

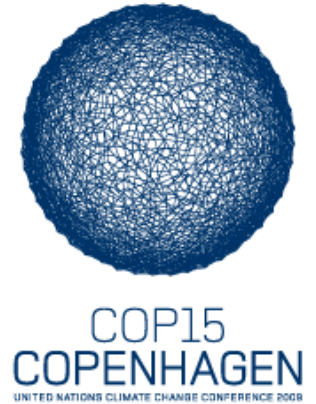
# Copenhagen Climate Plan

March 1st, 2024  
Maëlle Caussarieu  
City of Copenhagen  
Climate Unit

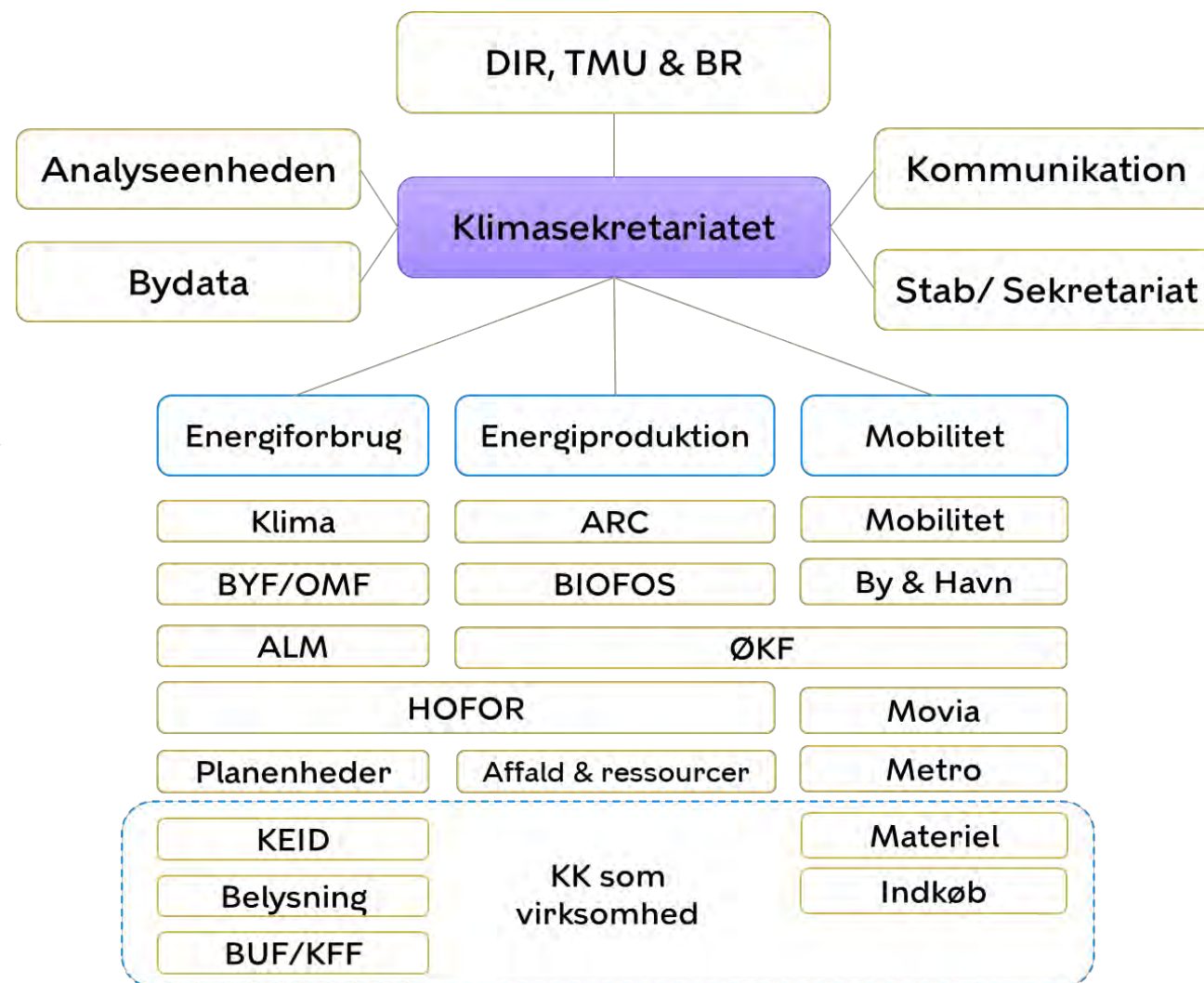
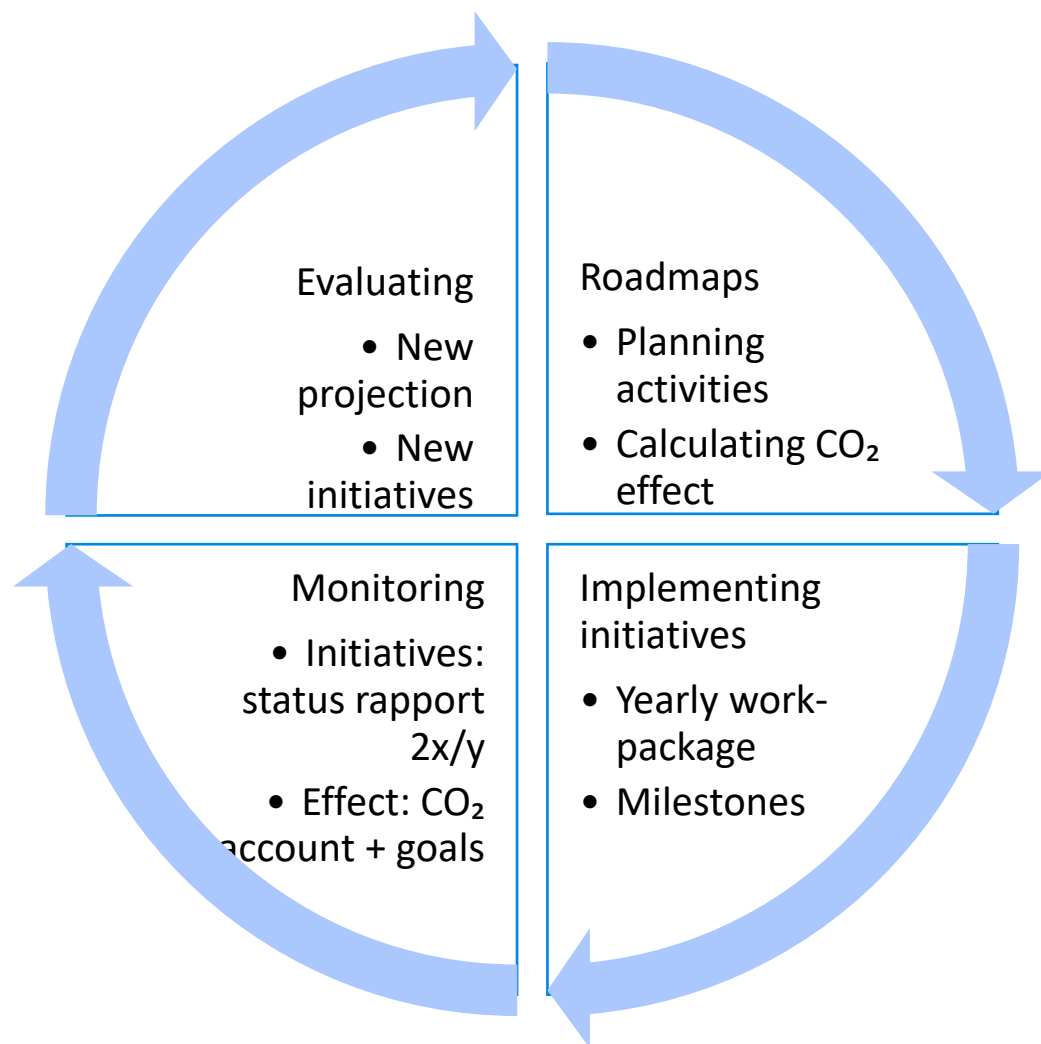


