The green transition in Denmark

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Danish Energy Agency

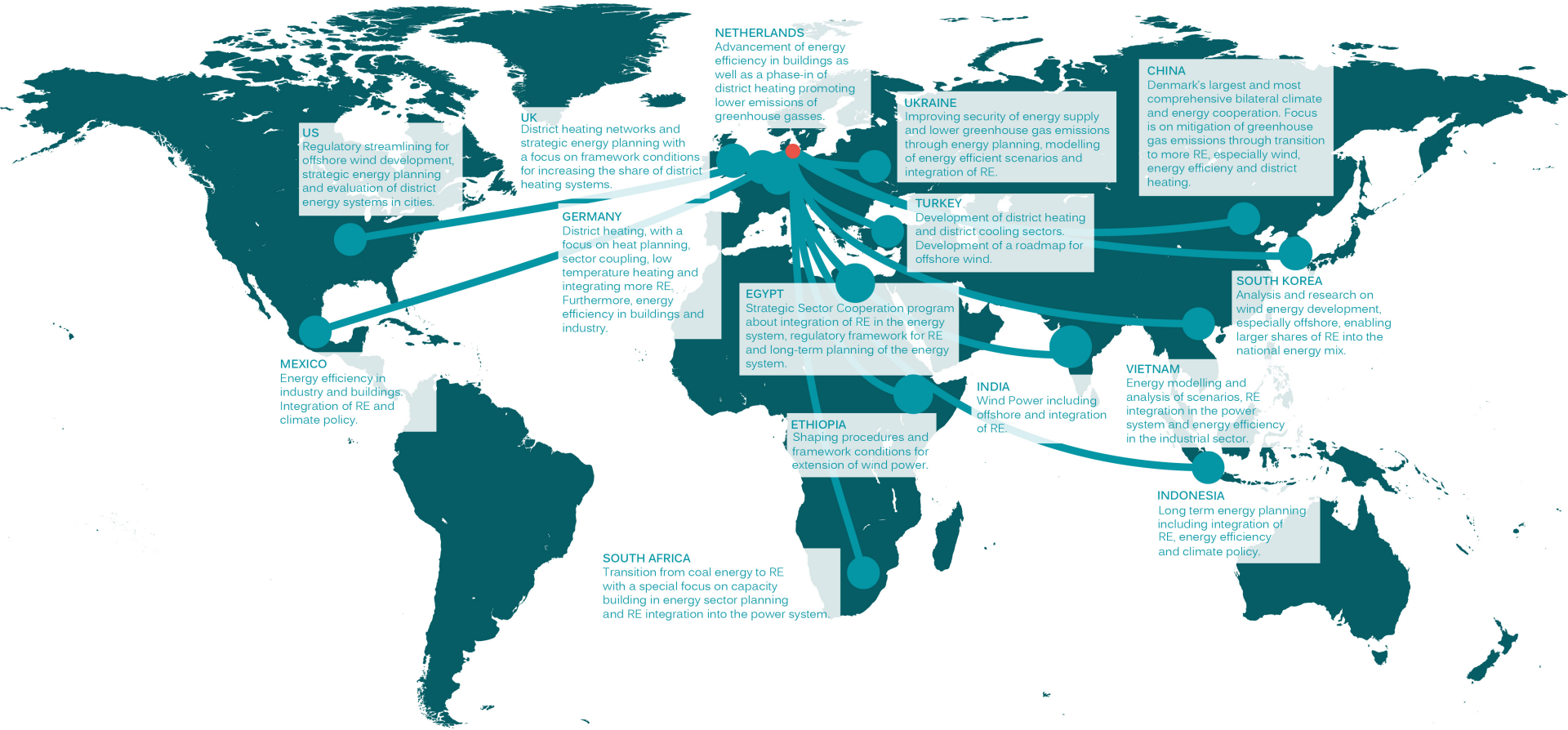
The Danish Energy Agency (DEA)

- The Energy Governance Partnership (EGP) is a strategic cooperation between
  - Danish Energy Agency *(part of Ministry of Climate, Energy and Utilities)*
  - Danish Ministry of Foreign Affairs
- Currently based in five countries
  - UK, Germany, The Netherlands, United States and South Korea
- UK focus on heat networks and energy efficiency in buildings
- Government funded for the next 5 years

