Energy Efficient Pump Solutions in Waste-to-Energy Facility for District Heating

Energy recovery from waste in general is a very good idea

JOB RAPPORT

1 ton of waste can be converted to 2 MWh heat and 2/3 MWh electricity. Using waste as fuel for district heating is both a good idea for the environment and for financial aspects: Waste is always an available "fuel", where prices are not fluctuating.

Denmark holds strong experience and competences for use of surplus heat from the Waste-to-Energy Plants. 29% of all waste in Denmark is incinerated (61% is being recycled). The Incineration/Waste-to-Energy plants supply approx. 20% of the district heating as well as 5% of the electricity in Denmark.

"AffaldVarme Aarhus" is the management company responsible for handling waste and district heating

in Aarhus (the 2nd largest city in Denmark). It is part of Aarhus Municipality. The facilities of this company, play an important role in relation to the overall environmental targets in Aarhus.

Developing the district heating supply system and optimizing the waste systems will ensure that targets can be achieved within the energy, environment, and climate arena. Since 1980, "AffaldVarme Aarhus" and consumer-owned CHP plants, have co-operated in targeting 90% of the heat demand. The target has been reached, and today 285,000 of the 300,000 citizens in the area are provided with district heating.

They are also responsible for the running and maintenance of the transmission system including the boiler plant, heat exchanger, pumping station etc.

The district heating network in the Aarhus area consists of 2,000 km of pre-insulated pipework.

DESMI Pumping Technology A/S is a leading, international pump manufacturer for district energy. In May 2013 DESMI supplied "AffaldVarme Aarhus" a large end-suction NSLH centrifugal pump for the transmission pipeline system: Pump model NSLH300-525, 1100 m3/h at 115 mWC, 500 kW, 4-pole motor, pressure-tested up to 37.5 bar.

The DESMI retrofit solution was chosen on the basis of: High efficiency and improved operating economy due to DESMI's innovative hydraulic design compounded by the application of an internal coating reducing friction losses. Ease of maintenance, as the unit is close coupled and makes the replacement of bearings and the mechanical seal more manageable.

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The direct energy saving consequences of this solution: A minimum saving of 224,000 kWh per year compared to that of the replaced pump. This results in a dramatically short pay-back period giving a quick return on initial investment.

It goes to show that selection of key equipment with particular focus on its energy efficiency (and long life cycle) is very important both on new built facilities and for retro-fit on existing plants where much improved energy efficiencies can be obtained.

DESMI has also supplied energy efficient pump solutions to two of the other main Waste-to-Energy plants in Denmark: “Vestforbrænding” and “Nordforbrænding” in Copenhagen.
”Vestforbrænding” is the biggest producer and distributor of waste-to-energy based district heating:
In 2012, 520,000 tons of waste was incinerated (from a population of approx. 900,000 as well as 60,000 companies). At the incineration in 2012, 1,114,000 MWh of district heating was produced – along with 249,000 MWh of electricity. Enough for heating up approx. 80,000 households – as well as the power supply for approx. 75,000 homes.

“Vestforbrænding”, Waste-to-Energy Plant, Copenhagen

DESMI has supplied many pumps to this facility: Mainly vertical in-line centrifugal pumps model: NSL 200-415B/A12 & NSL 125-330 + 110 kW