# Climate targets

- Climate Action Plan in 2009: 20% reduction by 2015 and a vision of becoming carbon neutral by 2025
- CPH2025 Climate Plan in 2012 with the target to become **the first carbon neutral capital in the world by 2025**



# Organisation



# CPH2025 Climate Plan

1<sup>st</sup> period  
2013-2016

2<sup>nd</sup> period  
2017-2020

3<sup>rd</sup> period  
2021-2025



2012



2014



2016



2018



2020



2021

# Municipal agency – where can we do what?

## Geographic city boundary

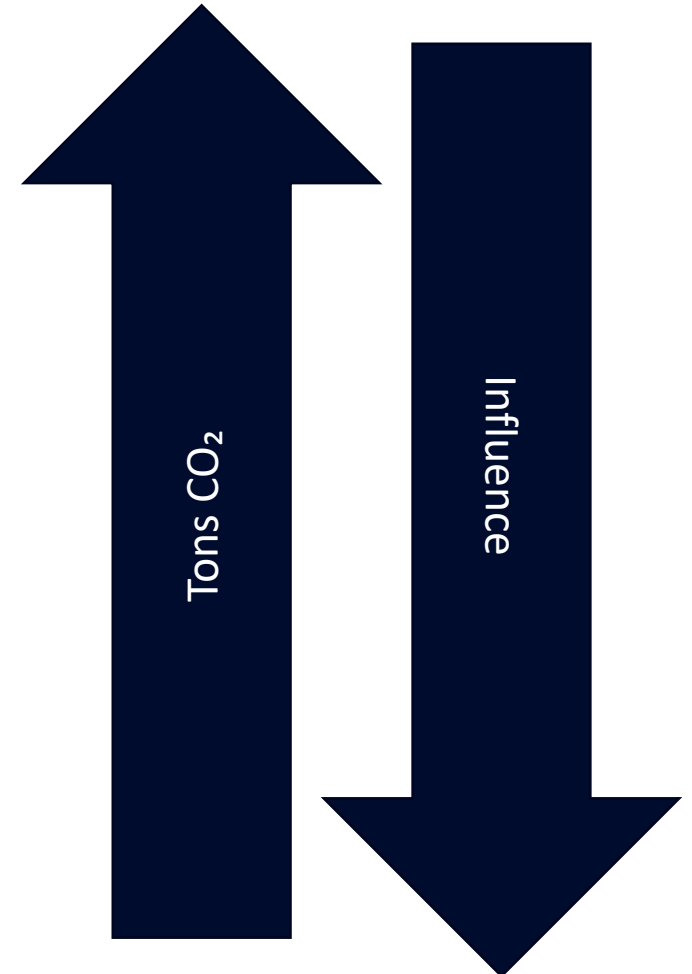
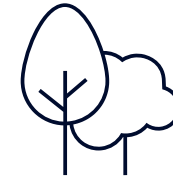
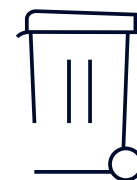
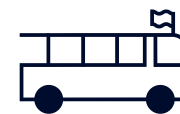
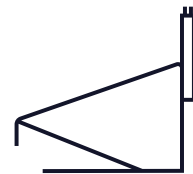
(The municipality as facilitator and authority)

### City-owned companies

(The municipality as a supplier)

### City's own activities

(The municipality as a consumer)

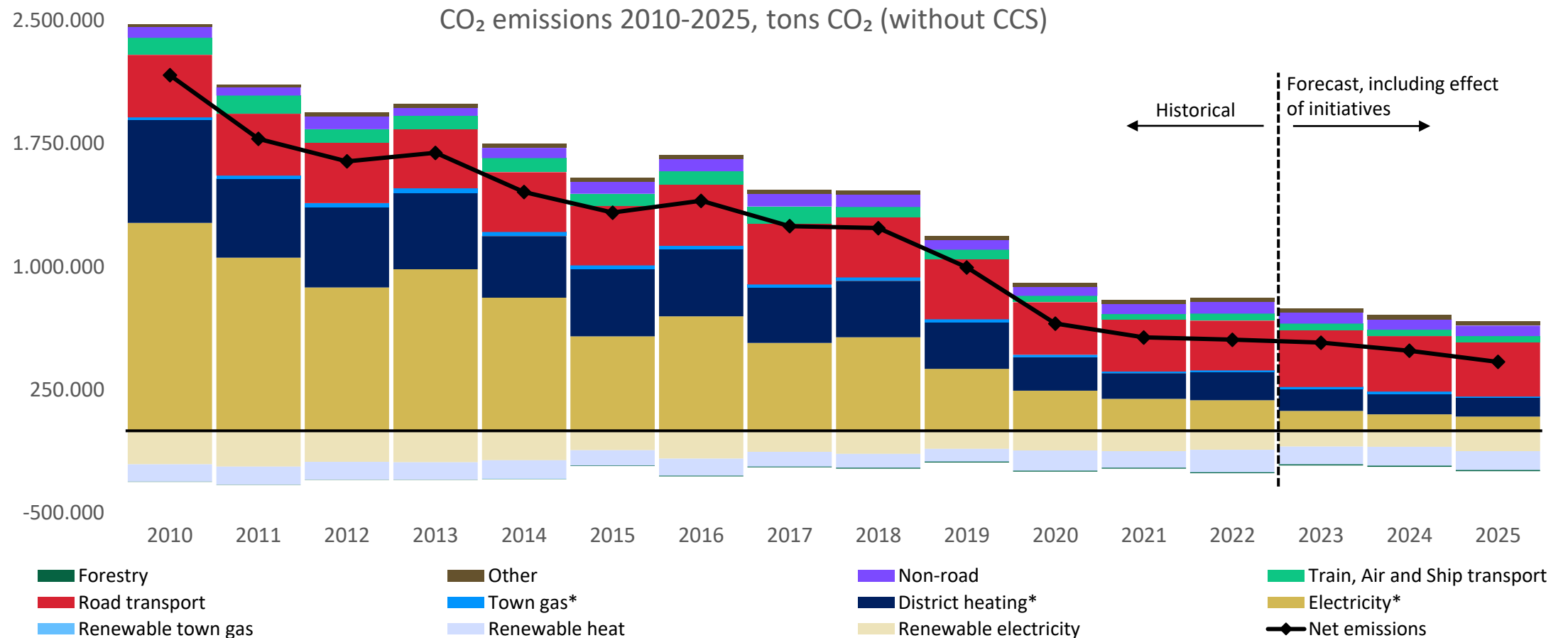


# Current Status



74% emission  
reduction in 2022  
compared  
to 2010

# CO<sub>2</sub> emissions in Copenhagen



\*Before RE-crediting, which involves renewable energy production within the city or outside the city where the city or the city's utilities own the facilities.