MINISTRY OF FOREIGN AFFAIRS OF DENMARK
The Trade Council

Global Cooperation

15 partner countries



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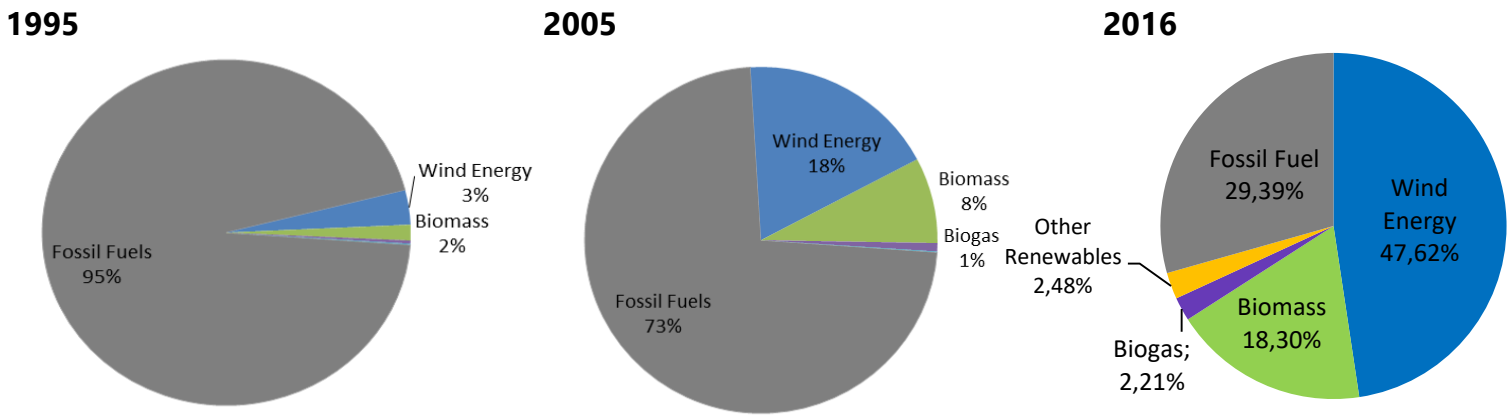
The Green Transition in Denmark

The green evolution of power production…



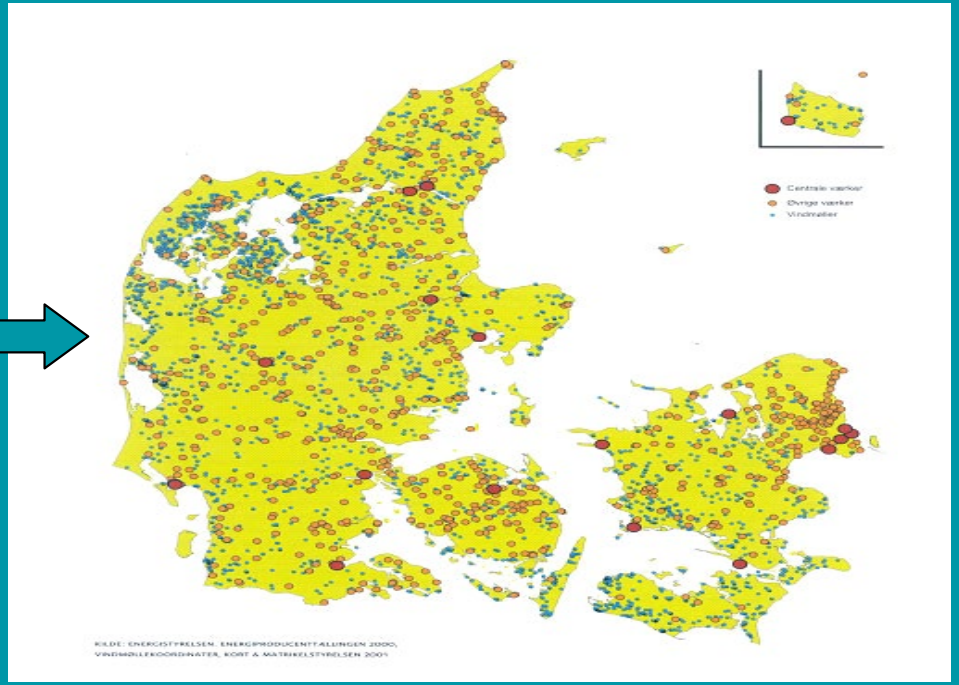
- Wind Energy
- Fossil Fuel
- Biomass
- Other Renewables
- Biogas

