



**MINISTRY OF FOREIGN AFFAIRS
OF DENMARK**

LESSONS FROM DENMARK: THE CASE FOR STRATEGIC HEAT NETWORKS IN VILLAGES, TOWNS AND CITIES

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November 2022

WHAT I'LL TALK ABOUT TODAY

WHY YOU SHOULD CARE ABOUT THE DANISH CASE STUDY

INTRODUCING SOME KEY DANISH POLICIES

WHAT DO WE MEAN BY STRATEGIC HEAT NETWORKS?

THE KEY MESSAGE FROM DENMARK

THE SIZE OF THE PRIZE: AN EXAMPLE OF A VERY BIG HEAT NETWORK

STRATEGIC HEAT NETWORKS IN TOWNS

SOME BACKGROUND INFO - WHY SHOULD I CARE ABOUT THE DANISH CASE STUDY?

64.5%

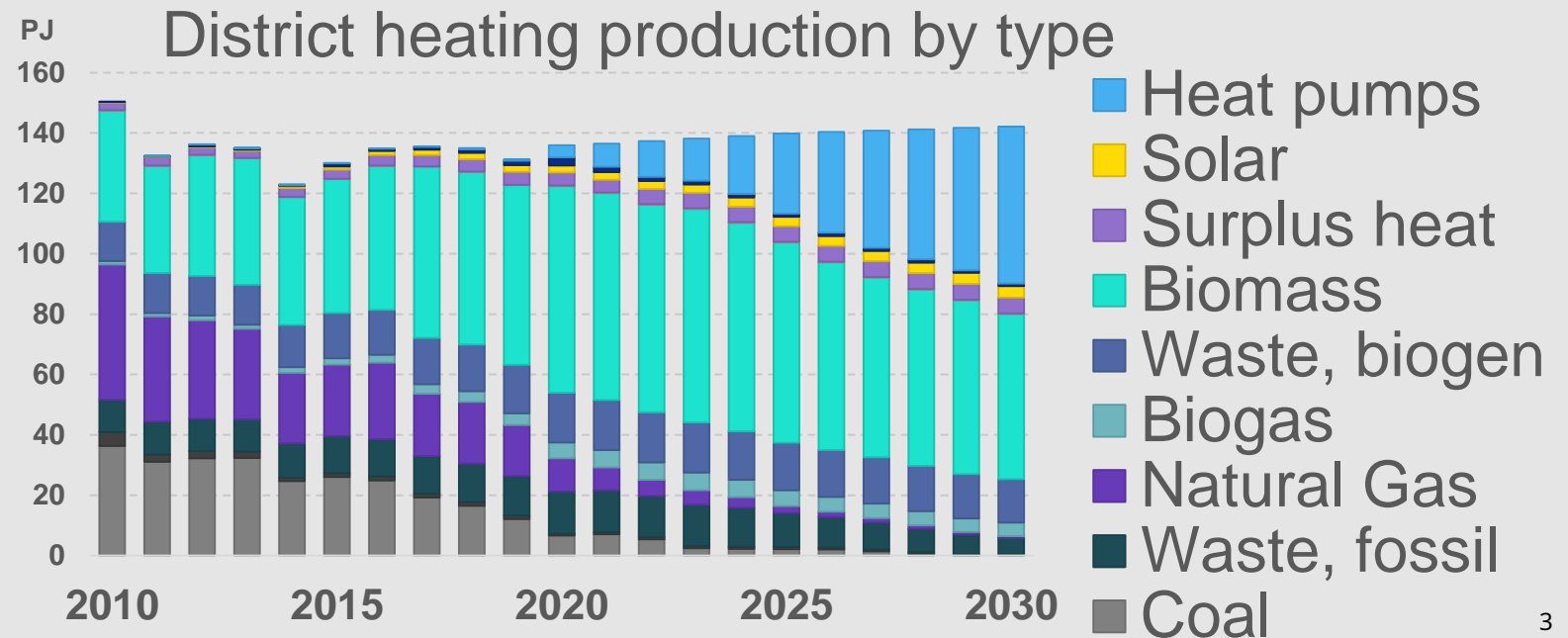
of Danish households are connected to heat networks

>60%

Of heat in heat networks is from low carbon sources

95%

of heat demand in the 4 biggest Danish cities is met through heat networks



HOW DENMARK IS RESPONDING TO THE RUSSIAN INVASION OF UKRAINE ON ENERGY SECURITY

The proposals...

