Experience with utilization of waste heat in Odense, Denmark
Case: Facebook datacenter and TBV heat pump plant

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Kim Winther – Head of Business Development
Key facts about Fjernvarme Fyn (District Heating Funen)

- Fjernvarme Fyn is a shareholders company owned by the municipalities of Odense and North Funen
- Annual turnover: 200 mio. Euro (Heat, electricity, waste incineration)
- 285 employees
- First heat from CHP in 1929

Our legal structure includes entire value chain

Targets:

- Top 3 on lowest price by Competitive development and cooperation along with automation and digitalization
- Phase out coal by 2025 by Stepwise installation of new technologies with synergies to existing units and a high level of electrification
Worlds largest district heating grid

Production:
- ~10,000 TJ heat and ~1,400,000 MWh power
- Coal 490/322 MW, straw 88/32 MW, waste 105/20 MW, wood chips 80/25 MW (heat/power)
- 22 small units, peak and backup (MW heat): Gas/oil 800 MW, surplus heat 19 MW

Distribution:
- 65,000 connections
- 120 km transmission lines (80-90 °C)
- 2200 km distribution lines (70-75 °C)
Waste heat are supporting our green transition

- Combination of large heat pumps with synergies to a CHP biomass unit and a large heat storage facility
- Peak load supplied by gas and power units
- Can be phased in in the period 2020-2025
Case: Facebook Data Center and TBV heat pump plant

Facts:
- Data center owned and operated by Facebook
- Heat pump plant Tietgenbyens Varme Central (TBV) owned and operated by Fjernvarme Fyn
- Data center and heat pump plant supplied by renewable energy
- 100,000 MWh surplus heat ~ 6900 households (6 pct. of distribution)
- 2017: Investment decision and detailed design of heat pump plant started
- 2019/2020: Operation of datacenter and heat pump plant

Source: www.facebook.com/OdenseDataCenter/
Situation map: Facebook, TBV, heat and power grid
Challenges related to the TBV project

Regulation
- Different regimes for cooling and heating
- Waste heat is taxed
- Donated heat is tax exempted for existing projects – but new regime introduces a low tax (1.5 Eur/GJ) with ISO 50001 certification

Commercial
- Waste heat is lower priority than data center main function and timeline
- Confidentiality vs high public awareness
- Waste heat has low value during summer season
- Advantage of TBV project: Facebook is located near district heating grid and Odense temperature is low (70-75 C)

Technical
- First large scale heat pump plant utilizing waste heat from datacenter in DK
- Hot air from servers are exchanged to water in closed loop
- Coordination
- Operation of heat pump central must not put data center cooling at risk
Kim Winther
Head of Business Development
kwi@fjernvarmefyn.dk
+ 45 40 23 64 32
www.fjernvarmefyn.dk