More and more **electricity production** from renewable energy

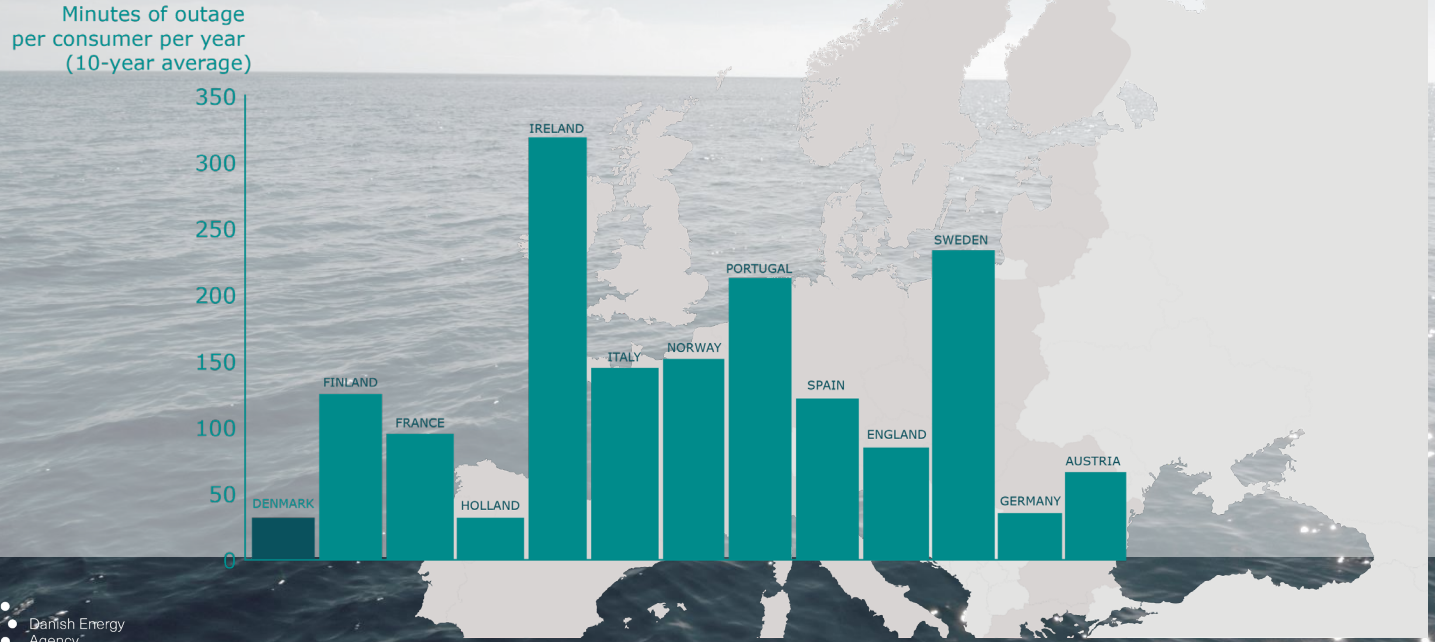
Through decentralization of the energy system…