- This year, all municipalities must prepare plans for green heat in their areas which are currently supplied by gas
- This year, all homes with a gas boiler or oil burner will receive a letter letting them know whether a heat network will be available in their area, or whether they should consider changing to a heat pump.
- Around 30-50% of households currently served by gas will be moved to heat networks by 2028. This corresponds to around 120,000-200,000 homes. It is the government's ambition that the last heat network projects are finalised in 2028.

WHAT DO WE MEAN WHEN WE TALK ABOUT STRATEGIC HEAT NETWORKS

- Strategically planned heat networks that make the most of local opportunity
- Covering a majority of homes and buildings in an area
- Considering opportunities to utilise waste heat and other local strategic opportunities
- With the potential for interconnection and cooperation with neighbouring networks
- Ensuring that heat networks have a diverse demand, and a diverse supply

Strategic doesn't just mean big. We must have strategic heat networks in towns, as well as cities

A KEY MESSAGE FROM DENMARK

- Normalise heat networks with multiple fuel sources
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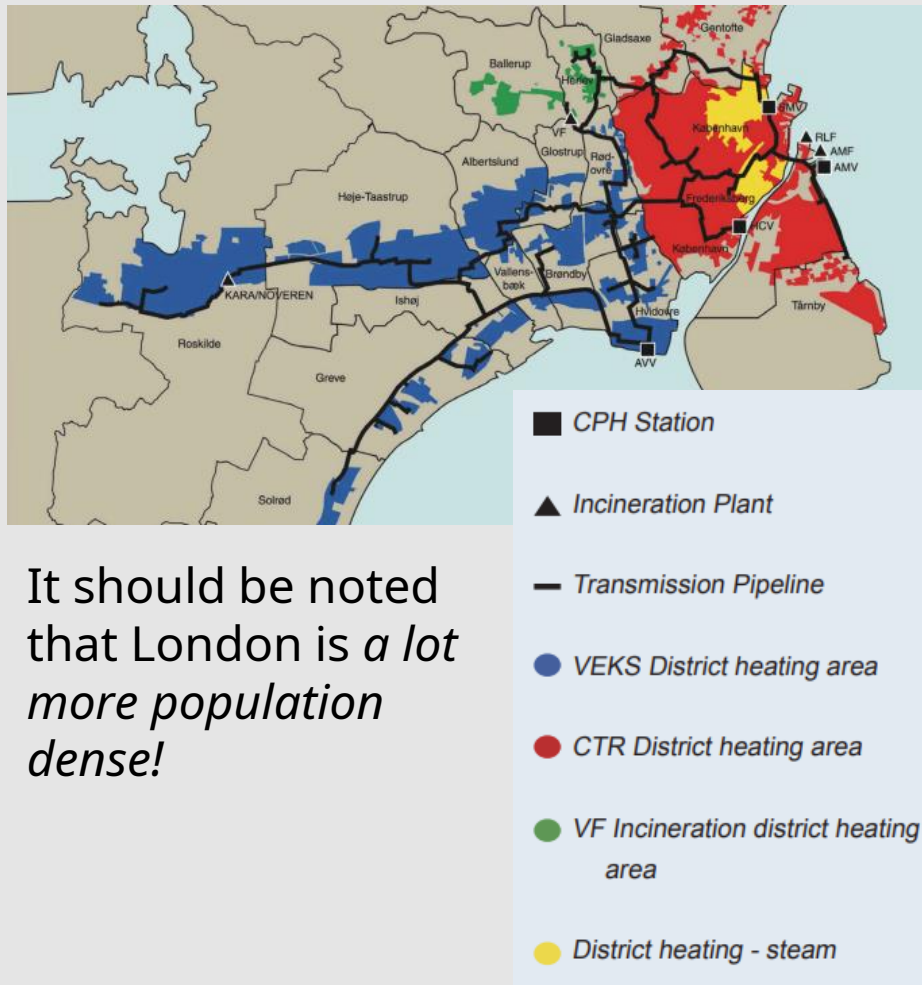
DID YOU KNOW...

According to the Danish District Heating Association, 90% of customers on heat networks in Denmark have seen stable or reducing prices despite the rising cost of energy!