# Four pillars in the climate plan





# Energy Consumption

Partnerships are key

## Goals for 2025

- 20% reduction in heat consumption
- 20% reduction in the electricity consumed by commercial and service companies
- 10% reduction in energy consumption in households

## Main current initiatives

- Reduce energy use in existing buildings via i.e. Energispring (Energy Leap)
- Focus on building renovation
- New PV solar strategy
- Individual heating: move away from oil

# Energy Leap

50 partners and for about 39% of Copenhagen's building stock

## Purpose:

- Reduce energy consumption in buildings
- Establish partnership between building owners, developers and organizations

## Actions:

- Benchmarking, network, knowledge sharing, workshops, communication and target setting
- Focus on active energy management and retrofitting of buildings



# Energy Production

A need for flexibility

## Goals for 2025

- District heating will be carbon neutral by 2025
- Electricity production is based on wind and biomass and will, in total, exceed the city's electricity consumption
- Plastic from households and companies will be sorted from waste
- Biogasification of organic waste

## Main current initiatives

- CCS
- Heating: focus on peak load and heat pumps
- CO<sub>2</sub> neutral utilities (town gas, water, district cooling etc.)
- 560 MW wind and solar
- Waste sorting



**99% District Heating**



Wind Energy - 560 MW

# Mobility

## Goals for 2025

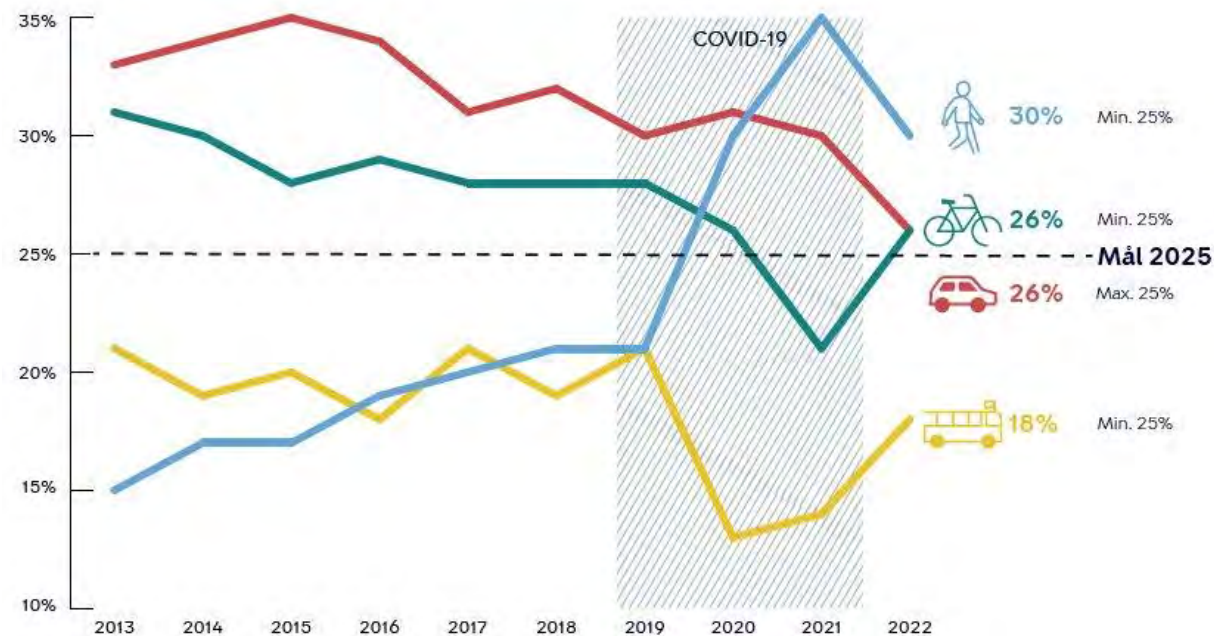
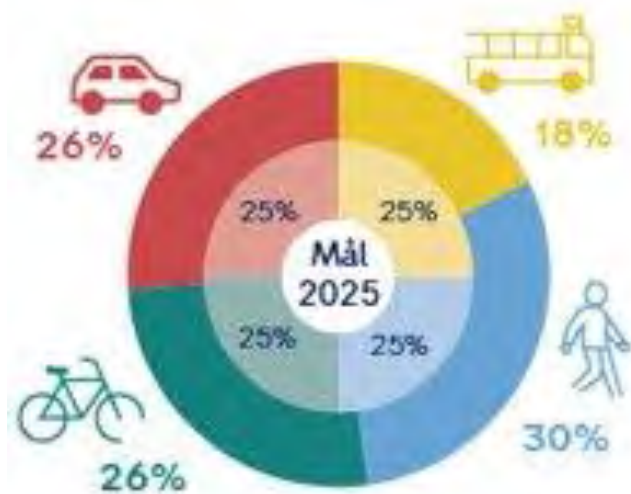
- 75% of all trips in Copenhagen are on foot, by bike or public transport
- 50% of all trips to work or school by bike

