CC at Amager CHP plant

IEA Bioenergy Task 32 workshop
Biomass combustion and CCUS
September 21st 2023

Anders Evald
HOFOR Strategy development

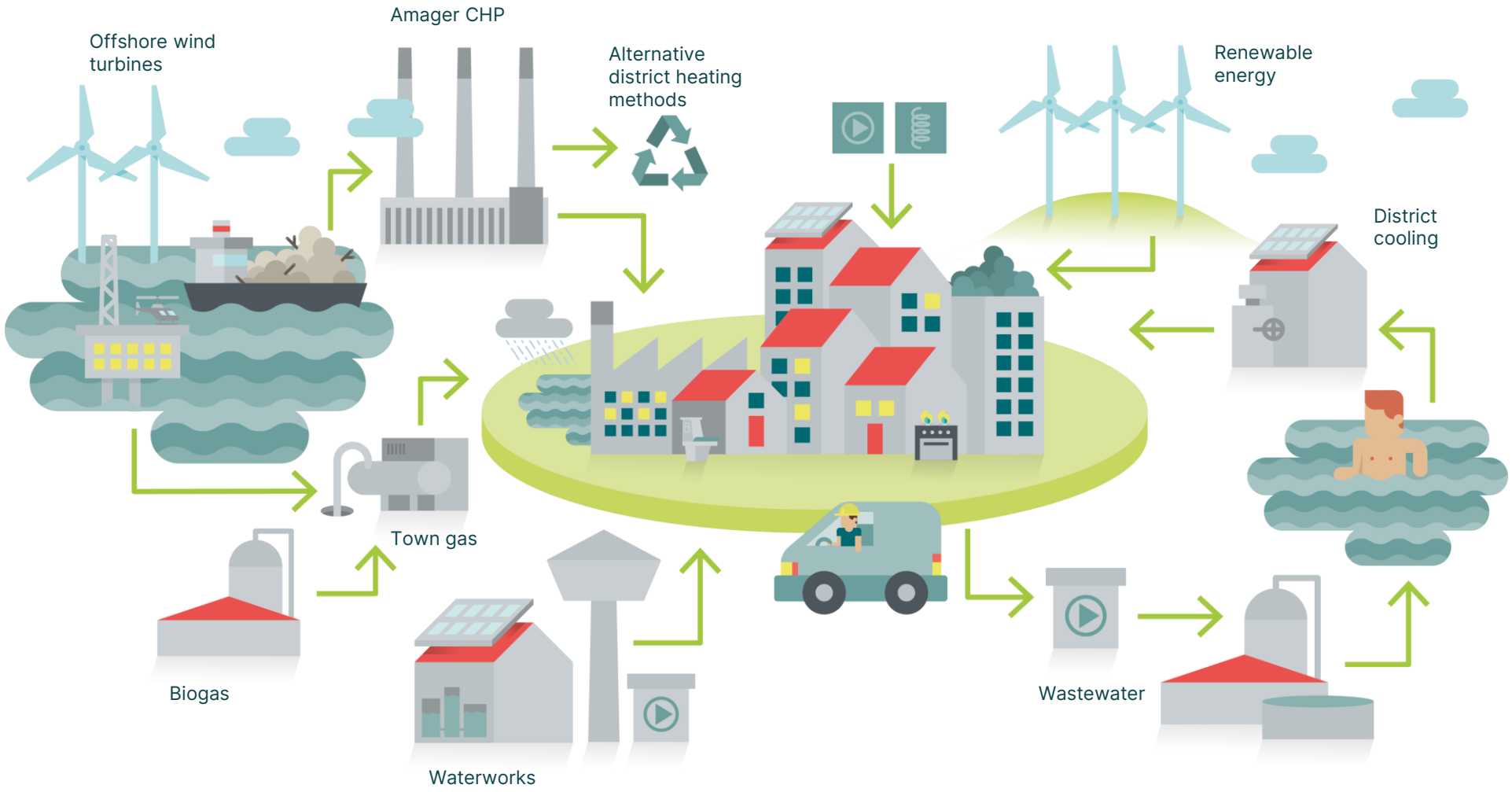
HOFOR

Introduction

CC at Amagerværket CHP plant towards 2030

HOFOR UTILITY SERVICES

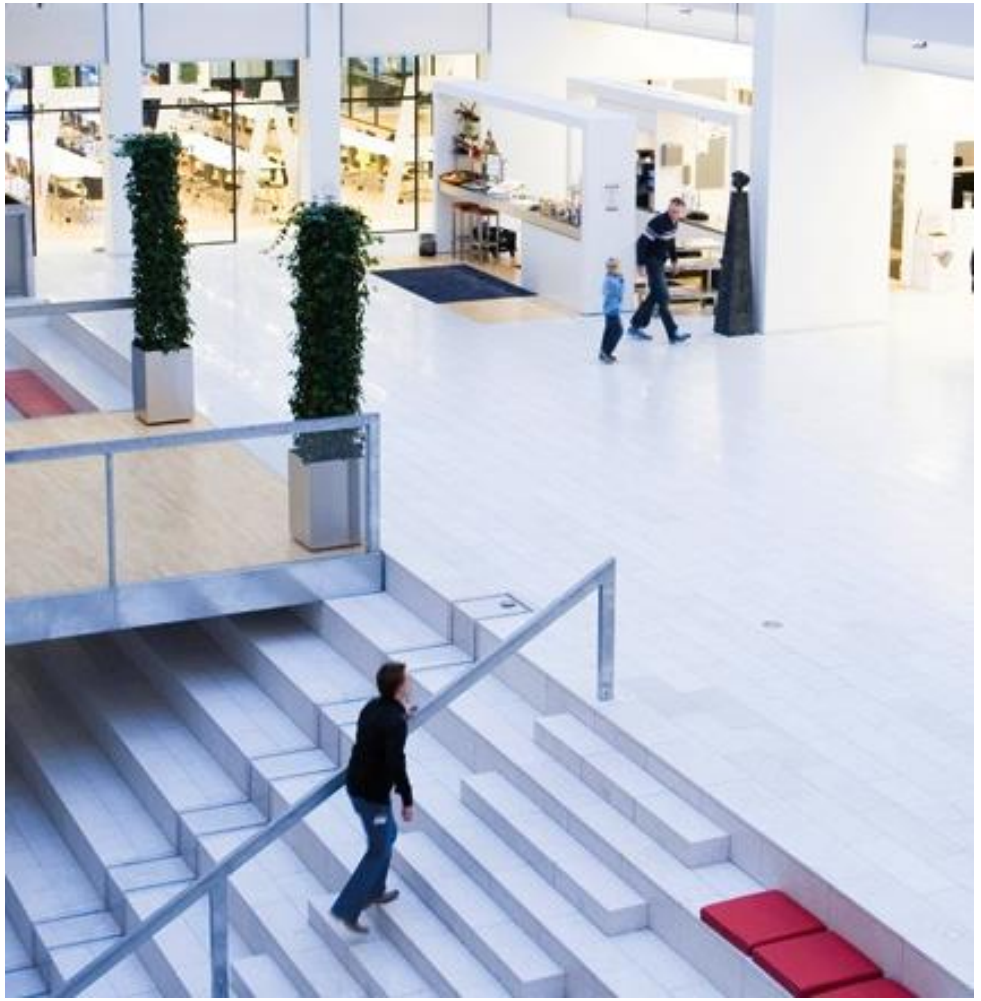
AMAGERVÆRKET DISTRICT HEATING WATER RENEWABLE ENERGY TOWN GAS DISTRICT COOLING WASTEWATER



GREATER COPENHAGEN UTILITY

THE COMPANY TODAY

- Denmark's largest utility company within our core areas
- More than 1,500 employees
- Approximately one million customers in Greater Copenhagen
- Approximately EUR 712 million in net turnover
- Total fixed assets: more than EUR 4 billion
- We are municipally owned (City of Copenhagen for AMV)
- Our utilities are regulated by law
- Our revenue and expenditure must balance out over time ("non-profit" organisation)
- We focus on sustainable supply and renewable energy