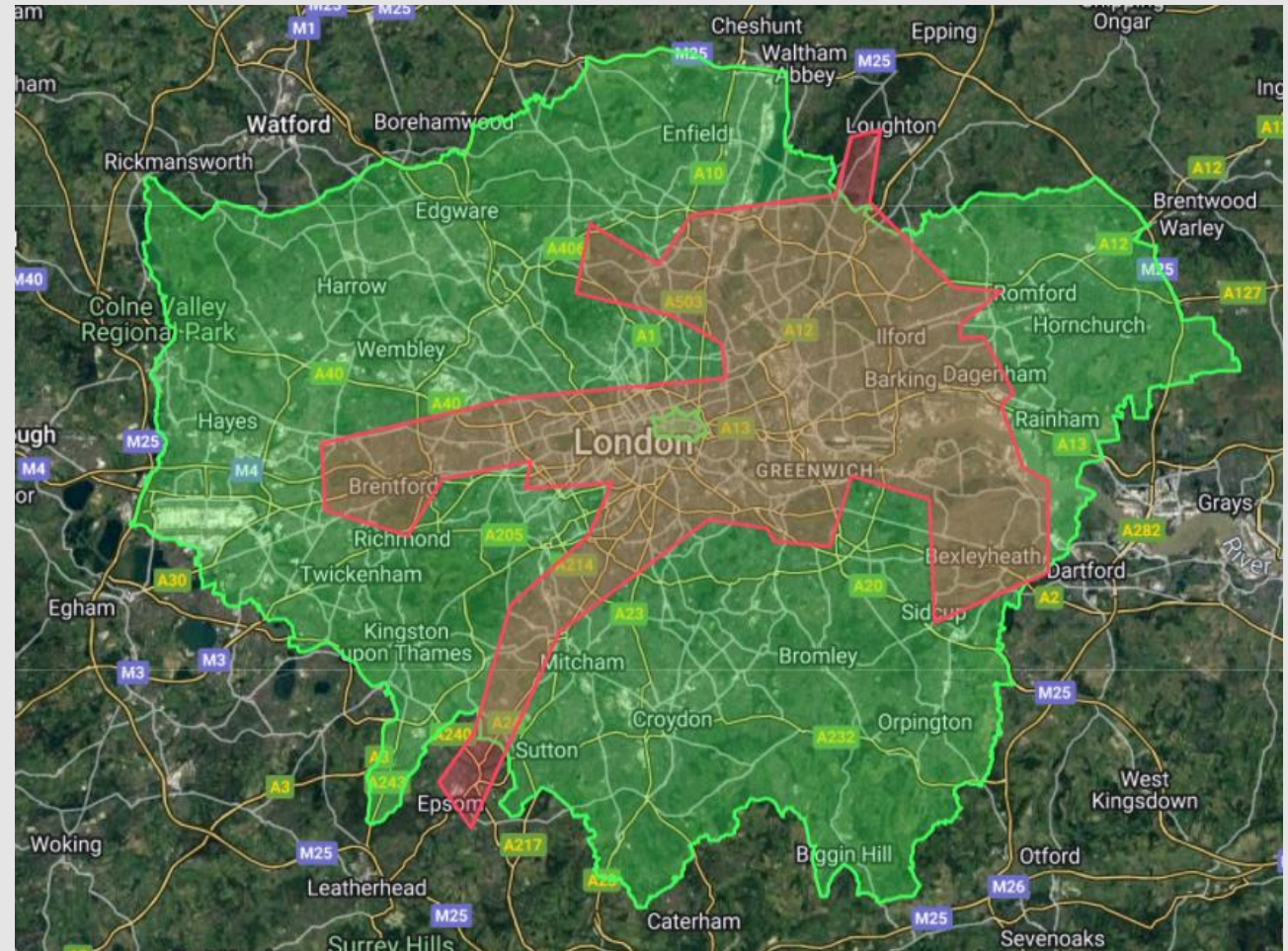
Danish District Heating Association, February 2022

! A common misconception in industries with waste heat to spare is that they will be the only heat source serving the heat network...!

THE COPENHAGEN HEAT NETWORK (AND A COMPARISON TO LONDON)



