficiency of residential buildings, it is recommended to apply the experience of solving these problems.

Key word: economy, energy-efficient residential building, energy resources, housing construction.

Introduction. The development of civilization has led to problems with the environment, lack of energy resources. The world community has faced the need to take serious measures to reduce energy consumption both in industry and in the housing sector [1]. The solution to the issue of saving energy resources is relevant for all sectors of the economy, including construction.

Today, two directions for improving the energy efficiency of facilities are recognized as the most promising:

- saving energy resources by minimizing energy consumption and energy losses, including the disposal of energy valuable waste;
- the use of renewable energy sources in the operation of residential buildings [2, 3].

Increasing interest in the world is the concept of "passive house". In it, the bulk of the total energy demand is covered by solar energy or the recovery of heat generated by household appliances and people. Passive houses use modern building materials and structures, as well as the latest engineering equipment. Currently, such residential buildings are recognized in Europe as the most advanced in terms of comfort, indoor microclimate and energy consumption [4].

The main condition for designing an energy-efficient house is to ensure a comfortable internal temperature without the use of heating and ventilation systems by sealing the building and using alternative energy sources. Classification of such houses is carried out on the basis of their energy consumption.

The energy efficiency of a residential building is ensured through the implementation of the following measures: reliable thermal insulation, using enclosing structures with high thermal insulation characteristics, "warm" windows; the use of a ventilation system with heat recovery from ventilation emissions, the use of secondary and renewable sources of thermal energy for heating and hot water supply, such as solar collectors or heat pumps, the use of internal sources of heat and energy of a residential building [5, 6]. Additional savings in thermal energy occur due to the use of an automated control system for all technical devices in the building.

In the Republic of Uzbekistan, these tasks are solved at the state level, legislative and regulatory legal acts regulating this area of activity have been adopted, the first energy-efficient multi-apartment residential buildings have been built and are being operated. A transition is being made to the mass construction of energy-efficient multi-apartment residential buildings, as well as work on the thermal modernization of the existing housing stock. New constructive and technological systems of energy-efficient residential buildings for industrial housing construction, standard design solutions for enclosing structures with increased heat-shielding characteristics have been developed. Enterprises of

the Republic of Uzbekistan have launched the production of engineering equipment used in energy-efficient residential buildings. Payment for utilities in energy-efficient houses for the consumed thermal energy for tenants is 2 times lower than in conventional houses. However, the problems of the high cost of 1 m² of the total area in multi-apartment residential buildings with low energy consumption due to the high cost of engineering equipment remain unresolved [7]. Investment costs are on average 25% higher. The payback period for such systems, according to the most optimistic estimates, is 7-10 years. In some cases, during this period of time, it becomes necessary to replace components. In addition, the domestic market does not have the required amount of spare parts for repairs. High prices can prevent even a convinced “green” from buying apartments in such houses, if he does not have an excess of financial resources [8, 9].

In addition to the construction of energy-efficient residential buildings in order to reduce the consumption of energy resources, it is important to bring the existing housing stock built in the period 1980-1990 to modern energy consumption requirements through thermal modernization. After its implementation, energy consumption for heating in panel houses of various series is reduced by 30–40%. The costs of these activities have a relatively short payback period of 3 to 5 years, and if we take into account world gas prices, then 1-2 years.

Another problem that arises in this area is the correct operation of energy-efficient residential buildings. The results of the resulting energy savings largely depend on the residents, their desire to save heat and their literacy in matters of operation. The problem of operating energy-efficient residential buildings is the lack of motivation in the proper operation of energy-saving equipment by apartment tenants. According to surveys, temporary residents in most cases do not care whether the windows are open, whether the supply ventilation system is working, whether it saves heat. Only about 11% of residents, regardless of their educational level, understand that it is not allowed to open windows in an energy-efficient house when the ventilation system is running. Ventilation system with heat recovery makes it possible to ensure a constant flow of fresh air into the apartments without the need to open windows. At an outside air temperature of +5 - -5°C, the ventilation system with recuperation allows to reduce the consumption of thermal energy for heating up to 70%. During the heating season, the amount of savings reaches at least 50%. When airing the premises by opening windows, the energy saving effect is canceled, since warm air is actively displaced by cold air. As a result, heating costs increase significantly and the payback period of engineering equipment increases significantly.

This problem can only be solved by a correct tariff policy for energy resources with the possibility of the tenant himself to regulate the actual consumption of energy resources for heating and, accordingly, the amount of financial costs for heating the apartment.

The next problem is the lack of highly qualified specialists. A prerequisite for the construction of such houses is the presence of highly qualified designers and workers. This is due to the need for careful adherence to construction technology. Even small flaws in the work nullify all efforts to seal the house, fixing a marriage is very expensive.

The reduction of energy consumption in housing construction is supported at the legislative level in the Republic of Uzbekistan. An analysis of the legislative framework in the field of efficient use of fuel and energy resources allows us to identify the following key areas of state regulation in this area:

1. Technical modernization of power generation facilities and transmission infrastructure.
2. Tariff regulation.
3. Energy saving.
4. Improvement of regulation in the field of use of fuel and energy resources and the system of monitoring and evaluation of management.

Conclusions. An important aspect of energy efficiency is the rational use and choice of fuel and energy resources, which is the focus of the entire legislative system of the fuel and energy complex of

the Republic of Uzbekistan. The rational use of energy resources will not only reduce economic costs, but also reduce the burden on the environment. An important aspect of the rational use of fuel and energy resources is the increasing involvement of local, including renewable sources.

References:

1. Широков. Е. И. Экодом нулевого энергопотребления - реальный шаг к устойчивому развитию // *Архитектура и строительство России*. 2009. - №2. - С. 35–39.
2. Кузнецов А. Проектирование энергосберегающих зданий // *Проектные и изыскательские работы в строительстве*. 2010. - №1. - С. 15-20.
3. Khusanov, U. S., & Akhmedov, Z. J. (2021). Innovative methods of teaching descriptive geometry in higher education. *Asian Journal of Multidimensional Research*, 10(10), 649-652.
4. Rakhimov Sh.T., Turapov F.Kh., Bobakulov A.A., Abdumumunov O.R., & Ahmedov Z.J. (2021). Features Of The Structure Formation Of A Filling Mixture Based On Industrial Waste. *The American Journal of Engineering and Technology*, 3(05), 150–155.
5. Shavkat Turdimurotovich, R., Jurayevich, A. Z., & RAshidovich, A. O. (2021). The Development of Compositions and Research of the Properties of Fine Concrete. *American Journal of Social and Humanitarian Research*, 2(9), 138–142.
6. Турдимуродов, Д. Ю. (2022). Формирование у подростков волевых качеств в процессе физического воспитания. *Science and Education*, 3(7), 283-289.
7. Yuldashevich, T. D. (2022). Education of moral-volitional and psychological qualities in athletes. Problems and scientific solutions, Australia, Melbourne.
8. Turdimurodov, D. Y. (2022, September). Formation of moral and volitional qualities of adolescents by means of physical education. In *International scientific conference "Innovative trends in science, practice and education"* (Vol. 1, No. 1, pp. 198-204).
9. Turdimurodov, D. (2022). Volitional qualities of a person and their formation in adolescent age. *Models and methods in modern science*, 1(14), 13-17.