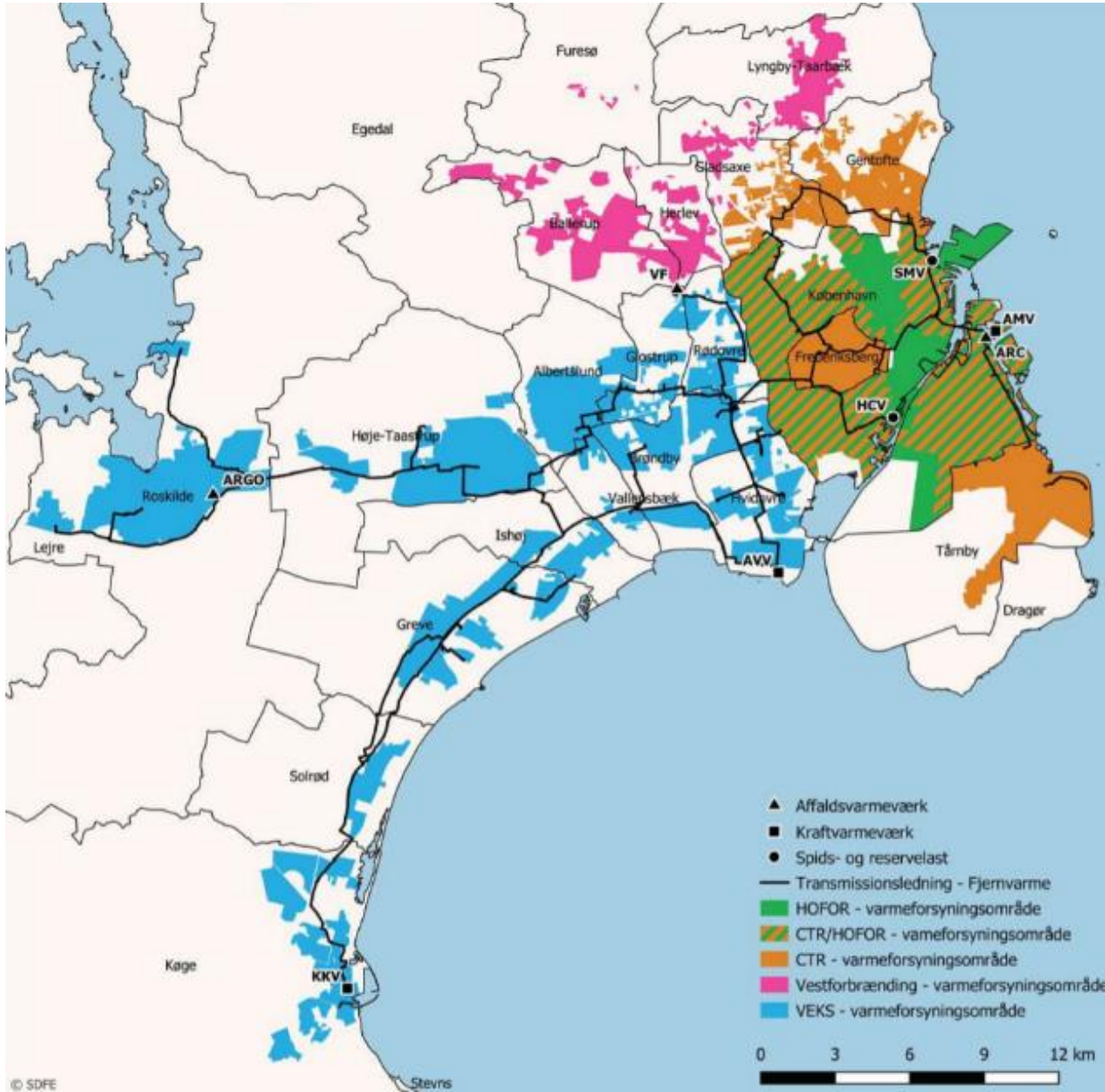


Importance of district heating