It should be noted that London is *a lot more population dense!*



THERE'S GOOD REASON TO TALK ABOUT SCALE: WITHIN DAY HEAT PRICES

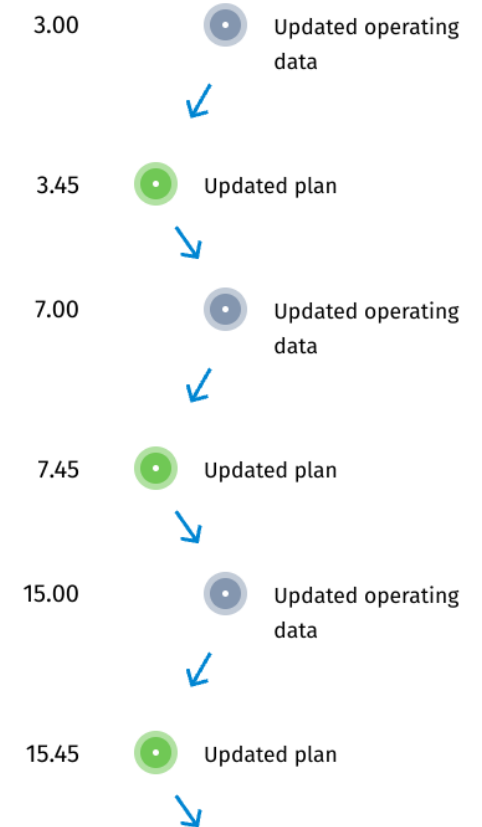
- The Copenhagen heat network has a transmission and distribution network, optimised from a control room.
- Heat suppliers bid in every 4 hours with a price for heat.



Intraday plan

What adjustments must be made during the operating day

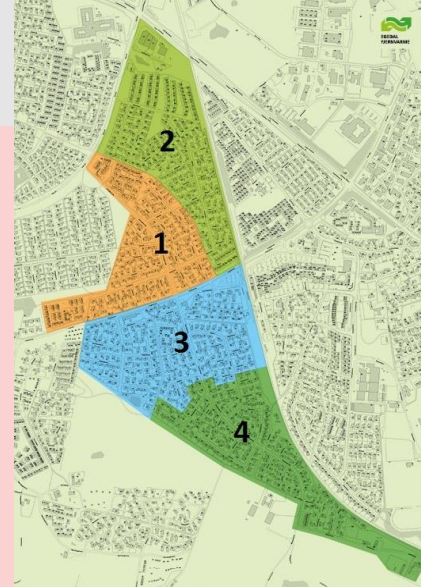
- HEAT LOAD
- HEAT PRODUCERS



THERE ARE PLENTY OF EXAMPLES OF REPLICABLE, RECENT HEAT NETWORKS, THAT ARE ACHIEVING LOCAL SCALE IN DENMARK

Egedal (ee-dale)

- 1,000 connections – 7,000 in future
- Expanding to deliver more cost-effective heat to customers
- Solar, biomass, absorption heat pump, gas...
- Potentially one day, it will connect up to the neighbouring heat network too



HERE ARE SOME OTHERS...



The world's largest solar heating plant on the outskirts of Silkeborg optimises the whole DH system. The green area between the two sections has been left untouched in order to make room for the future construction of a highway.

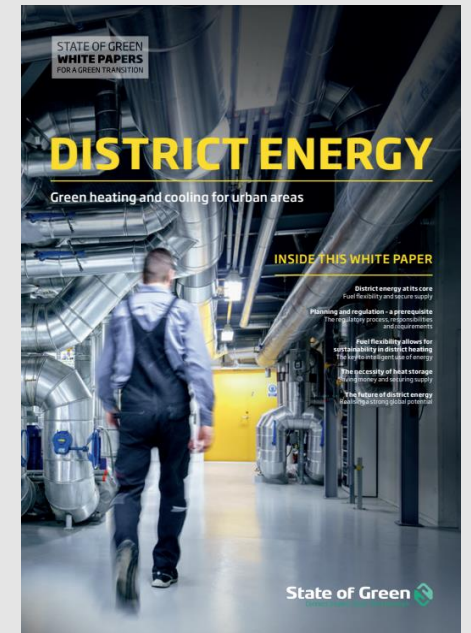
Silkeborg District Heating Company serves 21,000 buildings in Silkeborg through solar, CHP, heat pumps and waste heat.

Tietgenbyens Varmecentral (TBV) in Odense takes waste heat from Facebook's data centre to supply 7,000 homes

Gudenådalens Energiselskab Takes heat from Grundfos' industrial facility, and stores it in a storage aquifer for use during the winter. 80-85% of the waste heat stored is still available.

For more info on the case studies, check out State of Green's White Papers free:

https://stateofgreen.com/en/uploads/2018/08/SoG_WhitePaper_DistrictEnergy_210x297_V22_WEB.pdf?time=1645532021



STORAGE FOR (SYSTEM) EFFICIENCY & FLEXIBILITY

- All DH have day-to-day storage, while more and more are investing in (very) large-scale.

Vojens DH

- 2.000 connections
- 200.000 m³ pit storage capacity
- Up to 50% of heat demand from solar



KEY MESSAGE FOR THE AUDIENCE

Strategic heat networks are heat networks that **achieve local scale**, and capitalise on local opportunities. They are flexible, modern and enable low carbon choices.



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