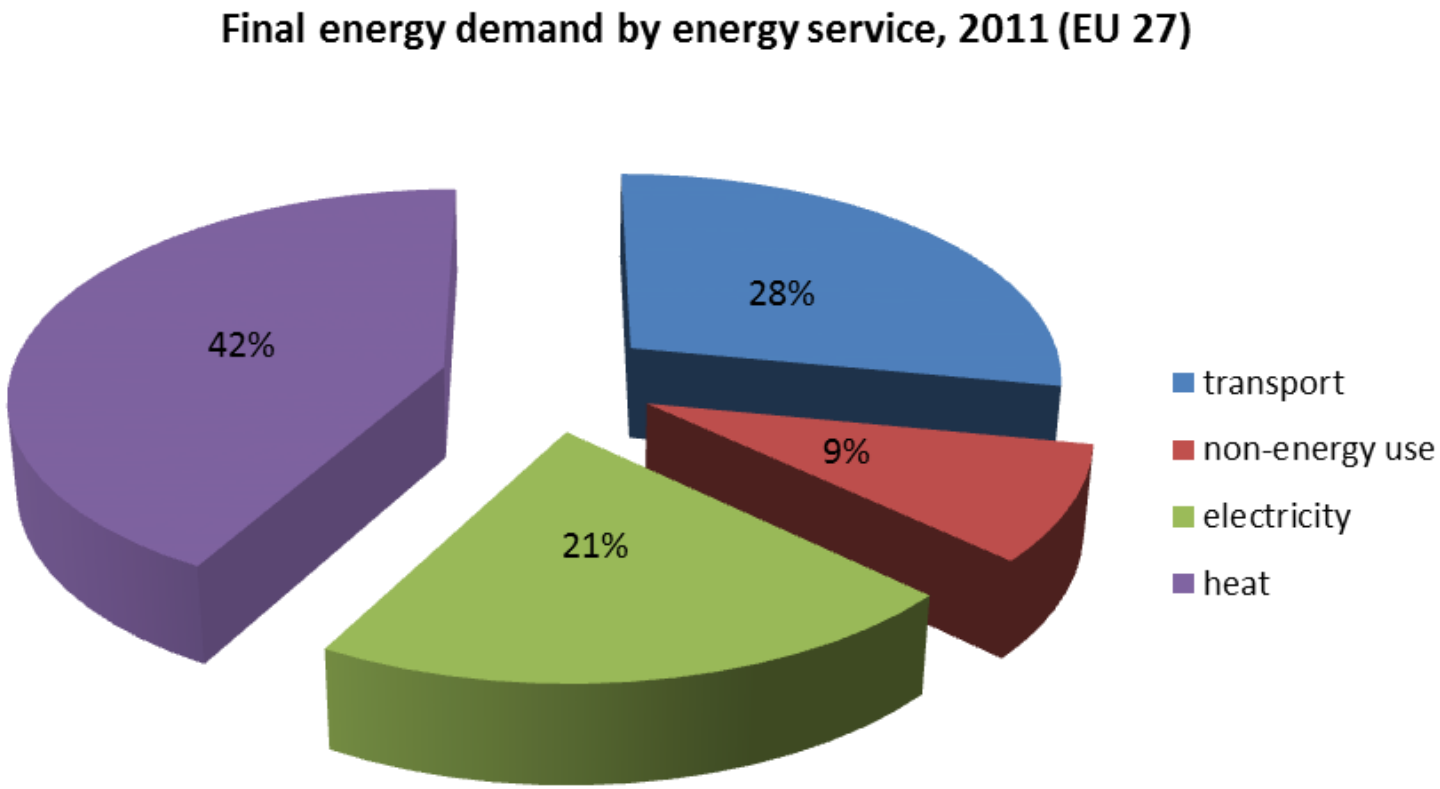
IEA-REWP, MARCH 28., 2017

DISTRICT HEATING DRIVING RENEWABLES AND DECARBONISATION

Birger Lauersen

DANISH DISTRICT HEATING ASSOCIATION

HEAT: THE ELEPHANT IN THE ROOM



Source: IEA, 2011

DANISH DISTRICT HEATING ASSOCIATION

DISTRICT HEATING HISTORY

1960's
- Growth on private cooperative and municipal initiative

1970's
- Energy crisis
- Heating Commission

1980's
- Heat law
- Heat planning
- Expansion of networks
- Shift to CHP and other surplus heat sources
- Phasing out oil