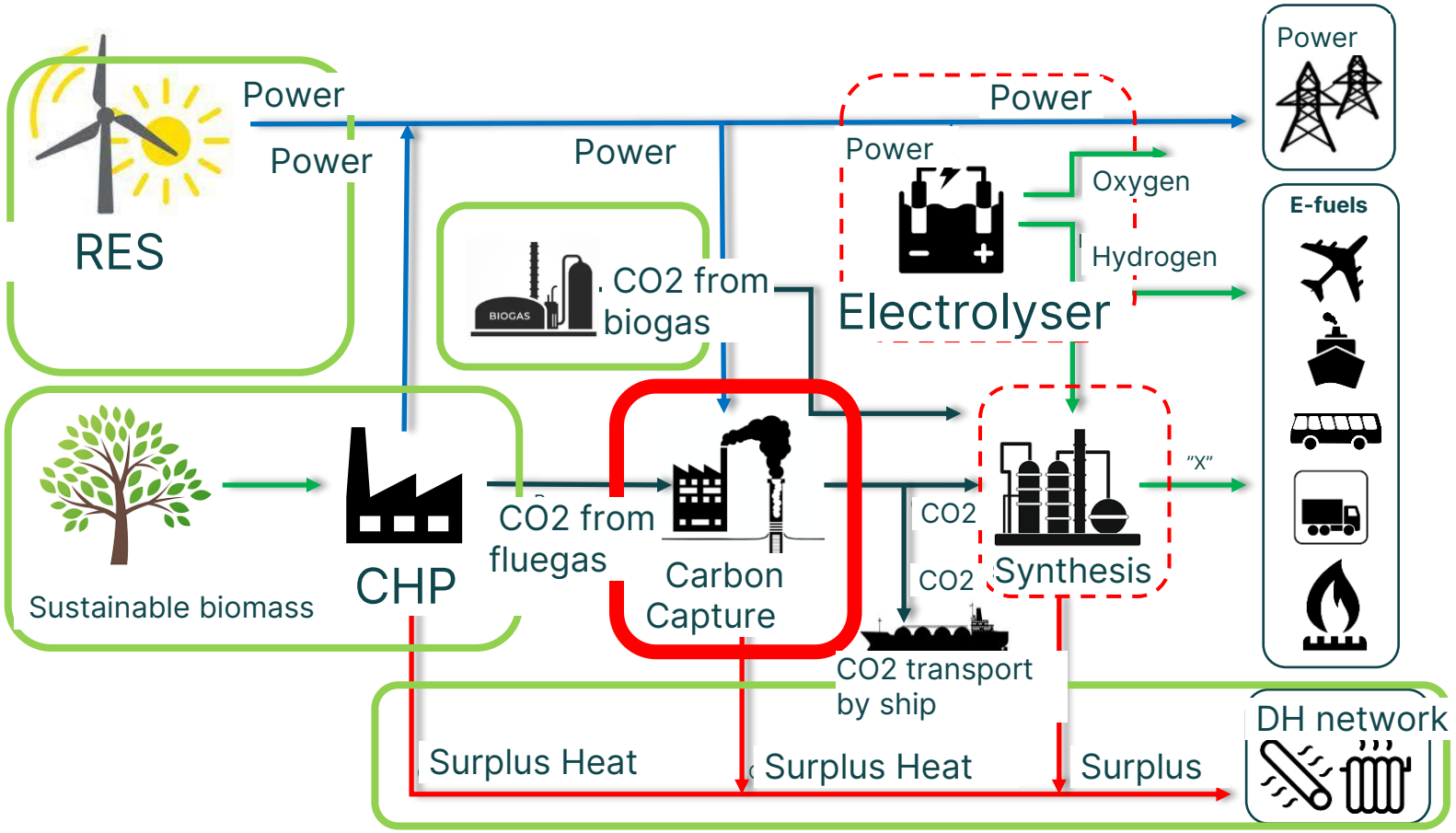
Large interconnected district heating (DH) network:

