

Energy efficiency in Public buildings

Thermal Insulation

This one-pager showcases the energy efficiency measures for the building envelope in a public building based on the results from an energy audit in the spring of 2025

Proposed Energy Efficiency Measures



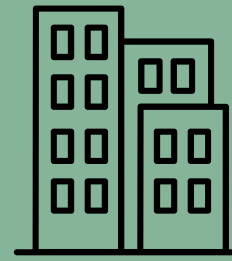
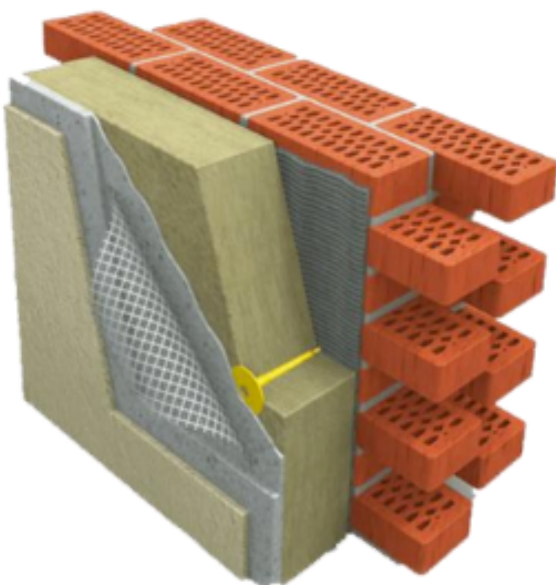
Insulation of roof

Install new insulation to a total thickness of 300 mm after securing a vapor barrier to avoid moisture build-up.



Insulation of external walls

Install thermal insulation material fastened to the outside of the external walls with plate dowels. Layer with reinforcing mesh is applied to the thermal insulation layer. After hardening, a primer is applied to the reinforcing layer and covered with a plaster layer. Then paint for the finished result. This solution requires replacing/restoring the paving and drainage system around the building perimeter.



Case description

The case is a public administrative building with a brick construction and steel roof. It was constructed in 1946 and has undergone some minor cosmetic repairs such as replacement of the lighting fixtures, window and door structures.

Floor area: 1042.8 m²

Total energy consumption: 378,963 kWh/year

Energy performance: 363 kWh/m²

Current condition

The building's external walls and roof have insufficient insulation of 70 mm that is significantly below the Ukrainian standard. This indicates a major source of energy waste.

Estimated savings and outcome

The modernization of the heating system is a key energy efficiency measure with the following projected outcomes:

- **Energy Savings:** 95,642 kWh of heat energy per year or 25 % reduction of the total energy consumption per year.
- **CO₂ Emission Reduction:** Reduction of CO₂ emissions by 21 tons per year.
- **Payback Period:** The simple payback period is estimated to be 40 years.
- **Other Benefits:** A well-insulated building maintains a more stable indoor temperature, reducing drafts, cold spots and mold growth, which creates a more comfortable and healthier environment for occupants.

Recommendations

Implementing insulation is a highly effective measure for several key reasons. First of all, it will provide a more comfortable indoor temperature, but it is also essential for maintaining a healthy environment. Poorly insulated buildings often experience mold growth and structural damage as condensation on will occur on interior surfaces when warm, moist air comes into contact with cold walls or roofs.

So, even though the pay back time is quite high, implementing insulation in the building envelope is essential for maintaining an energy efficient and healthy building.