1990's
- Localised CHP on DKs North Sea N-gas
- Biomass

2000's
- Consolidation
- Looking for sustainable heat

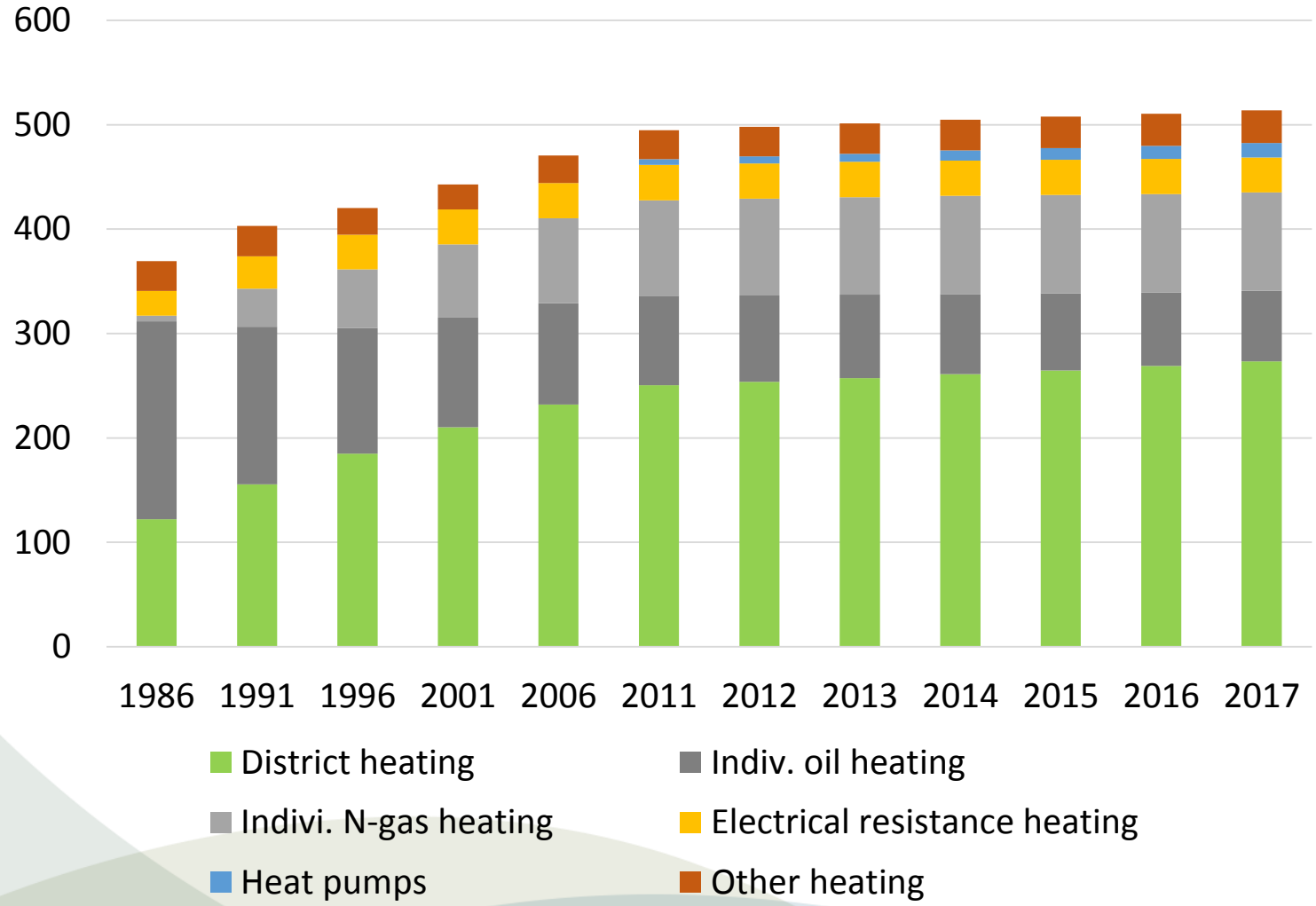
2010's
- Expansion
- Renewables
- Integration

