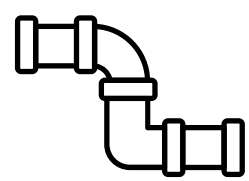


Energy efficiency in Public buildings

Heating systems

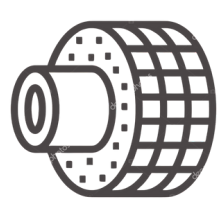
This one-pager showcases the energy efficiency measures for a heating system in a public building based on the results from an energy audit in the spring of 2025

Proposed Energy Efficiency Measures



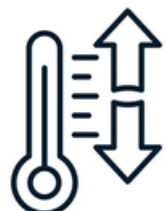
Repair and replace heating pipelines

Damaged and worn sections of pipelines and shut-off valves should be repaired or replaced.



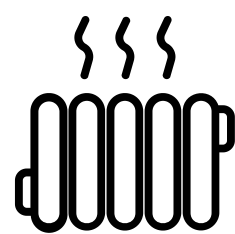
Insulate heating pipelines

New and existing pipelines in unheated spaces should be insulated to reduce heat loss.



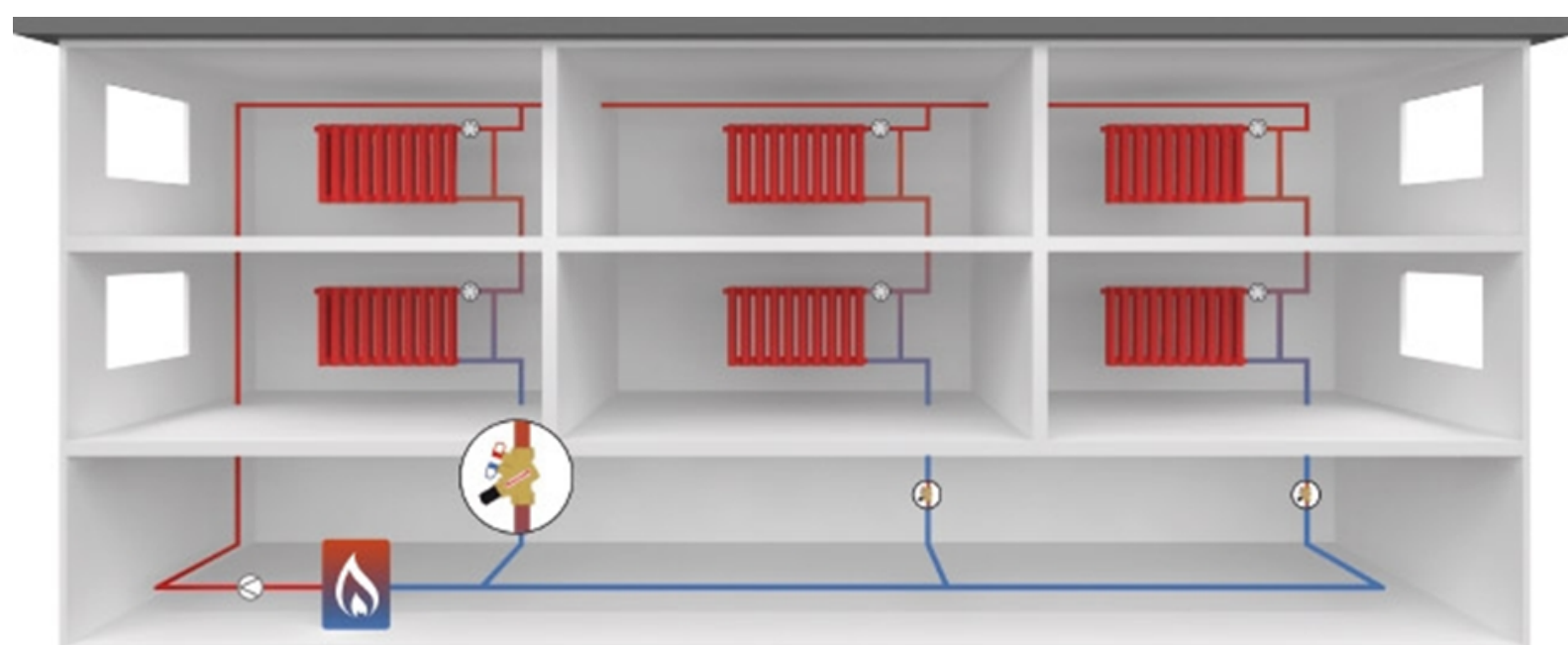
Install thermoregulators

Thermoregulators should be installed on all heating system radiators to allow for the regulation of the heat carrier flow. This is in compliance with DBN V.2.5-67:2013 "Opalennia, ventyliatsiia ta kondytsionuvannia".



Hydraulic balancing of the heating system

To ensure an even distribution of the heat throughout the system, balancing valves should be installed on the system risers. This aligns with DBN V.2.5-67:2013, which requires the use of automatic balancing valves in vertical heating systems.



Recommendations

Modernizing an inefficient heating system not only improves comfort for building occupants but also ensures that energy is used more efficiently. While the simple payback period is long, the cumulative savings in heat energy and the reduction in CO₂ emissions are significant and contribute to long-term sustainability in heating supply and operational efficiency.



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 heat is supplied by a floor-standing gas boiler with a two-pipe vertical distribution system.

Key issues identified include:

- The existing gas boiler is equipped with a weather-dependent automation unit that is not functional and needs maintenance or replacement.
- The distribution system is not hydraulically balanced.
- The thermal insulation on main pipelines in the unheated attic is partially missing or damaged, and insulation on shut-off valves and connectors is absent.
- Thermoregulators are not installed on the heating devices.

Estimated savings and outcome

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

- **Energy Savings:** 34,039 kWh of heat energy per year or 9 % reduction of the total energy consumption.
- **CO₂ Emission Reduction:** Reduction of CO₂ emissions by 7.49 tons per year.
- **Payback Period:** The total payback period is estimated to be 18 years.
- **Other Benefits:** These improvements will lead to a more efficient and balanced heating system, reducing heat loss and providing better indoor climate within the building.