

THERMISCHE SPEICHER

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Einbindung von Grosswärmespeicherne in Dänemark

A FEW PICTURES.



Vojens - 13-05-2015

PRESENTATION.

- Flemming Ulbjerg. Senior Consultant.
 - Started working 1980. Buildings HVAC.
 - Medio 1990, gradually more and more district energy. Solar, heat pumps, CHP, storages etc.
 - Ramboll Energy, since 1989.
- Ramboll, a consultant with 14.000 employees.

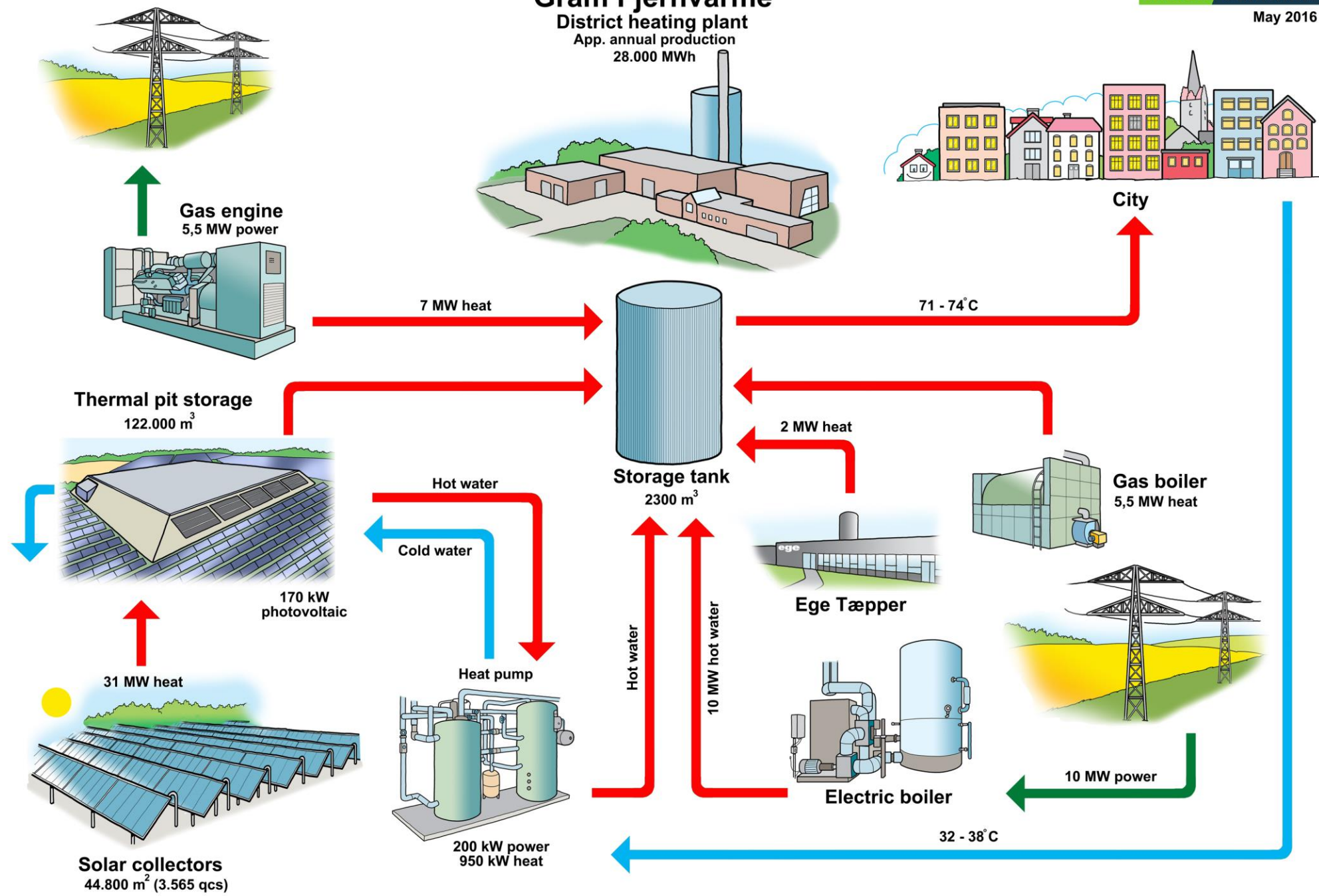
TES IN DENMARK, UNTIL NOW.

- Integration of:
 - Solar.
 - CHP (Natural gas)
 - Heat from electric boiler.
 - Boiler / absorption heat pump. (natural gas and biomass)
- Replacing:
 - Heat-only from natural gas.

Gram Fjernvarme

District heating plant

App. annual production
28.000 MWh



ADDITIONS AT EXISTING PLANTS.

- Surplus heat from industry / data. (When available)
- More electric heat pumps.

By implementing more heat from power, these plants are complete.

Preferable heat pumps.

Electric boilers makes a lot of sense.

IN THE PIPELINE FOR DISTRICT ENERGY.

Actually in predesign / detail design.

1. Larger PTES, where:
 1. No solar.
 2. Waste to energy, rejects heat in the summer.
 3. Bio CHP, grants gives low / even negative heat prices.
 4. Surplus heat from industry.
 5. Surplus heat from data centres.
 6. Surplus heat from cooling of buildings.
 1. Either building by building or district cooling.
2. Sizes: 0,5 up to 5 mio. m³ of water.

USE OF THE HEAT.

- Replace natural gas. (Denmark and f. ex. Baltic countries)
- Replace heat-only coal. (Germany)
- Replace CHP on coal etc. (Denmark)

OTHER PURPOSES.

- Diurnal cold storage in deserts regions. (Middle East etc.)
 - Cool at night instead of during the day.
 - Lower power prices, and lower ambient temperatures.

VIELEN DANKE