From burning platforms in the 70's…

…to modern ones

DANISH DISTRICT HEATING ASSOCIATION

HEATING SOLUTIONS IN DENMARK -
MILLION M2 HEATED BUILDING AREA

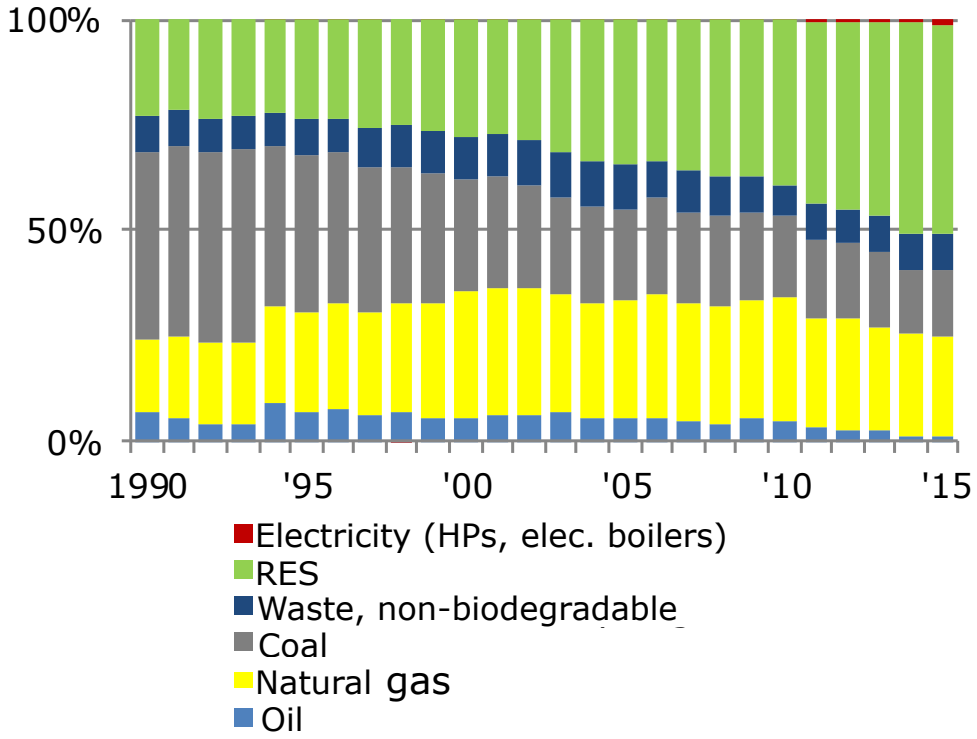


DANISH DISTRICT HEATING ASSOCIATION

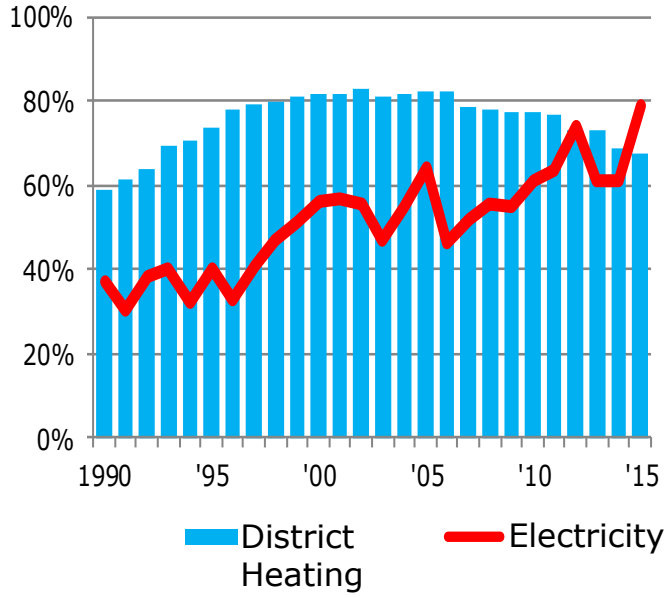
Source: StatBank Denmark, Statistics Denmark

DANISH DISTRICT HEATING DEVELOPMENTS I

Compositions of Fuels in District Heating Production



Share of CHP



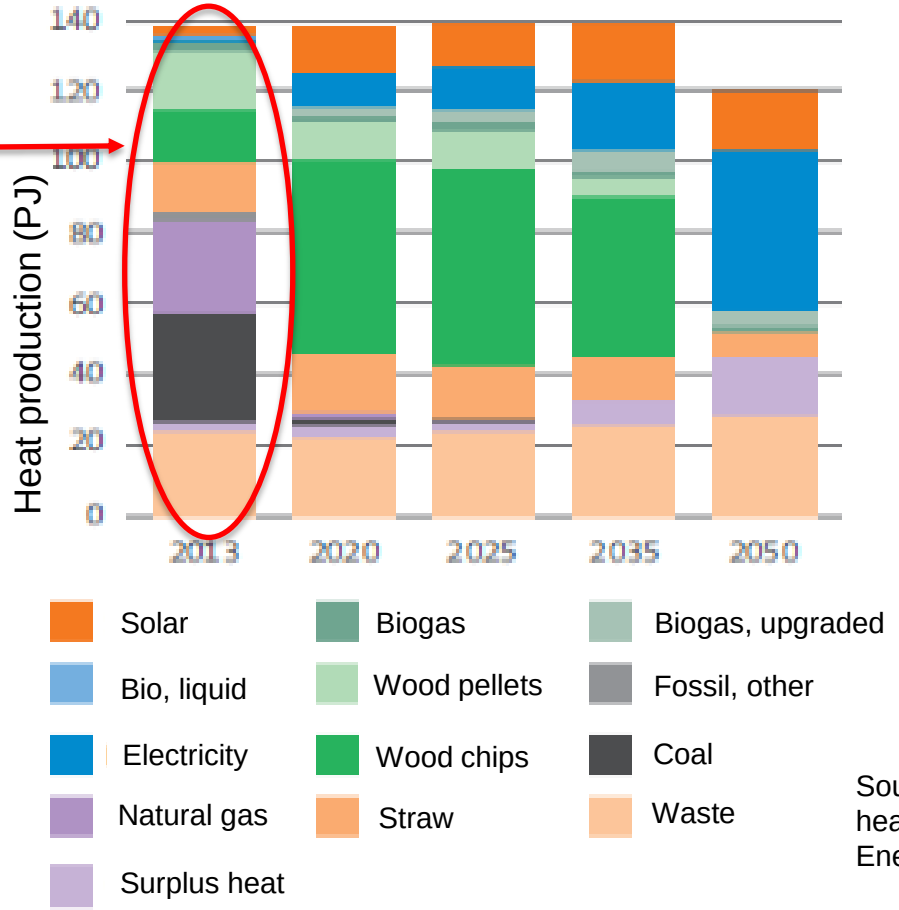
Source: Danish Energy Agency, Energy Statistic 2015

