

Central Controller – Demand Response System

Energy | Stavanger, NO

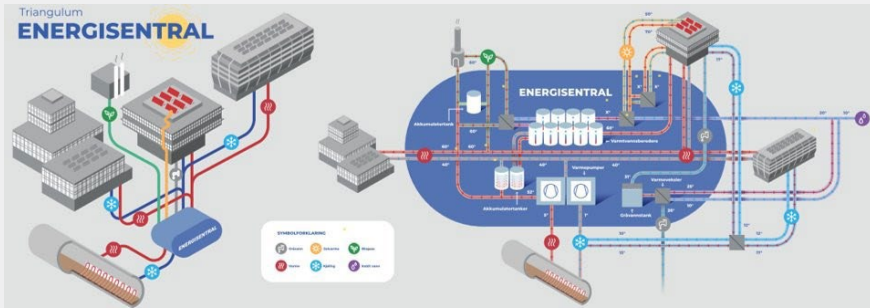


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The overall aim of the task is to demonstrate innovative use of local renewable energy sources other than fossil energy and hydropower, to make the solution relevant for replication in Norway and other European cities.

Stavanger municipality needed to renovate its old power plant, installed in 1970. To be able to meet the Triangulum targets, the municipality have developed and built a new Central Energy Plant (CEP) for heating and cooling, with at least 75% energy from renewable sources. The biggest innovation in the system is that the heat pumps get heat from the city's main drain line tunnel. A heat exchanger system has been established and installed for extracting energy from the wastewater and sewer system.

CEP has used various systems such as heat pump technology with waste heat exchangers in drainage tunnels, together with grey water recovery of shower water and solar collectors in an interaction. Biogas is used as peak load.

The CEP is owned by the municipality of Stavanger and is automated, monitored and remotely controlled from the operation centre by employees in the municipality.

This technical solution for use of waste heat has not previously been used in Norway.

Measured Impacts

tCO₂e 473 (84%)

1 250 000 NOK Total annual savings

26 real time data feeds

project scale

Individual site

development type

**Retrofit/
Technology**

Benefits

- Reduce GHG emissions
- Reduce peak demand
- Improve data availability
- To reduce the use of fossil fuels
- Reduce operating costs
- Decreasing energy consumption
- Decreasing energy costs
- Improve energy efficiency
- Improved Technology knowledge

Lessons learned

- Academically highly involved project manager who manages the project from start to finish
- The importance of concept study and use of possible sources of energy and combination of different sources to assess energy use and greenhouse gas emissions
- Tendering, advertising and evaluation are time-consuming
- Open data – be clear about the source and availability of relevant datasets
- Test operation and function testing is important for error correction and to ensure the delivery of an automated, monitored and remote-controlled system

Challenges

- This technical solution for use of waste heat has not previously been used in Norway.
- Time requirements in the procurement regulations can increase the time spent on a project.
- The availability of data streams and different data in different formats.
- Maintain heat production during renovation
- Can heat exchangers installed in pipes directly finished from the factory be standardized? Questions must be answered by pipe manufacturers.

Supporting factors

- infrastructural** Suitable site for location. Stavanger municipality owns the drainage tunnel and can utilize this without other stakeholders having to be involved. All cities have drainage solutions that can be utilized as energy sources together with heat pump technology in a power plant.
- financial** The CEP is fully part of the Triangulum funding. The municipality of Stavanger provided additional funding to retrofit OK19.
- geographical** Stavanger. Located in Olav Kyrres Gate 19
- social** Contribution to carbon reduction targets for 2030
- partners** Stavanger Municipality / Norconsult / Dansk Kloak Renoveringsteknik / Norwegian Pipeline Drilling / Klimaservice / DNF

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