Comprehensive Assessment, efficient DHC, Denmark

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Key goals of the policy

- **Milestones up to 2050:**

The government's energy policy milestones up to 2050

In order to secure 100 pct. renewable energy in 2050 the government has several energy policy milestones in the years 2020, 2030 and 2035. These milestones are each a step in the right direction, securing progress towards 2050.

2020	2030	2035	2050
Half of the traditional consumptions of electricity is covered by wind power	Coal is phased out from Danish power plants Oil burners phased out	The electricity and heat supply covered by renewable energy	All energy supply – electricity, heat, industry and transport – is covered by renewable energy

The initiatives up to 2020 will result in a greenhouse gas reduction by 35 pct. in relation to 1990.

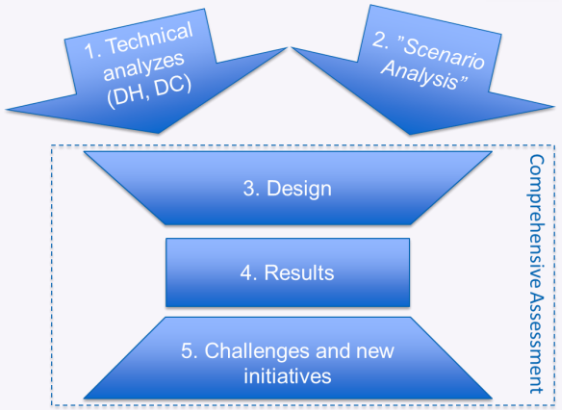
- **Energy agreement, March 2012**

These are the headline results for 2020:

2020

- More than 35% renewable energy in final energy consumption
- Approximately 50% of electricity consumption to be supplied by wind power
- 7.6% reduction in gross energy consumption in relation to 2010
- 34% reduction in greenhouse gas emissions in relation to 1990

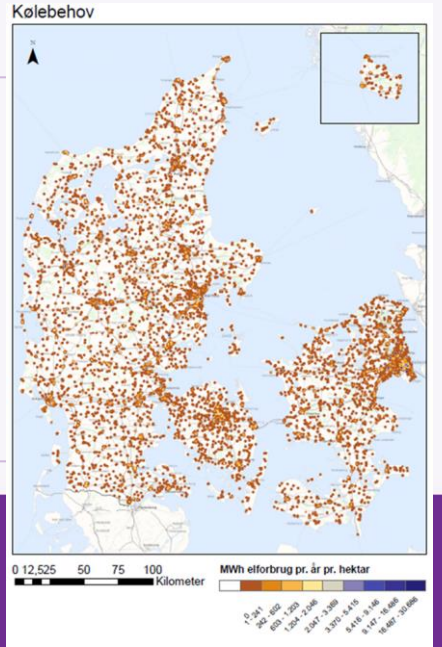
Critical success factors



Innovation

District cooling (DC) analysis

- **Large untapped potential**
  - Economically competitive and technically feasible
  - Smart grid advantages
  - Possible synergy with district heating (DH)
- **Main barriers:** knowledge, organization and regulation



May 2016

Outcomes

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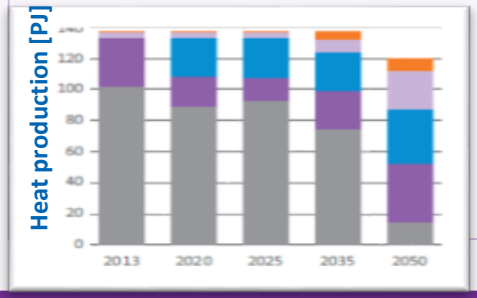
Key achievements

A cross sectoral scenario analysis:

- Aims to present possible technical paths to a fossil-free energy system by 2050
- Scenarios: Wind, biomass, hydrogen, Bio+ and "Reference"
- Method: For each scenario, the most cost-efficient energy system in 2050 is constructed, hereafter back-casting to 2035 and 2020

Findings:

- Main direction wind vs. biomass to be decided post 2020 (current energy agreement in Parliament expires in 2020)
- DH will play a crucial role, DH-supply is expected to decrease (energy savings - despite more cons.)
  - ≈ 50% (199 PJ) of demand covered with DH (2013)
  - Potential for up to 70% (189 PJ) by 2020



Lesson learned

CHP:

- The roll of CHP will decrease in all circumstances
- Many plants have already few full-load hours
- Operation according to financial viability
- Current support schemes for CHP production (natural gas) expires by 2018

District heating:

- Ongoing assessment and decision of heat supply method:
  - This is regulated by the Heat Supply Act and socio economic criteria (CBA).
  - Close "race" between ind. NG-supply areas and DH – areas.
  - Individual solutions (e.g. bio-boilers and heat pumps) are becoming more competitive – especially for new dwellings.

District cooling:

- Large untapped potential
- New regulation put in place June 2014
- Development is monitored and further initiatives are considered by government

Further information

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Final comments

What has been achieved?

- **Better documentation and new knowledge:**
  - **Economic / financial viability of extension of DH systems** (competition with individual natural gas and heat pump alternatives)
  - **Economic optimised DH-production depends of overall development of Danish energy system.**
  - **Opportunities and barriers regarding development of DC**

Current and new initiatives:

- **Ongoing analysis of energy taxation and support schemes to support green transition**
- **Geothermal potential being identified in 28 DH-markets**
- **Demonstration program and task force unit for large heat pumps in DH**
- **Enhanced economic efficiency in district heating (benchmarking etc.)**

Further information

- CA Denmark - report (English)
- Presentation CA efficient DHC - Denmark (CA-EED)
- Danish Energy Agency

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