INTEGRATION OF RENEWABLE ENERGY IN DANISH DISTRICT HEATING SYSTEMS

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DANISH DISTRICT HEATING ASSOCIATION

• Lobbying to promote and facilitate DH developments in Denmark and beyond

• Organizing co-operation between members
  – Common guidelines
  – Know-how groups
  – Networking
  – Communication

• Service to members
  – Operations
  – Training
  – Legal, economic etc. advice
MEMBERSHIP BASE

• 396 members representing 99% of national DH-sale
  – From 100 consumers in villages – 2 GWh/y
  – To 100,000 consumers in cities – 3,000 GWh/y

• 40 members are public utilities (approximately ½ of DH sales)
• 355 members are private cooperatives (other ½ of DH sales)
• 10 private companies (very little sold heat)
• 3 transmission companies
• 11 associated members
DANISH DISTRICT HEATING “FAMILY”

Danish District Heating Association
Association for Danish DH companies

Green Energy
Association btw. DDHA and industry, Think-tank, R&D projects, export of DHC concept

Danish District Heating IT-Company
Cooperatively owned by 258 DH companies, IT solutions for district heating companies

Danish District Heating Project Consultancy
Cooperatively owned by 83 DH companies, Engineering & consulting

Danish District Heating Trading Company
Cooperatively owned by 115 DH companies, Exchange for energy savings

Danish CHP Capacity – Being established
Will be cooperatively owned by clients (DH-companies), Capacity exchange for CHP

Danish Board of District Heating
Association with 57 members in DH-industry, Export of DH technology & services

FIF Marketing
Association 200 members in DH-industry, Promotion & marketing

Total staff of 100+ working for district heating and cooling in Denmark
DISTRIBUTION HEATING HISTORY

1960’s
- Growth on private and municipal initiative

1970’s
- Heating Commission
- Shift to surplus heat (CHP)

1980’s
- Heat law
- Heat planning
- Continued shift to CHP and other surplus heat sources
- Expansion of networks
- No more oil

1990’s
- Localised CHP
- Natural gas/biomass

2000’s
- Consolidation
- Looking for sustainable heat

2010’s
- Expansion
- Renewables
- Integration

From a burning platform in the 70’s…

…to newer versions!
HEAT SUPPLY ACT

Objective
“(1)….to promote the most socio-economic and environmentally friendly utilization of energy for heating buildings, supplying them with hot water and reduce the dependency of the energy system on oil.
(2) in agreement with the objectives mentioned in subsection (1), the supply of heat shall be organized with a view to promoting the highest possible degree of cogeneration of heat and power.”

Prices
“..can include necessary expenses for fuel, wages, and other operational costs, research activities, administrative and energy delivery costs as well as costs related to public service obligations including energy savings obligations […..], financing expenses and costs of the previous period, which accrued due to investments implementing or developing the energy networks”
RESIDENTIAL HEATING SOLUTIONS, 1981-2017

Source: StatBank Denmark, Statistics Denmark
HEAT MARKET SHARES, BUILDING TYPES AREAS 2014

Source: StatBank Denmark, Statistics Denmark
DANISH DISTRICT HEATING DEVELOPMENTS

Compositions of Fuels in District Heating Production

Source: Danish Energy Agency, Energy Statistic 2015
Future Fuel Composition – ”Official” Projections

Source: District heating - The role of district heating in future energy supply, COWI og Ea Energianalyse 2014 for Danish Energy Agency
DK-PARLIAMENT AGREEMENT 2012

Headlines for 2020
• More than 35 % RE in final energy
• 50 % wind, relative to electricity consumption
• 7.6 % reduction in gross energy consumption (comp. 2010)
• 34 % reduction greenhouse gas emissions (comp. 1990)

Specific for heating sector
• A ban on installation of oil-fired and gas-fired boilers in new buildings from 2013
• A halt to installation of oil-fired boilers in existing buildings from 2016 in areas with district heating or natural gas
• Conversion from coal to biomass at large-scale CHP plants
• An analysis of the future role of district heating in the energy system
PHASING OUT COAL FROM CHP

2017 biomass/waste

100 % biomass in:
2020
2016
2023
2/3 biomass & waste
CARBON NEUTRAL CAPITAL

MAJOR GOALS FOR 2025

// DISTRICT HEATING IN COPENHAGEN IS CARBON NEUTRAL.
// ELECTRICITY PRODUCTION IS BASED ON WIND AND BIOMASS AND EXCEEDS TOTAL ELECTRICITY CONSUMPTION IN COPENHAGEN.
// PLASTIC WASTE FROM HOUSEHOLDS AND BUSINESSES IS SEPARATED.
// BIOGASIFICATION OF ORGANIC WASTE.

SHARE OF TOTAL CARBON REDUCTION

- Energy Consumption: 74%
- Energy Production: 11%
- Green Mobility: 6%
- City administration initiatives: 2%
- New initiatives: 7%
DEVELOPMENTS IN SOLAR THERMAL DISTRICT HEATING
Using a large pit storage and a heat pump we can allow 50% of solar energy in our system.
DEVELOPMENT IN HEAT PUMPS IN DH
INTEGRATION

In a smart energy system, “energy scavengers” in district heating will deliver degrees of efficiency to the system.
FOR FURTHER INFORMATION

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