

Technical study to investigate the possibility of installing condensers on solid fuel boilers

Project background

Name of applicant	Public Utility Company 'Miskteplovodenergiya'
Project info/Project name	Technical study to investigate the possibility of installing condensers on solid fuel boilers
Contractor	Imatran Lämpö Oy
Project duration	February 2020-June 2020
Contract value	EUR 35,000

Project summary

1 Project summary

The project was a continuation of a twinning project between Miskteplovodenerhiya and Imatran Lämpö Oy in 2019.

The key objective of this project was to analyse possible technical energy efficiency improvements at the new combined heat and power (CHP) plant of Miskteplovodenerhiya (TPP). The use of flue gas condensers for both bio boilers and improved heat recovery for gas engines was the main point of analysis in the study.

The experts from Imatran Lämpö Oy conducted a technical study with the following tasks: 1) Baseline determination, 2) Identification and dimensioning of the efficiency investments, 3) Budget estimations, 4) Financial model at project level (not at company level) and simplified cash flow model, 5) Implementation and Procurement Strategy, 6) Environmental analysis.

2 Project conclusions

Four possible Flue Gas Condenser connections were analysed in the study.

Basic Flue Gas Condensers are estimated to be the most feasible and least sensitive to changes in investment costs, and fuel and electricity prices. The basic Flue Gas Condenser for the 10 MW Bio Boiler is the recommended solution from the study.

The other alternatives studied are also feasible with boundary conditions that are further discussed in the report. If flue gas condensers are used, the marginal cost of cleaning condensate water for district heating (DH) feed water will make it a technically promising investment. In the future, if the price of raw water increases, this investment will also become more economically feasible.

Due to the already high energy efficiency of the gas engines at the CHP plant, a further investment in heat recovery is not feasible. In the future, if and when an investment is made in new engines, the heat recovery system of the new engines should be reviewed.

Currently, the bio boilers have monthly breaks in operation due to regular maintenance. Longer continuous running periods could be achieved in cooperation with the boiler manufacturer, for instance through improved boiler soot blowing.

3 Impact on human rights and the UN's Sustainable Development Goals

The project would positively impact human rights by supporting improvements in infrastructure and living standards, ensuring environmental sustainability and energy security, so all consumers, including vulnerable groups, would have access to affordable, reliable and modern energy services.

The technical study concerns the following SDGs:



3 Project deviations

Due to the coronavirus situation, the final phases of this project were slightly delayed.

4 Lessons learnt

A technical study such as this helps to analyse and compare different technical improvement options and assess the benefits of each alternative for the energy efficiency of the district heating system.

With the study having provided detailed calculations of the most feasible choice of flue gas condenser, including financial indicators IRR and NPV as well as sensitivity analyses of fuel, electricity and investment prices, Miskteplodenerhiya will be able to start discussions on the implementation phase of the project.

Implementing the project will allow Miskteplodenerhiya to improve the heating boilers of the new CHP plant by increasing their energy efficiency and reducing emissions.

With condensers, the CHP plant can better utilise cheaper moist fuels. Systematic analysis and monitoring of moisture improves control and quality of delivered fuels, improving the energy efficiency of the heating plants in the long run.