Centralized power production in the mid 80's

Decentralized power production of today



.. While ensuring highest security of supply



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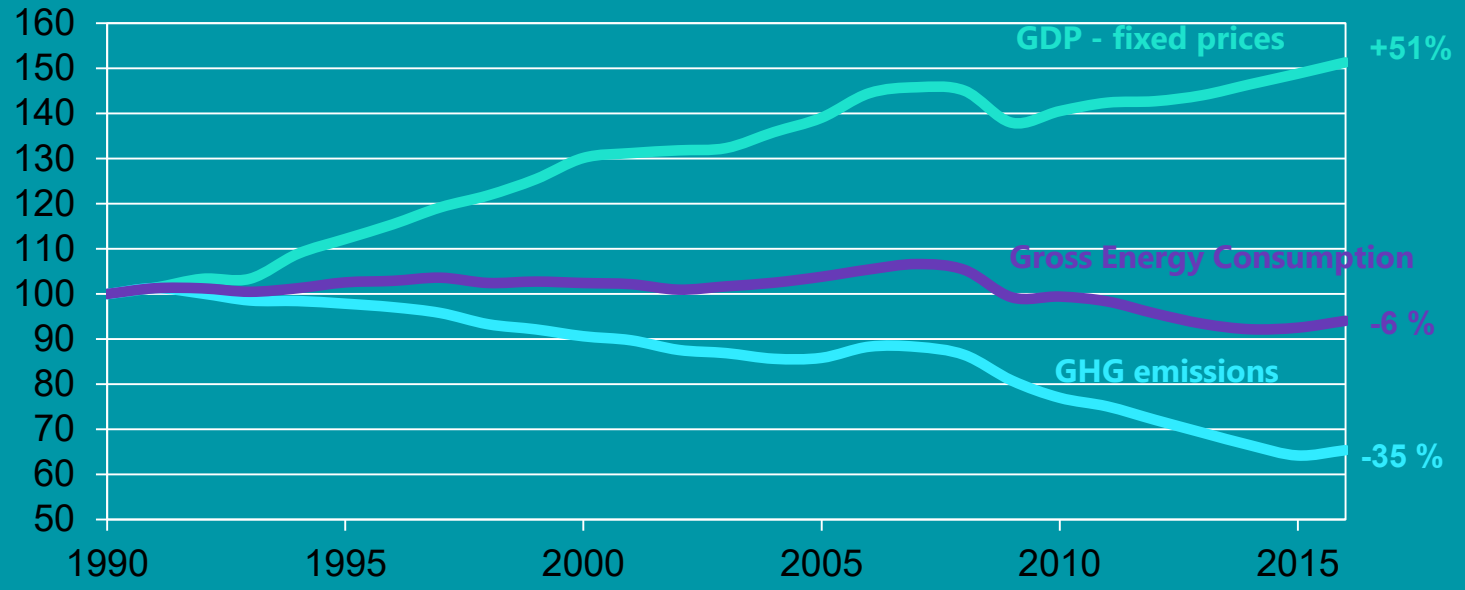
Green growth track record

Doing more with less



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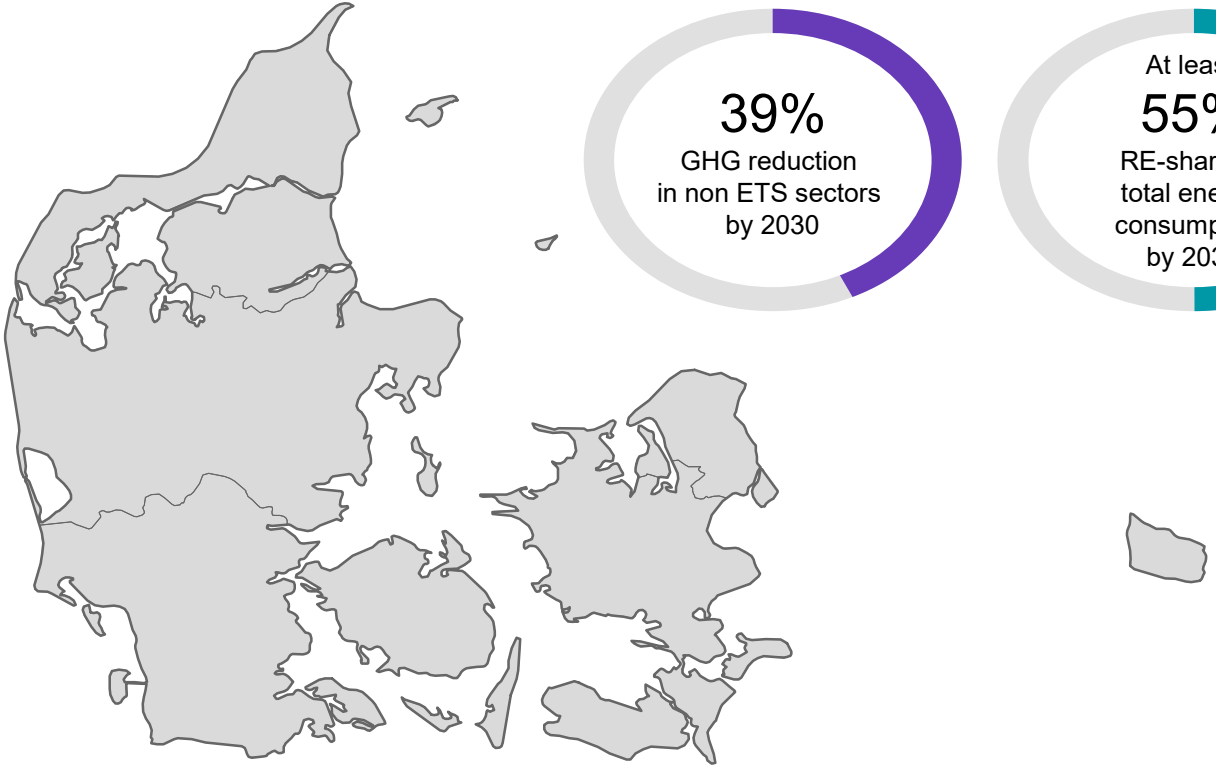
The current energy and climate policy in Denmark