DANISH DISTRICT HEATING ASSOCIATION

DANISH DISTRICT HEATING DEVELOPMENTS II

Future Fuel Composition – ”Official” Projections

75 % waste heat



District heating production in Denmark in wind scenario

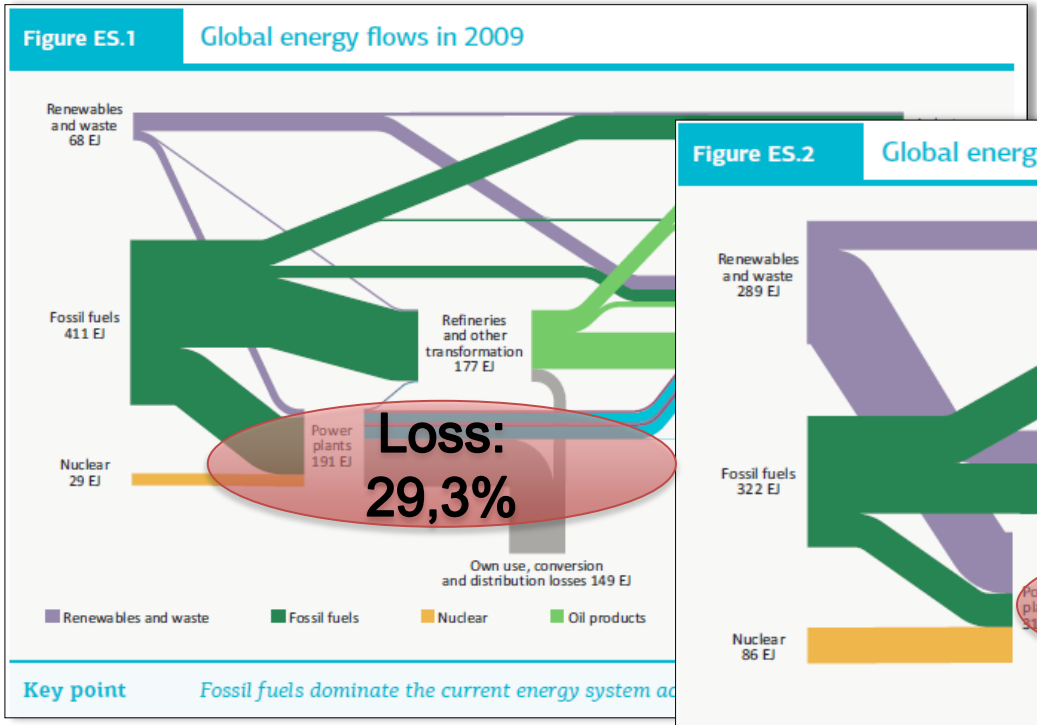
Changing 500 heat networks – not 808.000 (≈ 50 %) individual building heat installations!

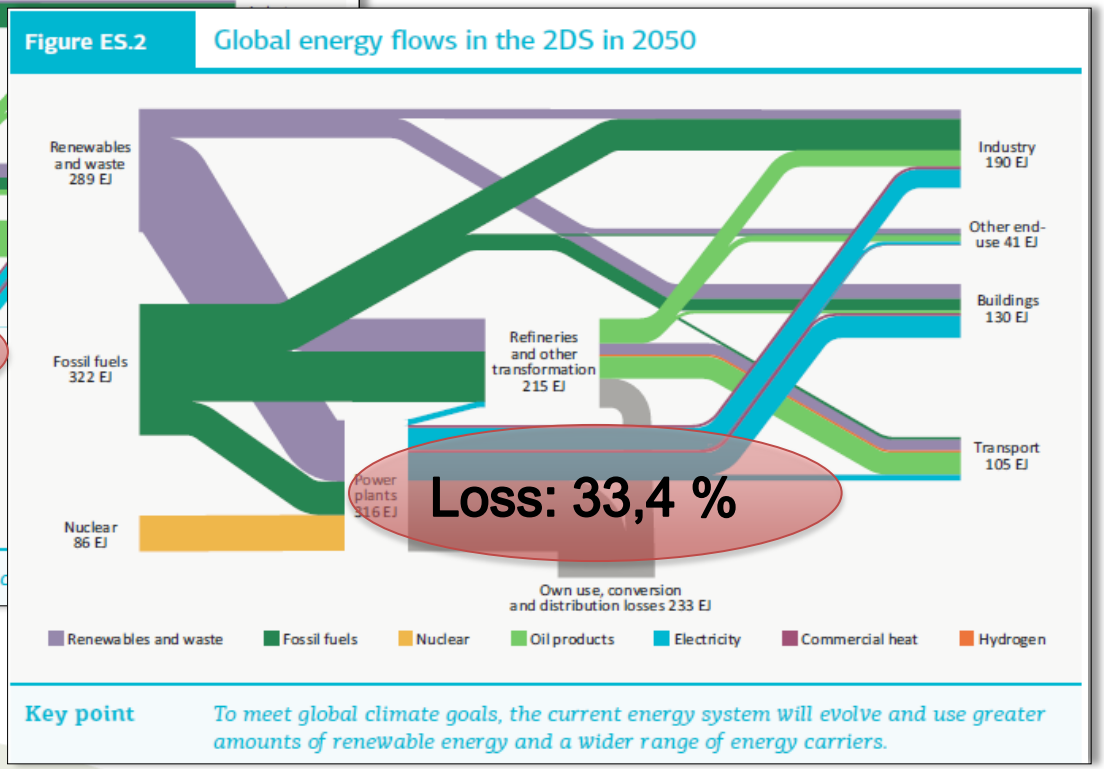
Source: District heating - The role of district heating in future energy supply, COWI og Ea Energianalyse 2014 for Danish Energy Agency

DANISH DISTRICT HEATING ASSOCIATION

WILL THE WORLD BECOME MORE ENERGY EFFICIENT?

