

# ENERGY SAVING IN THE OPERATION OF COMMERCIAL REAL ESTATE

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**Abstract:** *this article considers a list of measures to save energy in buildings of commercial real estate in the three areas of saving heat energy, saving electricity, saving water. The information can be used to address issues related to improving the energy efficiency of non-residential, commercial buildings and facilities.*

**Keywords:** *energy efficient technology, energy saving, energy efficiency, commercial real estate, systems, savings, resources, environment, environmental engineering*

## ЭНЕРГОСБЕРЕЖЕНИЕ ПРИ ЭКСПЛУАТАЦИИ КОММЕРЧЕСКОЙ НЕДВИЖИМОСТИ

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**Аннотация:** *в данной статье рассмотрен перечень мероприятий по энергосбережению в зданиях коммерческой недвижимости по трем направлениям экономии тепловой энергии, экономии электроэнергии, экономии воды. Информация может быть использована для решения вопросов, связанных с повышением энергоэффективности нежилых, коммерческих зданий и сооружений.*

**Ключевые слова:** *энергоэффективные технологии, энергосбережение, энергоэффективность, коммерческая недвижимость, системы, экономия, ресурсы, окружающая среда, экологическая инженерия.*

In today's world sustainability is becoming an increasingly urgent issue. With rising energy prices and climate change, energy efficiency and energy saving are among the most important issues that directly affect the economy and the environment. Of great importance are not only issues of improving the energy efficiency of residential buildings and social facilities, but also commercial real estate. In particular, commercial real estate consumes huge amounts of energy for lighting, heating, air conditioning and other needs. In this article, the term commercial real estate refers to buildings, structures, and constructions that benefit the owner/beneficiary by renting them out or using them for commercial purposes other than production. At the same time, owners of commercial real estate are quite flexible, decisive and variable when it comes to investing in modern technological solutions that allow for a delayed economic effect.

Optimizing energy costs is one of the most important tasks for commercial property management; it carries economic benefits for businesses, although not always instantaneous. In addition, improving the energy efficiency of commercial real estate contributes to increasing its competitiveness, improving working conditions for employees and increasing the level of comfort for tenants. Russia has a huge number of buildings that were built back in the Soviet Union. "According to studies, buildings that were built in Russia before 1990 according to typical designs have a good potential for energy saving, because in the Soviet period the policy of "cheap energy carriers" was actively pursued and the scientific and technical regulatory documentation on the thermal protection of buildings in construction was insufficiently developed." [1, c.1]

To solve the problems of energy saving in commercial buildings it is necessary to carry out a comprehensive analysis of the processes of operation of commercial real estate and develop effective measures to reduce energy consumption in this industry. It is also necessary to draw attention to ecological aspects and increase public consciousness concerning economic benefits and energy saving.

Now in Russia the main legal document regulating energy saving and increase of energy efficiency is № 261-Federal Law RF [2]. According to No. 261- Federal Law RF every five years the energy efficiency requirements must be reviewed [2, Article 11, paragraph 4]. "One of the most important directions of development of economy of Russia is approved by the state program of the Russian Federation "Energy saving and increase of energy efficiency for the period till 2030". [3, c. 1]

The main directions of energy saving of commercial real estate buildings can be divided into three directions: heat energy saving, electric energy saving, water saving. Below is a list of energy saving measures for each direction separately.

### **Thermal energy:**

1. Replacement of outdated heating radiators by modern ones
2. Installation of heat reflective shields behind the heating radiators.
3. Water heating with the use of water storage tanks on the roof

4. Installation/replacement of traditional windows with energy-saving windows or use of heat reflective films on traditional windows.
5. Glazing of balconies
6. Insulation of building envelopes
7. Installation of microventilation systems
8. Installation of filters in the heating circuit to prevent clogging of the system
9. Installation of thermostats for radiators
10. Regulation of the temperature in the premises during working and nonworking hours, including the use of automatic programmable systems
11. Installation of the air recuperation system
11. Extraction and distribution of ground heat in the basement
12. In case of major repairs, installation of heating and hot water piping inside the building using modern pipes

**Electrical energy:**

1. Using energy efficient high energy efficiency appliances and office equipment
2. Using photoacoustic systems for controlling the switching on/off of lighting in public areas
3. Installation of lighting points inside and outside the building with LED energy-efficient lighting fixtures
4. Installation of control systems for elevator motor drives
5. Installation of roof solar panels
6. Keeping windows and light fixtures clean to save on lighting costs

**Saving water:**

1. Using faucets with a sensor water delivery system.
2. Using faucets with automatic water temperature control.
3. Installation of dual-mode toilet flushing cisterns
4. Installation of pressure stabilizers (pressure lowering and pressure equalizing on the floors)
5. Heat insulation of pipelines DHW
6. Installation of a heat pump in the basement

**Conclusion:**

All listed measures separately show their effectiveness, which is confirmed by control calculations, open data of energy audit of commercial buildings and economic indicators. In order to achieve the maximum cumulative effect, stakeholders, owners of commercial real estate should use the greatest number of available measures from the above, which will increase the overall synergistic effect and provide an opportunity to obtain a meaningful economic effect.

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