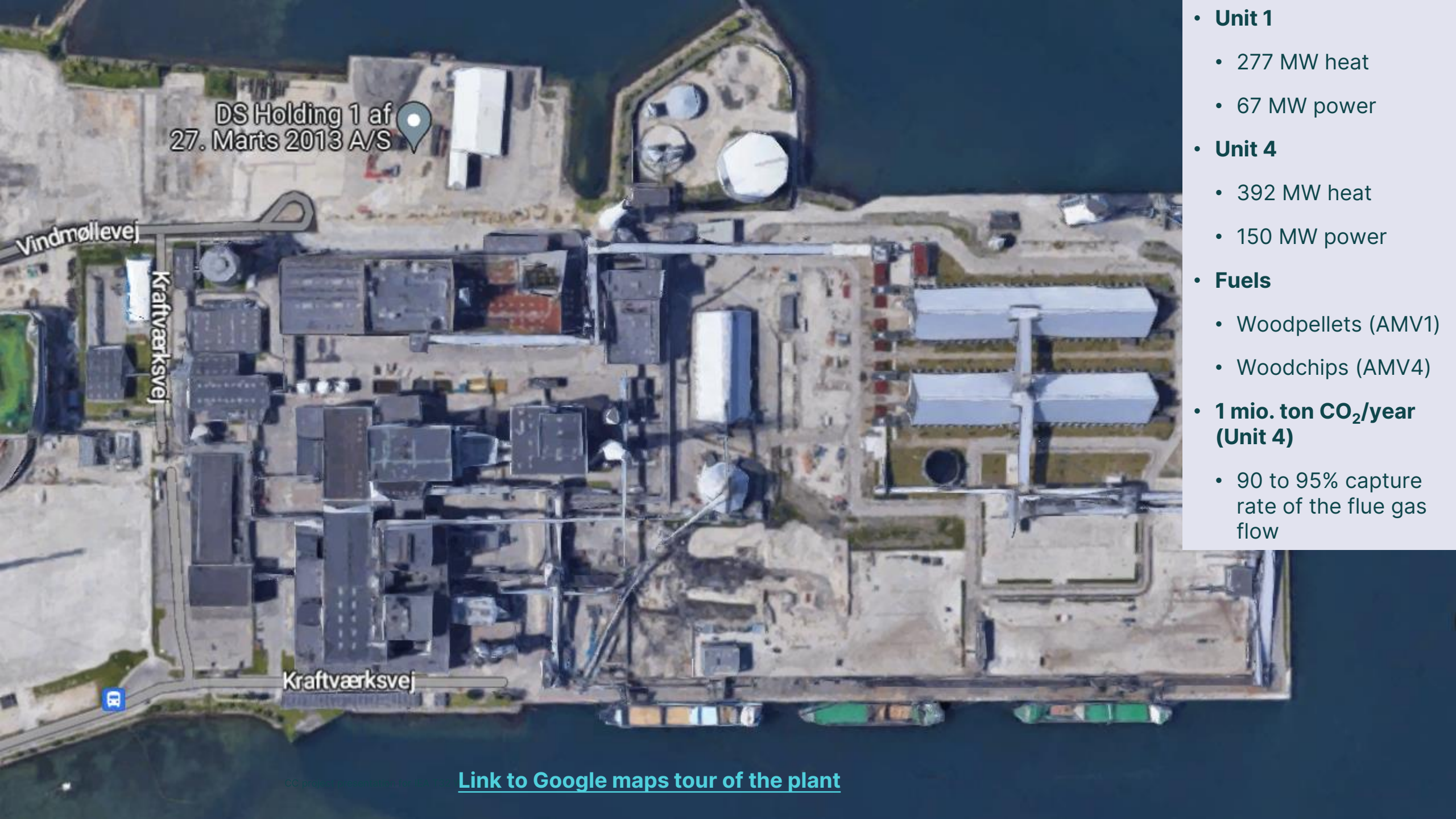
- Several CO_2 point sources, of which several are preparing CC-projects
- The DH network is supplied by 4 CHP plants, 3 waste-to-energy plants and several peak load units
- Transmission DH network has relatively high pressure and temperatures (100-120°C - coming down)
- Distribution networks with lower pressure and temperatures (65- 90°C)
- Heat used for space heating and hot tap water (avg. annual heat demand 1000 MW – peak load 3500 MW)
- HOFOR DH distribution has 600,000 end users within the City of Copenhagen

For a BE-CC plant in Copenhagen the value of recovered heat from the CC-processes are important



HOFOR has strategic focus on Carbon Capture (CC)





- **Unit 1**
  - 277 MW heat
  - 67 MW power
- **Unit 4**
  - 392 MW heat
  - 150 MW power
- **Fuels**
  - Woodpellets (AMV1)
  - Woodchips (AMV4)
- **1 mio. ton CO_2/year (Unit 4)**
  - 90 to 95% capture rate of the flue gas flow

[Link to Google maps tour of the plant]

Selected discussion and issues for a large scale BECCS project

- Onshore or offshore storage
- Pipeline or ship transport
- CO2 quality standards - temperature, pressure, state and purity standards
- Amine or HPC
- Scale
- Steam supply
- Proces optimizations (capture rate, heat recovery...)
- Footprint and layout
- Danish Government support scheme
- Other income streams
- Time schedule
- LCA (losses and energy consumption for steam, CO2 transport, evaporation etc.)
- Risk assessment
- Ownership and financing

Thank you!

HOFOR