Global Energy Flows 2009 & 2050

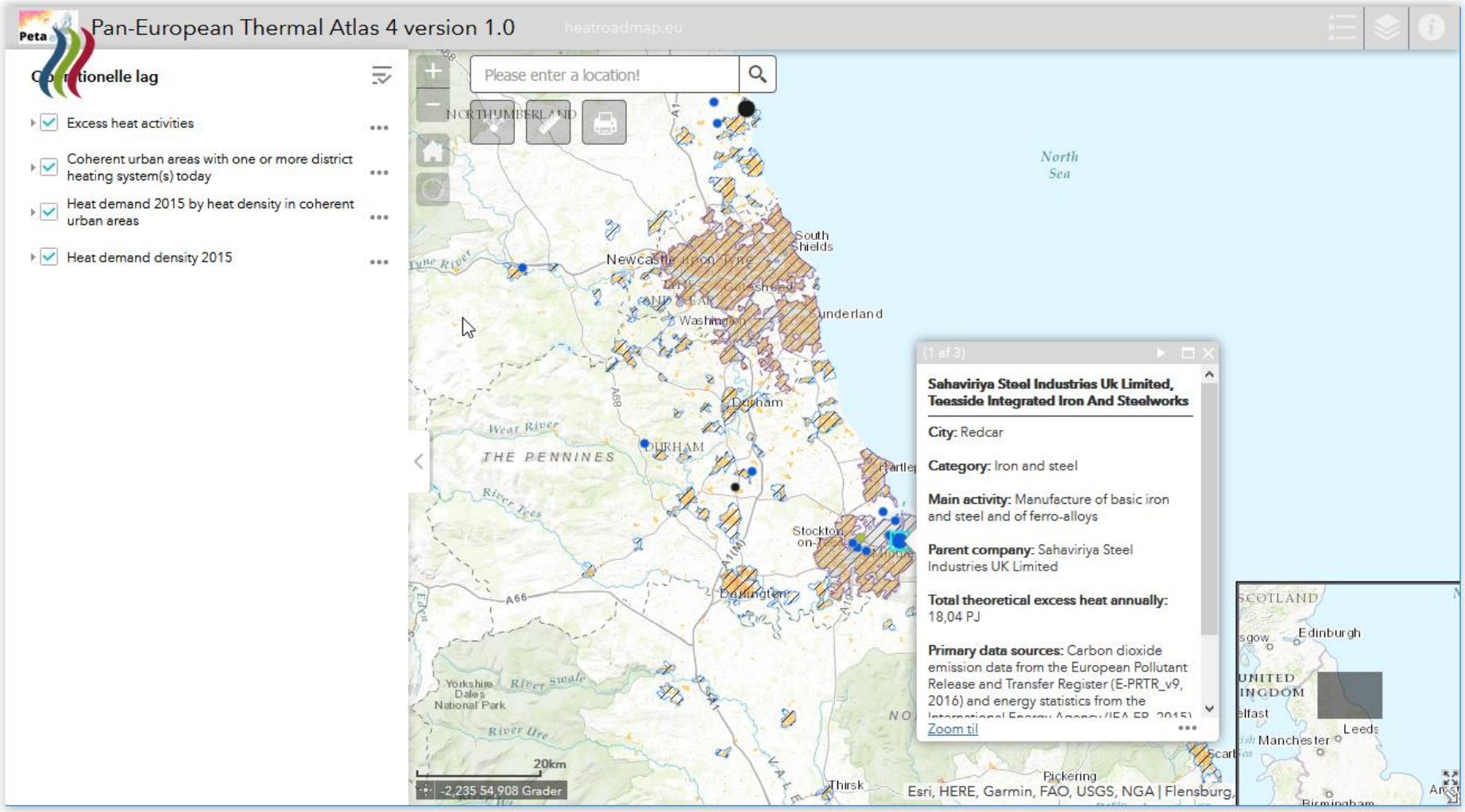




Source: IEA, Energy Technology Perspectives 2012

DANISH DISTRICT HEATING ASSOCIATION

HTTP://WWW.HEATROADMAP.EU/PETA4.PHP

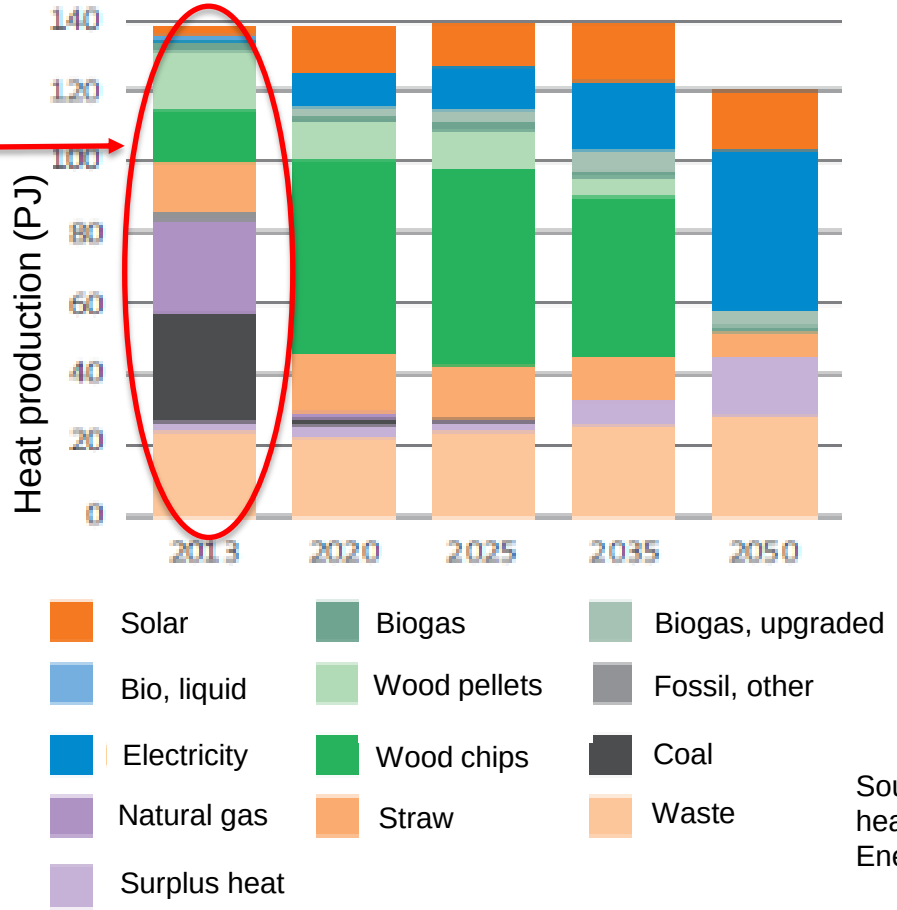


DANISH DISTRICT HEATING ASSOCIATION

