

1. PEC Wałbrzych is one of the regional stakeholders in the DISCO project, and the modernisation of the C-3 Heating Plant is an important example of the transformation of the local district heating system. How does the investment support this transformation, and what results is it expected to deliver?

The investment is one of the key elements of the transformation of the district heating system in Wałbrzych. Its main objective is to reduce the use of coal in heat production, increase the share of renewable energy sources and significantly reduce greenhouse gas and other pollutant emissions. The modernisation of the C-3 Heating Plant is not limited to replacing one fuel with another. The project combines a biomass heat source with a flue gas heat recovery system, absorption heat pumps and a thermal storage tank.

Thanks to this, the system will not only produce heat from renewable sources but will also use the energy contained in the fuel more efficiently and help stabilise heat prices for consumers. The installation is expected to provide an additional 20 MW of renewable capacity and produce around 75,000 MWh of heat from renewable sources annually. Thermal storage is another important element: it will help reduce the impact of daily and seasonal fluctuations in demand and enable generating units to operate more steadily. The project thus contributes to the Company's objective of achieving the status of an efficient district heating system and its climate neutrality plan, i.e. the long-term decarbonisation of the system.

2. What project is this investment part of, and what are its main objectives?

The investment is being implemented under the project entitled "Decarbonisation of the Wałbrzych Subregion and reduction of greenhouse gas emissions through the transformation of the energy infrastructure of the District Heating Company S.A. in Wałbrzych", project no. FEDS.09.04-IP.01-0114/23.

The project is being carried out under the European Funds for Lower Silesia 2021–2027 programme, with support from the Just Transition Fund. The total project value is PLN 104,064,231.18, eligible expenditure amounts to PLN 83,002,868.61, and EU funding totals PLN 39,000,000.

The main scope of the investment is the expansion of the C-3 Heating Plant by two biomass boilers with a capacity of 8 MWt each, together with a flue gas heat recovery system using condensing economisers and absorption heat pumps. The project also included biomass supply infrastructure, auxiliary and safety systems, reconstruction of part of the existing boiler hall, and a thermal storage tank with a pumping station and related infrastructure.

The project started in Q4 2023 and was completed on 28 July 2026. Final settlements with the institution responsible for the call for proposals are currently underway.

3. What does the technical solution involve?

The new system is based on two biomass-fired boilers using wood chips as fuel. The nominal thermal capacity of each boiler and dry economiser unit is 8 MW, or 16 MW in total. The installation has also been expanded with a system that recovers thermal energy from the condensation of water vapour contained in the flue gas (latent heat). For this purpose, condensing economisers working with absorption heat pumps have been installed. By using the heat contained in the flue gas, the total capacity of the biomass installation is 20 MW.

The entire system has been integrated with the existing infrastructure at the C-3 Heating Plant. The investment also includes dust removal systems, economisers, biomass storage and conveying systems, pipelines connecting the new boiler house to the existing pumping station, electrical systems and automation, and the thermal storage tank.

At the heart of the solution is making maximum use of the energy contained in the fuel: heat is not obtained solely by burning biomass and transferred through boiler heat exchangers; it is also recovered from the flue gas, then stored and used according to the system's current needs.

4. Why is the ability to use high-moisture biomass important in this project?

The fuel for the new installation will be certified wood chips that meet sustainability criteria. From the outset, the project has assumed the use of an installation designed to burn wet biomass with a moisture content of up to 60%. This is directly linked to the heat recovery system used, the technical specifications of the furnace and local fuel conditions. Water vapour present in the flue gas is condensed under controlled saturation conditions in the condensing economisers, and the energy generated in this process is efficiently recovered by the absorption heat pumps.

As a result, some of the energy that would be released into the atmosphere in a conventional system can be reused by the district heating system. This is particularly important when using fuel with a high moisture content, because the technology deliberately uses water vapour condensation to improve the efficiency of the overall process.

5. What role does the thermal storage tank play?

The thermal storage tank is one of the key elements increasing the flexibility of the entire system. It is a steel cylindrical tank with an internal diameter of 11 m and a capacity of 2,250 m³. A pumping station building and connections linking the system to the existing heating plant were also constructed as part of the investment.

Its main function is to balance the difference between current heat production and demand. Consumer demand changes during the day and week, as well as over the heating season, mainly depending on outdoor temperature. The tank enables heat to be stored during periods of lower demand and used during periods of higher demand within the day.

Thanks to this, generating units can operate more steadily, without having to constantly adjust their output to short-term changes in demand.

6. What environmental and economic effects are expected once the investment is completed?

One of the project's most measurable effects will be a significant reduction in greenhouse gas emissions. Baseline emissions amount to 42,429.61 t CO₂e per year, while the target value after project completion is 16,424.10 t CO₂e per year. This represents a reduction of approximately 26,000 tonnes of CO₂e per year, or more than 61%.

At the same time, the project aims to deliver an additional 20 MW of renewable capacity and around 75,000 MWh of heat from renewable sources each year. It also aims to reduce dust, SO_x, NO_x and CO emissions and decrease the use of coal in heat production.

From an economic perspective, reducing the use of fossil fuels and CO₂ emissions should reduce the Company's exposure to costs associated with emissions.

7. How will the investment affect the residents of Wałbrzych, as well as the stability and operating costs of the local district heating system?

For residents, an important effect of the investment will be a modernised local district heating system with greater use of renewable energy sources, more efficient heat generation and lower emissions from heat production. Reduced dependence on coal and on costs related to CO₂ emissions should also help ease cost pressures on the district heating system.

It is also important to increase the stability and flexibility of system operation. The thermal storage tank separates heat production from heat consumption in time, allowing the heat sources to operate under more stable conditions despite changes in consumer demand over the course of the day.

8. What elements of this investment could inspire other regions or district heating companies? What experience would be valuable to share with DISCO project partners?

From the perspective of other district heating companies, the most interesting feature of the project is the combination of several technologies into one integrated system: a biomass heat source, flue gas heat recovery, absorption heat pumps and thermal energy storage. The project shows that transforming a medium-sized district heating system does not have to mean only replacing the fuel source; it can also involve improving generation efficiency and increasing system flexibility at the same time.

9. Can the project be seen as demonstrating a new approach to heat recovery and the efficient use of heat in a district heating system?

Yes. One of the project's most distinctive features is the recovery of heat within the heat production process itself. The recovered energy comes from flue gas generated by burning wet biomass. Thanks to the use of condensing economisers and absorption heat pumps, the energy released when the water vapour contained in the flue gas condenses can be recovered.

As a result, the installation is not limited to the 16 MW of capacity obtained from the two furnace-boiler-dry economiser units. Once the heat recovery system is taken into account, the total capacity of the biomass installation reaches 20 MW. The recovered heat can then be used in the system or stored in the thermal storage tank and used when consumer demand increases.

In this sense, the solution differs from the conventional use of an external waste heat source: here, the energy is recovered from the plant's own heat production process, which increases the overall energy efficiency of the system.