The Future: ambitious climate targets



39%
GHG reduction
in non ETS sectors
by 2030

At least
55%
RE-share in
total energy
consumption
by 2030

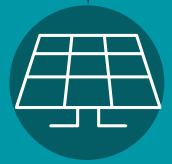
100%
Green electricity
by 2030

"Low-emission
-society" in 2050
Independence
from
fossil fuels

The 2018 Energy Agreement

Offshore Wind

By 2030, 3 offshore wind farms to be established with a total of additional 2400 MW.



Technology neutral tenders and biogas

Support for technology neutral tenders and for the expansion of biogas production

Energy efficiency

Creation of a market-based grant pool focused on energy savings

Energy and climate research

Further funding to energy and climate research

Transport

Focus on green transportation development

Taxation of electricity

Immediate relaxation of electricity and electric heating taxes

Heating sector

Modernization of the heating sector and enhancement of surplus heat.

New ambition for green policy in Denmark

- The Danish Government has increased the national CO2-emission target to 70 % reduction by 2030. The Government wants to be the Green Leader for the rest of the World and want to make this target binding through law

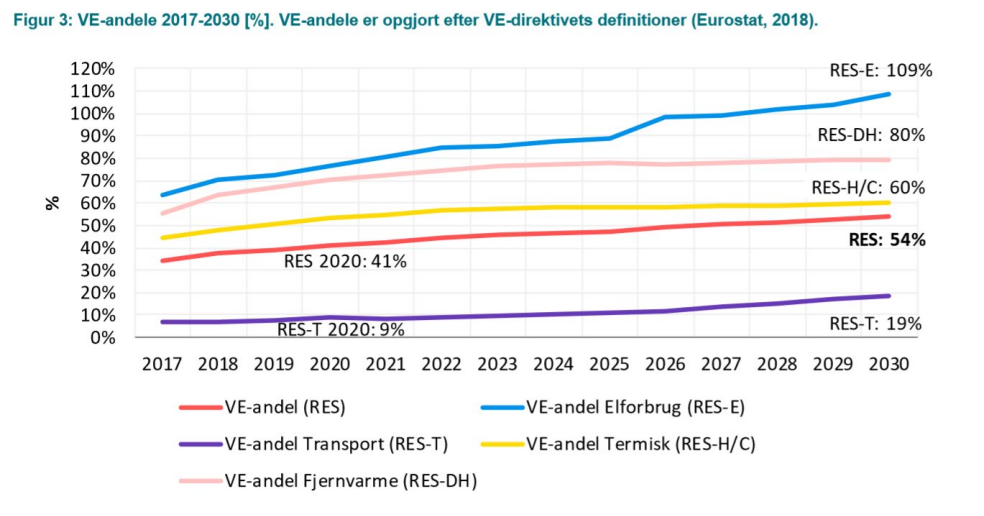
- The new Minister for Climate, Energy and Utility, Dan Jørgensen

- Denmark will strengthen the global cooperation and together create better framework conditions for private green investors in the global market

70 pct. by 2030 will require serious efforts

...but heating will not be the main challenge

- Danish Energy and Climate Outlook 2019
- BAU estimates 54 % RE by 2030
- District heating is estimated at 80 % RE, while power production will be at 109 % by 2030
- So heating will be a focus area but it can only take us part of the way