## Main current initiatives

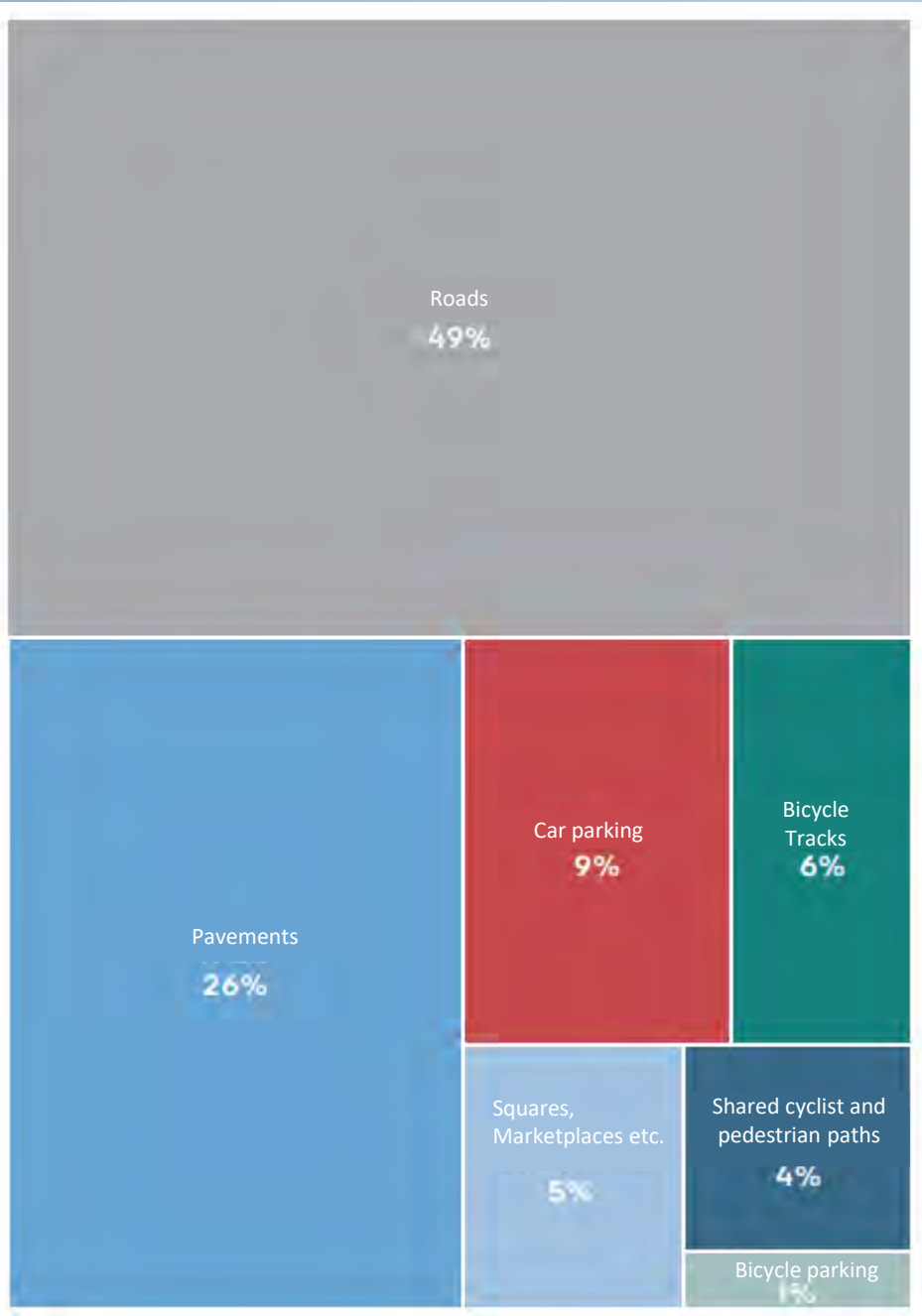
- Zero-emission buses
- Shore power for cruise ships
- Non-road machinery
- Speed reduction (50 km/h to 40 km/h)