DANISH DISTRICT HEATING DEVELOPMENTS II

Future Fuel Composition – ”Official” Projections

75 % waste heat



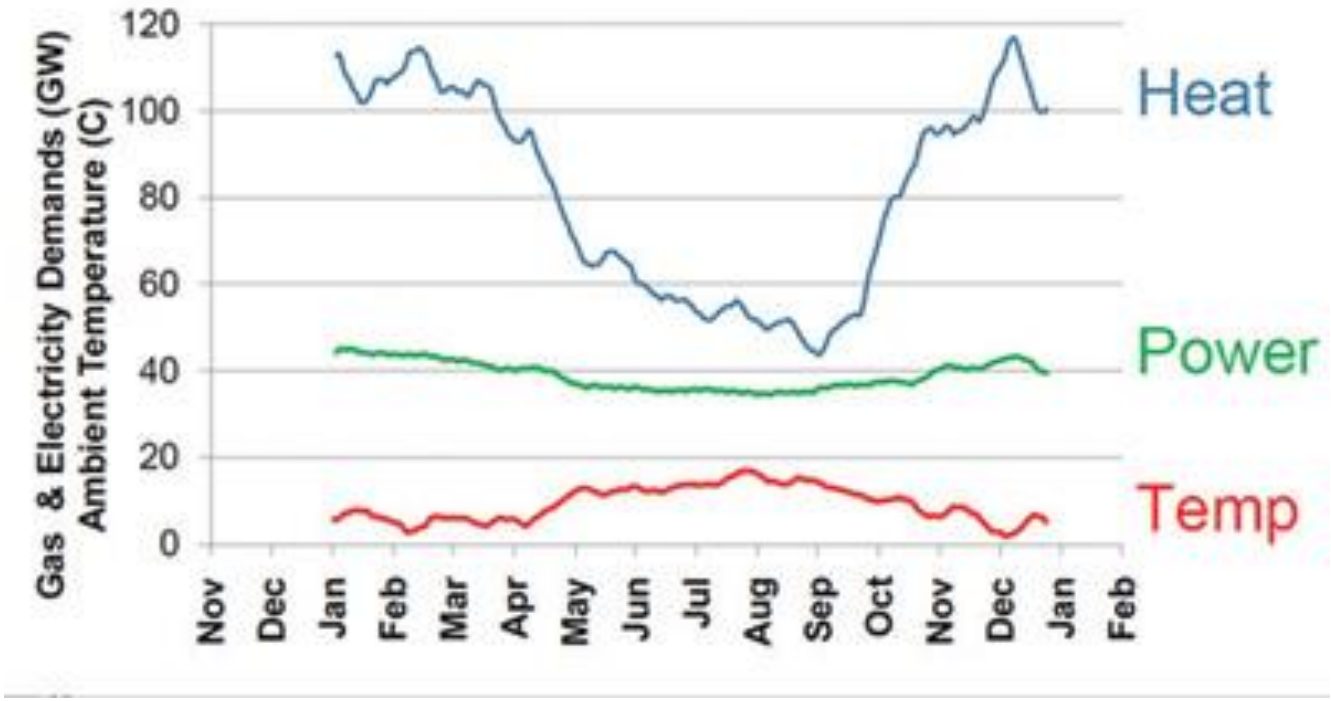
District heating production in Denmark in wind scenario

Changing 500 heat networks – not 808.000 (≈ 50 %) individual building heat installations!