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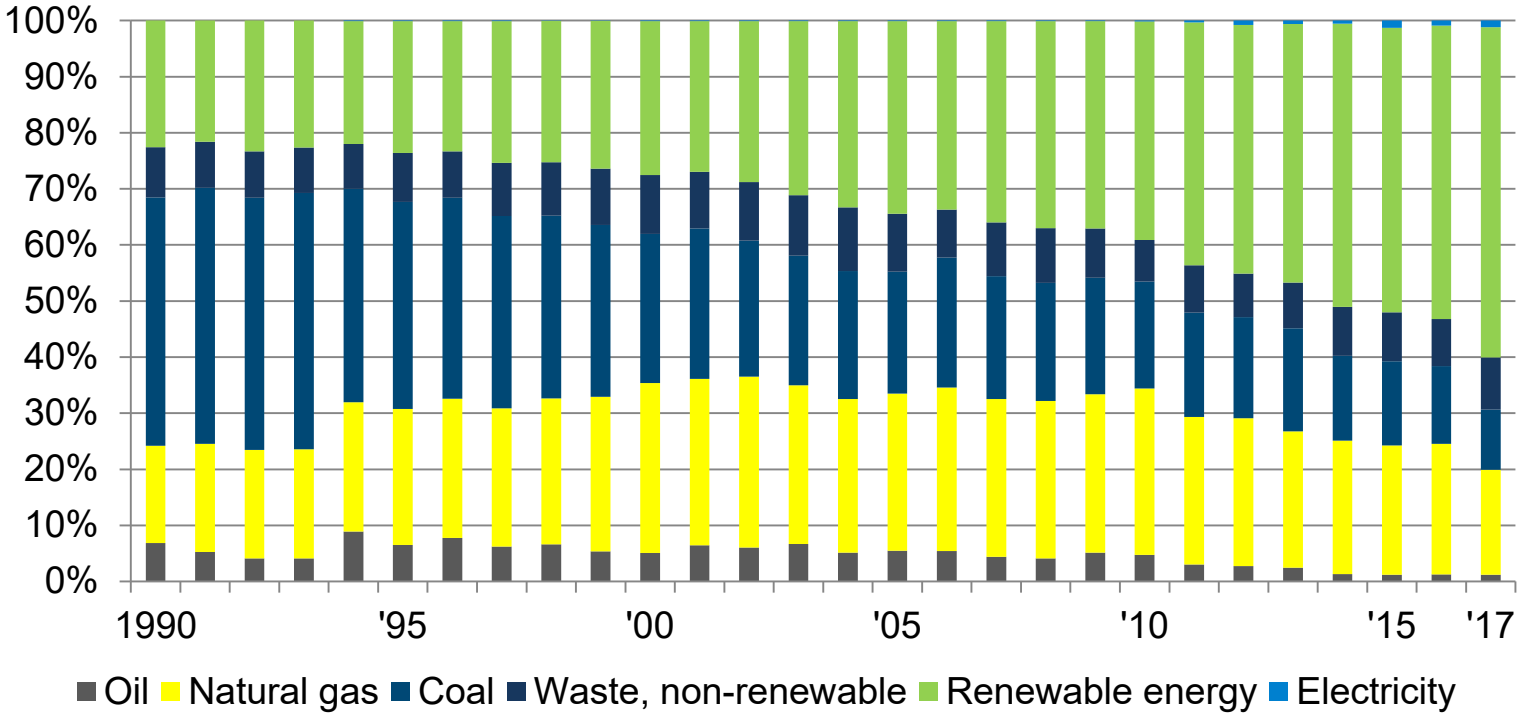
District heating in Denmark

The state of district heating

- 5.6 million inhabitants
- 33,000 km. district heating pipes (trench) all over Denmark.
- 64% 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 heat sale: 2½ billion Euro (= 2/3 % of GDP).
- Direct employment = 2,000 persons. 10,900 persons incl. suppliers.