Out of the car and hop on the bike, public transport or walk

# Development of the mobility share in Copenhagen – status 2022



# How the areas between the buildings in **Copenhagen** are distributed



# City Administration

## Goals for 2025

- Reduce energy consumption in city buildings 40% compared to 2010
- The city's new build should meet sustainability requirements
- All city administration vehicles run on electricity, hydrogen or biofuels
- Energy consumption for street lighting in Copenhagen is reduced by 50% compared to 2010
- A total of 60,000 sqm of PV modules on existing municipal buildings and new build have been installed

## Main current initiatives

- Energy efficiency in city buildings
- City vehicles
- City procurement
- Education
- Forestry
- Food strategy

A good example



# Examples of initiatives



# Energy Production

A need for flexibility

## Goals for 2025

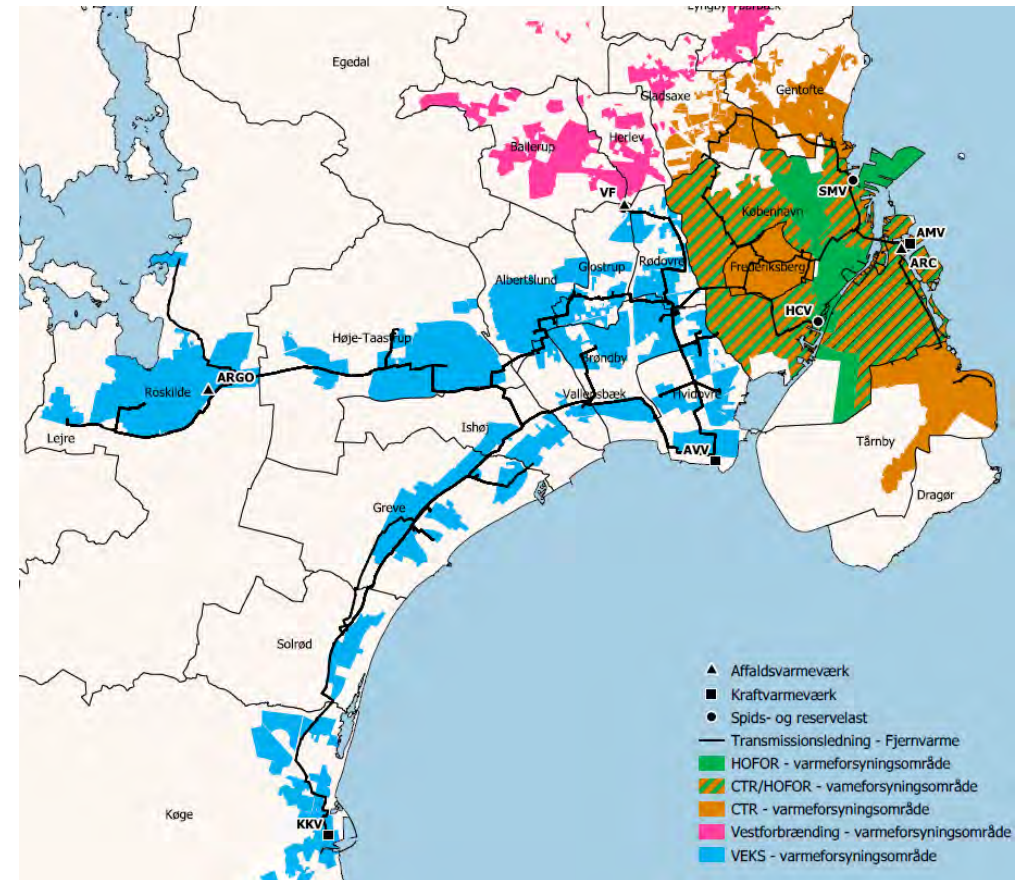
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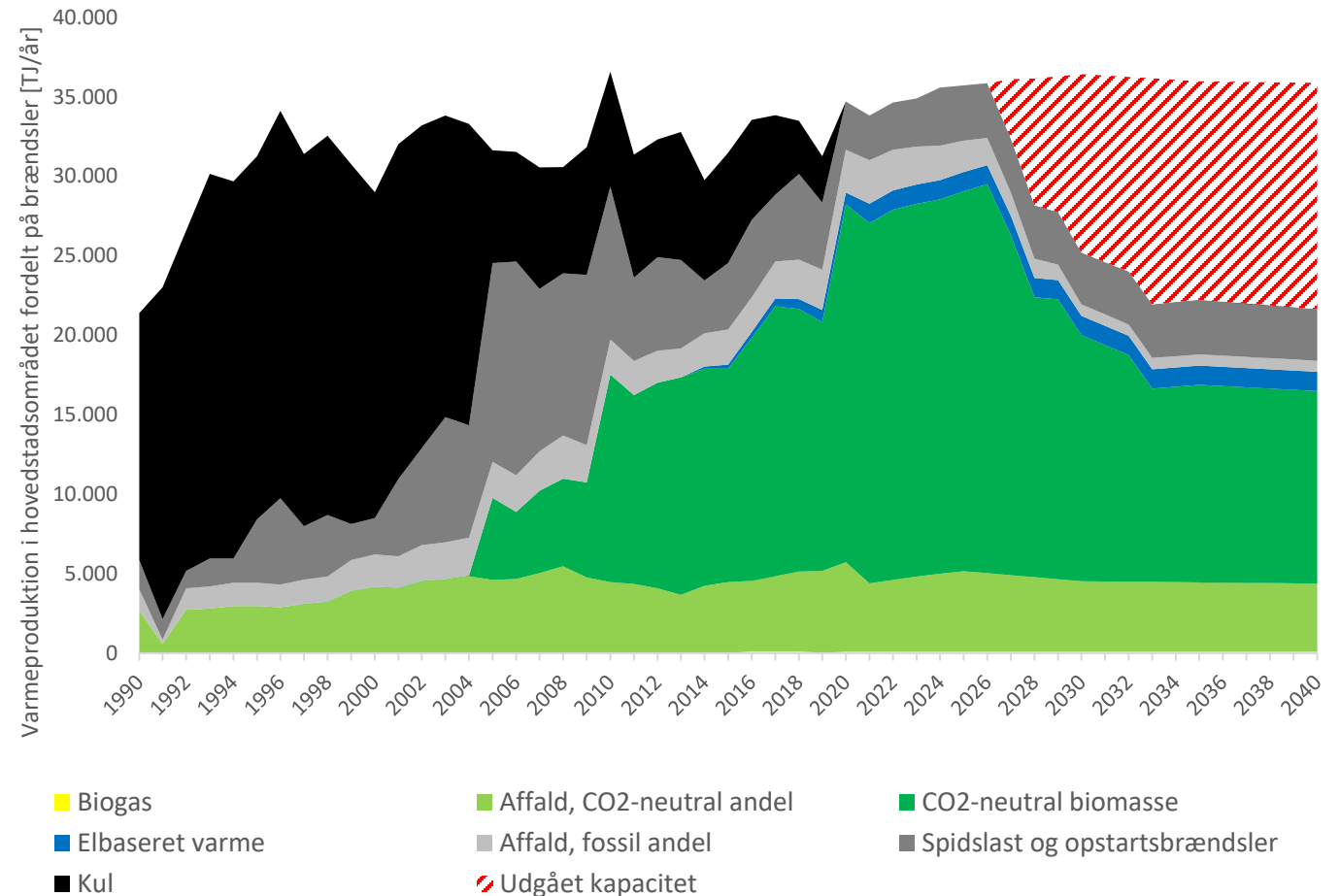
# Greater Copenhagen heat supply