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

DANISH DISTRICT HEATING ASSOCIATION

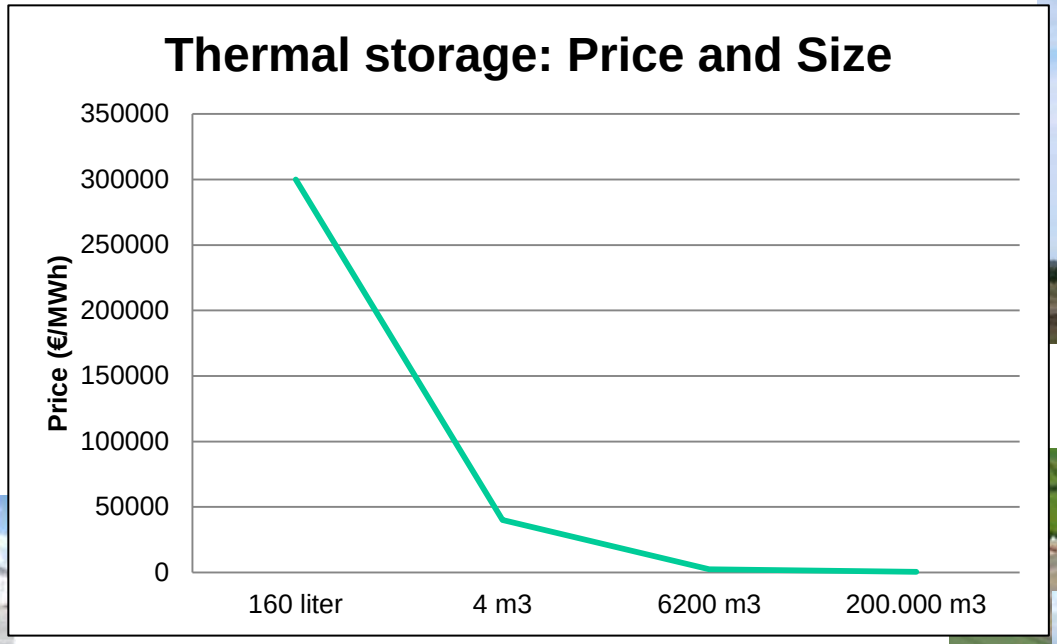
THE CHALLENGE – UK AS AN EXAMPLE



DANISH DISTRICT HEATING ASSOCIATION

THERMAL STORAGE OPTIONS

0.16 m3 Thermal Storage
300.000 €/MWh
(Private house: 160 liter for 15000 DKK)



6200 m3 Thermal Storage
2500 €/MWh
(Skagen: 6200 m3 for 5.4 mio. DKK)

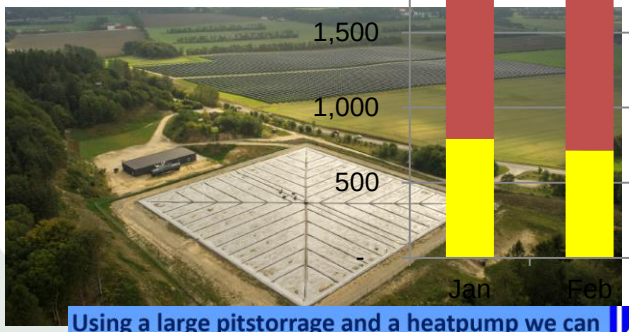
4 m3 Thermal Storage
40,000 €/MWh
(Private outdoor: 4000 m3 for 50,000 DKK)

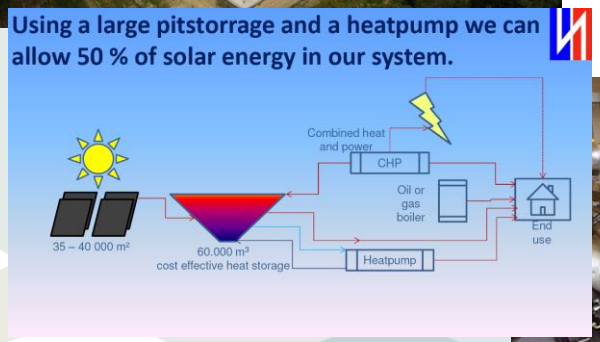
200,000 m3 Thermal Storage
500 €/MWh
(Vojens: 200,000 m3 for 30 mio. DKK)

