

High efficiency

Combined Heat and Power plant (CHP)



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BWSC 

GRAM FJERNVARMECENTRAL

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Background

In order to fulfil the Danish government's directives for decentralized energy production and still be able to offer lowest possible prices of district heating, the management of the Gram District Heating Company decided, in the Spring of 1995, to exchange the existing coal-fired boiler installation with a new natural gas-fired engine-based combined heat and power plant, including new peak load and back-up boilers.

The heating company is a non-profit consumer owned cooperation with the purpose of producing reliable supply of hot water for heating of mainly private houses.

Consultants

Høy & Jessen, Consulting Engineers, was the planner and consultant engineer for the entire project with Sydenergi A/S as representative for the commissioning of the plant.

Turnkey Contractor

Burmeister & Wain Scandinavian Contractor A/S was the turnkey contractor for the entire CHP plant.

Project Specification

The plant is based upon 1 Wärtsilä 18V34SG lean-burn gas engine. The engine outputs are 5,312 kW_e and 6,508 kW_h which gives a total efficiency of 91.2%. The power produced is sold to the public grid at 15 kV level. For back-up and peak load heat production, 2 x 5 MW gas fired boilers are installed.

Installation Supplied

The plant is designed with a view to obtain the lowest possible net price of heating combined with high reliability for the consumers. The plant is connected to the existing district heating system via a new pipeline.

The heating system is designed to ensure constant temperature to the turbo-charger inlets. It is thereby ensured that the engine will be in full operation at any climatic condition prevailing in Denmark.

Heat accumulation in the 2,200 m³ heat storage tank will ensure that the engine is only operated during hours when the electricity produced can be sold at the premium rate.

The plant is controlled, regulated and supervised automatically by a PLC-based system. Control includes automatic start-up and optimized electricity production based upon graduated tariffs and current heating requirements.

Delivery

The delivery time for the complete CHP plant was 10 months from the date of signing the contract in March 1995 so that the plant was ready for commercial operation in February 1996.



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