District heating production by fuel



Policy drivers

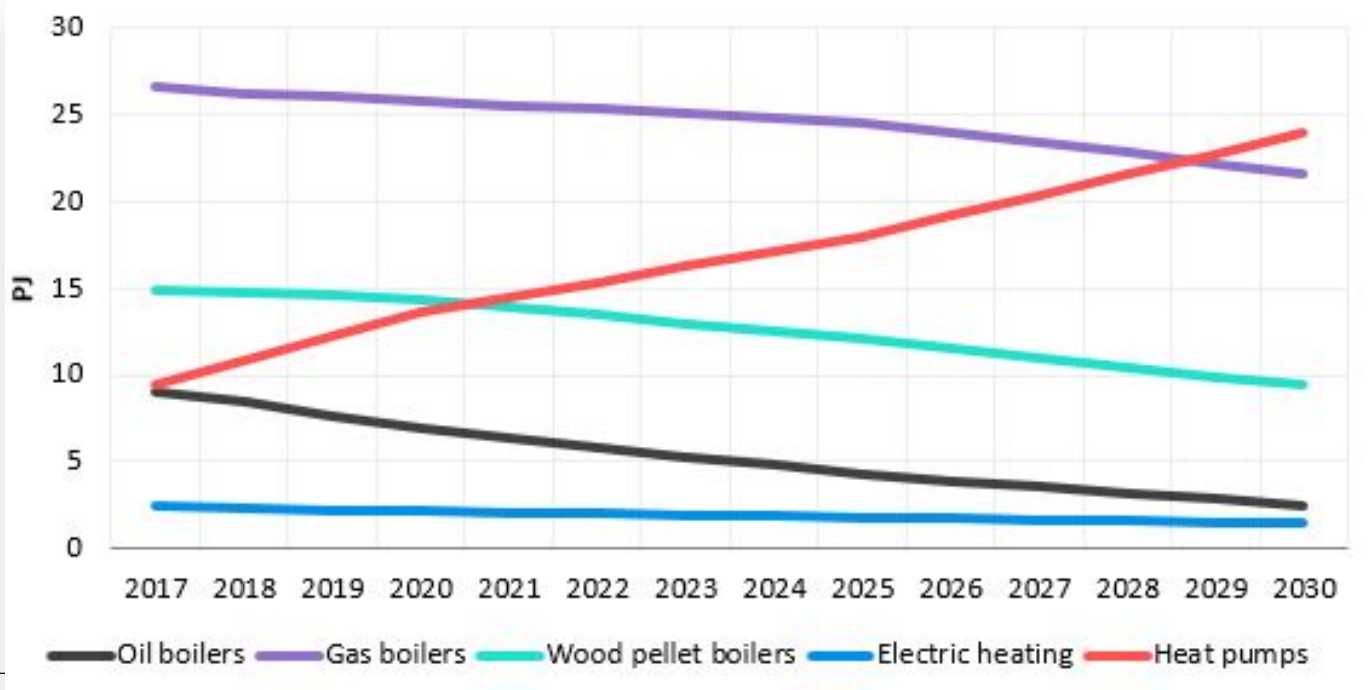
From planning to marked incentives

- The oil-crisis of the 70's created a demand for drastic changes to the heating sector in Denmark
- The main focus in the heat sector was to **diversify** and be more **effective**. Heat networks ticked both boxes.
- Through the 80's and 90's heat networks where deployed through a combination of ambitious coordinated public planning – and economic incentives.
- This period created the "back-bone" of most heat networks. Latter expansions has been within these areas or from extensions to nearby areas. The driver was mulititude of elements: planning, competitive prices – and comfort/quality of service
- Today public planning is less need = the pipes are already in the ground

…and those not connected to heat networks

- Many households already on individual RE. Changes primarily driven by economic incentives (taxes on the counter factual).
- ≈16 % of households still on the gas grid. Slowly changing to either heat networks or heat pumps, but unlikely to see massive changes by 2030.
- Oil boilers has proven difficult to incentivise
    - Decades with large potential savings (>+50% yearly)
    - Upfront cost a challenge (low property value)
    - Inconvinient
    - Badly insolated houses
- It's however estimated that the last oil boilers will (almost) disappear by 2030

Final energy consumption by households (DH is excluded)



District heating – Danish approaches

Socio-economics
- Methodology
- Value assumptions
- International approaches

Value of district heating
- Security of supply
- Trade barriers
- De-risking through diversification

Municipal planning
- What does it entail?
- How have different countries approached it?
- What are the necessary preconditions?

Regulation and history
- What 'problem' is district heating trying to solve?
- What lessons from other countries are relevant?

The role of institutions
- Government influence
- Forms of ownership (market v. politically controlled)

The future

- Forecasts 80% RE in heat networks by 2030 (BAU). 10 % of the remaining non-RE is related to waste incineration
- Heat pumps and biomass are today the cheapest option in both individual households and heat networks – but not everything is money
- Focus will therefore likely also be on integration with the wider energy system
    - Heat pumps and electric heaters creates valuable synergies with wind and solar pV
    - New surplus heat sources like data-centers is a whole new and large potential
    - The gas grid is important but too valuable for heating
- Still work to be done to reach the 70 % target in CO2 reductions

Thank you for your attention!

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