Source: Professor Henrik Lund
Aalborg Universitet

DANISH DISTRICT HEATING ASSOCIATION

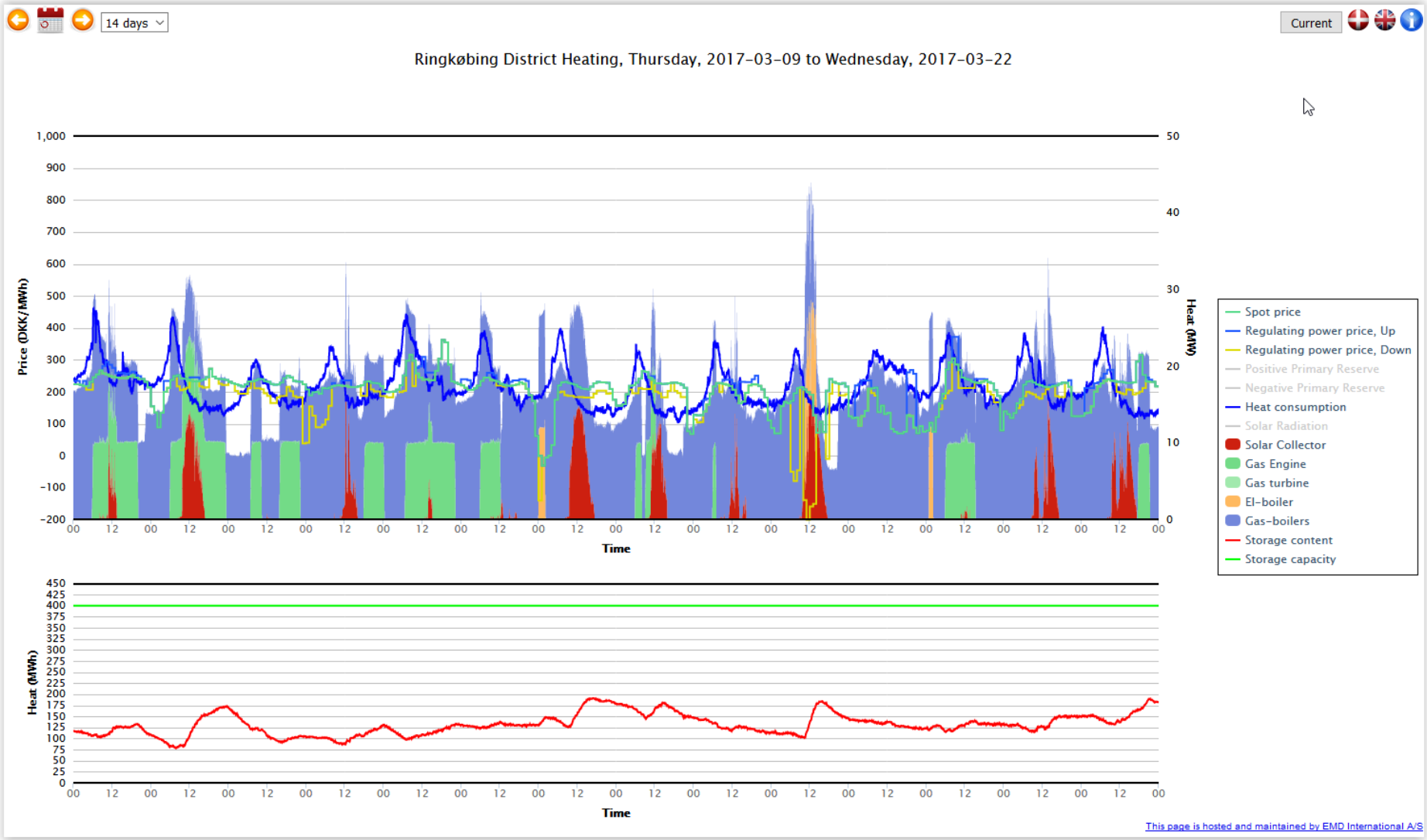
DRONNINGLUND DH, ENERGY SOURCES 2015





DANISH DISTRICT HEATING ASSOCIATION

FLEXIBILITY



http://www.emd.dk/plants/rfvv/

DANISH DISTRICT HEATING ASSOCIATION

KEY SUCCESS FACTORS IN DANISH DHC POLICY*

- Adequate national policy and regulatory environment
- Direct/indirect financial support
- Focused local policy and coherence with urban planning
- Alignment of interests / Cooperation maturity
- Availability and relevance of local resources
- Comprehensive project development
- Price competitiveness against alternative energy solutions
- Flexible heat and cold production
- Combining technical and non-technical innovation

* Taken from "*Efficient district heating and cooling systems in the EU - Case studies analysis, replicable key success factors and potential policy implications*" European Commission, JRC, 2016

DANISH DISTRICT HEATING ASSOCIATION

BENEFITS

Heat load aggregation facilitates

- use of available waste heat
- integration of renewables difficult to handle at building level/in urban settings (biomass, biogas, deep geothermal, large scale solar, biodegradable waste) – including the environmental issues
- benefits of scale in backup and peak capacity as well as storage
- flexible integration with electricity (and gas)

It empowers local authorities

It provides long term flexibility in the heat sector

CHALLENGES

Finding the (renewable) heat

What to do with those still on N-gas

DANISH DISTRICT HEATING ASSOCIATION

FOR FURTHER INFORMATION

Birger Lauersen
bl@danskfjernvarme.dk
+45 4028 3020

Danish District Heating Association
House of District Heating
Merkurvej 7
6000 Kolding
Denmark
Phone +45 7630 8000
Fax +45 7552 8962
mail@danskfjernvarme.dk

DANISH DISTRICT HEATING ASSOCIATION