- The Municipality of Copenhagen is one of the 26 municipalities that are connected to the capital's district heating network with approx. 500,000 households. Copenhagen is 99% connected to district heating.
- District heating production is based on a few central CHP plants:
  - 3 waste incineration plants (ARGO, ARC and Vestforbrænding)
  - 2 biomass incineration plants (Avedøre plant and Amager plant).
- The central plants are supplemented by several peak load units during cool periods or in the event of an outage. These are typically powered by oil or natural gas.
- Copenhagen is part of a larger connected heating network, but must have a certain amount of production close to its own consumers in order to maintain security of supply in the Municipality. This is due, among other things, to bottlenecks in/out of Copenhagen and distribution network capacity.



# Biomass is Greater Copenhagens main heat source

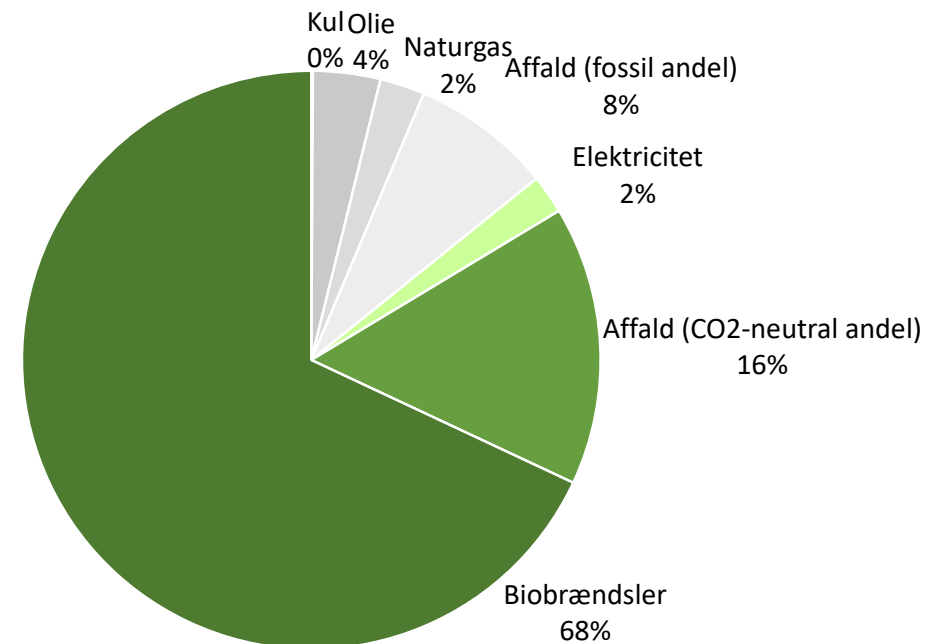
- The figure shows the heat production in the metropolitan area per fuel.
- Biomass represents ca. 2/3 of the heat production
- The political ambition of phasing out biomass heat means that a corresponding heat capacity based on other technologies must be established
- It is estimated that large and medium-sized heat pumps have a significant role in replacing biomass heat capacity.



