Roadmap on the Development of District Heating in Azerbaijan until 2020

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BUILDING PARTNERSHIPS FOR ENERGY SECURITY

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• Extraction CHP the most efficient form of heat production and more efficient than heat pumps!
• Accumulators to balance supply and demand and maximize value to generator and customer
• Located close to heat markets
• Heat led operation
Danish District Heating Sector

DENMARK

- Energy Production Companies
  - District Heating Companies
  - The Energy Appeal Board (private)

- Ministry of Climate Energy and Building

- Danish Energy Agency
- Municipalities
- Danish Energy Board of Appeal

Nordic Electricity Regulator (NordREG)
European Regulators Group for El. and Gas
Danish District Heating Sector

- 5.4 million inhabitants
- 50,000 km. district heating pipes all over Denmark.
- 62 pct. of all houses DH-heated
- Average heat consumption: 8.3 MWh per person per year.
- District Heating = 17% of DK’s final energy demand.
- Annual turn-over of DH: 2.8 Billion US$ (= ¾ % of GDP).
- Direct Employment = 10,200 persons at plants and suppliers (indirect employment = 25,000).
Danish District Heating Sector

- Till the 1980’s most DH was produced as a by-product from electricity around the cities.
- In the 1980’s and -90’s most new DH was a main-product. Produced as DH or CHP in towns.
- The share of DH doubled from 1980. Today 1.7 mio. houses supplied with DH.
Centralized and Integrated Systems
Example Capital Copenhagen

- 18 municipalities, 500,000 customers, 8.25 million GWh,
- 98% connection rate
- 4 integrated systems, transmission companies sell heat to distribution companies
- Pool system, large central producers, many peaking plants
System Centralization and Integration
VEKS Phase 0

1985

Waste Incineration plant

Local heat plants (Oil, coal)

Local heat plants (oil)
System Centralization and Integration
VEKS Phase 1

CTR

Pump station

Waste Incineration plant

Pump station

Heat exchanger stations

Local heat plants (Oil, coal)

1987

Local heat plants (oil)
System Centralization and Integration

VEKS Phase 2

Avedøreværket
CHP Plant

Heat exchanger stations

AMV
HCV
CHP Plant

Waste Incineration plant

Local heat plants
(Oil, coal)

Pump station

VEKS Today
125,000 – 150,000 households
104 km double-pipes; ø100 - ø800
44 exchanger stations
26 local heat plants (peak- and reserve loads)
7 pumping stations
20 customers; district heating companies
Load dispatch
Variable flow regime
Heat Accumulation

Practically all CHP plants in Denmark are equipped with heat accumulators.

*Heat accumulators at Avedøre Power Station.*
Height 50 m, Diameter 26 m,
2 x 22,000 m³, 2x 2,000 Gcal,
Pressurized heat accumulator, 120 deg C

Source: Heat Plan Denmark, Ramboll
Coordination and Cooperation
Roadmap to 2050 for Danish Heating Sector

Heating sector almost CO₂ neutral by 2030
Delivered through increased DH and heat pumps
Phasing out of individual boilers

Heat supply of the building stock
Modest development

Historical
Projection

Source: Heat Plan Denmark, Ramboll
Roadmap to 2050 for Danish Heating Sector

Waste incineration CHP and fossil fuel CHP continuing as predominant sources

Growth in biomass CHP, not biomass boilers

Deploying heat pumps and electric boilers to harness wind, geothermal and low grade industrial heat

Phasing out of gas engine CHP and fossil fuel boilers

Solar thermal district heating
Almost CO2 neutral in 2035

CH281000-9146 1980-2050

CO2-emissions
Modest development

Historical  Projection

CO2-emission, district heating
CO2-emission individual
CO2-emission total

Almost CO2 neutral in 2035

Source: Heat Plan Denmark, Ramboll
District cooling in Denmark

Downtown Copenhagen has district cooling today:
Major shopping centres, and banks with large server rooms among customers

Benefits include:
Space savings
No noise
Simple operation
Low environmental impact

Electricity savings potential:
60,000,000 kWh/year
Heat Planning in Denmark

Energy Infrastructure is **long term** investments
- Buildings ~ 100 years
- District energy ~ 50 years
- Power plants ~ 40 years
- Boilers ~ 25 years

Political cycles are short ~ 4 years
- Political consensus needed
- Leads to stable frameworks
- Investor certainty

Cooperation usually leads to far better solutions!

It doesn’t matter if you’re smart and green, we all have to be smart and green
Zones for Heat Systems in Denmark
Thank you for your attention!

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