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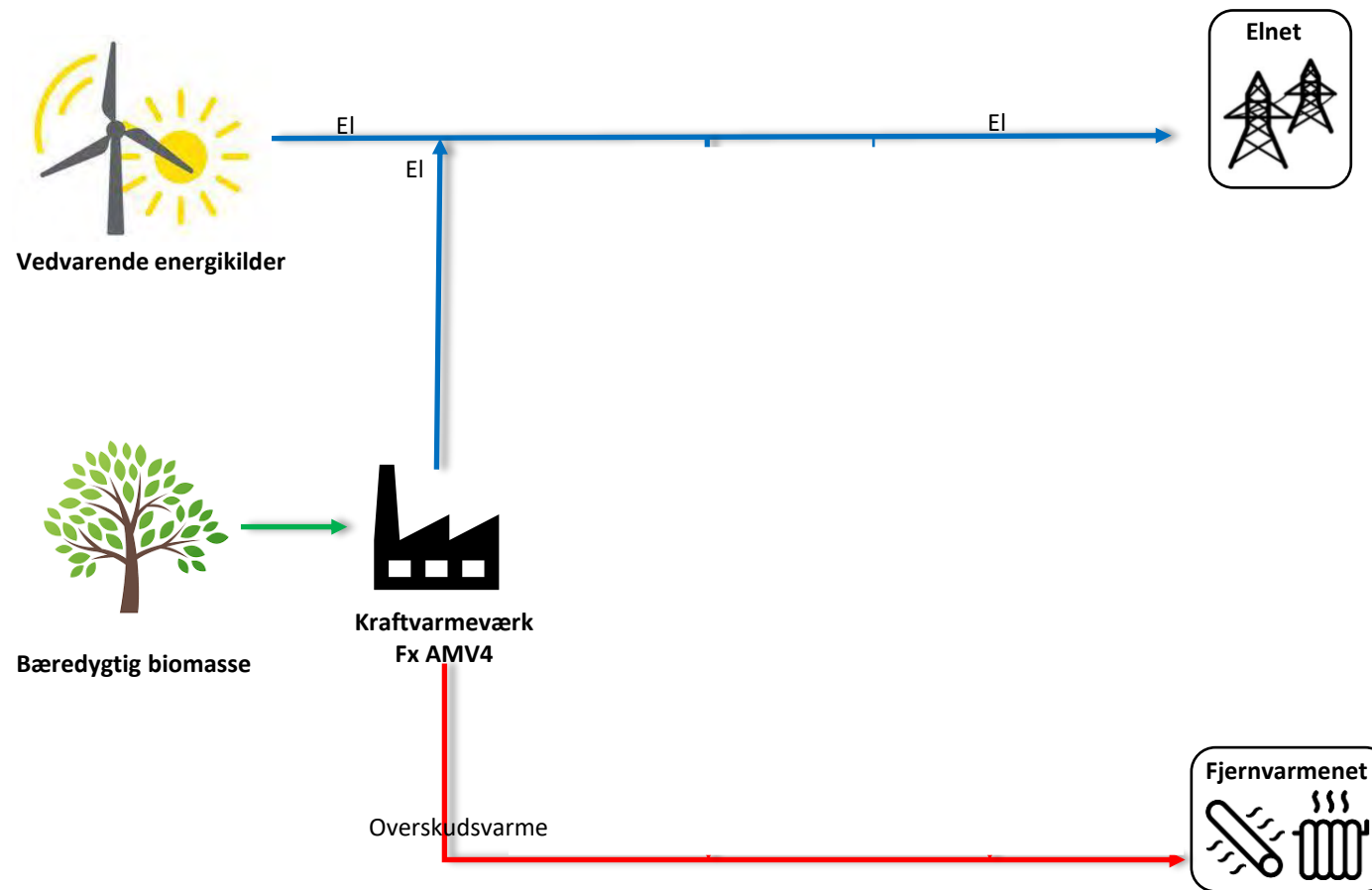
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68% of the capital's district heating came from biomass in 2022

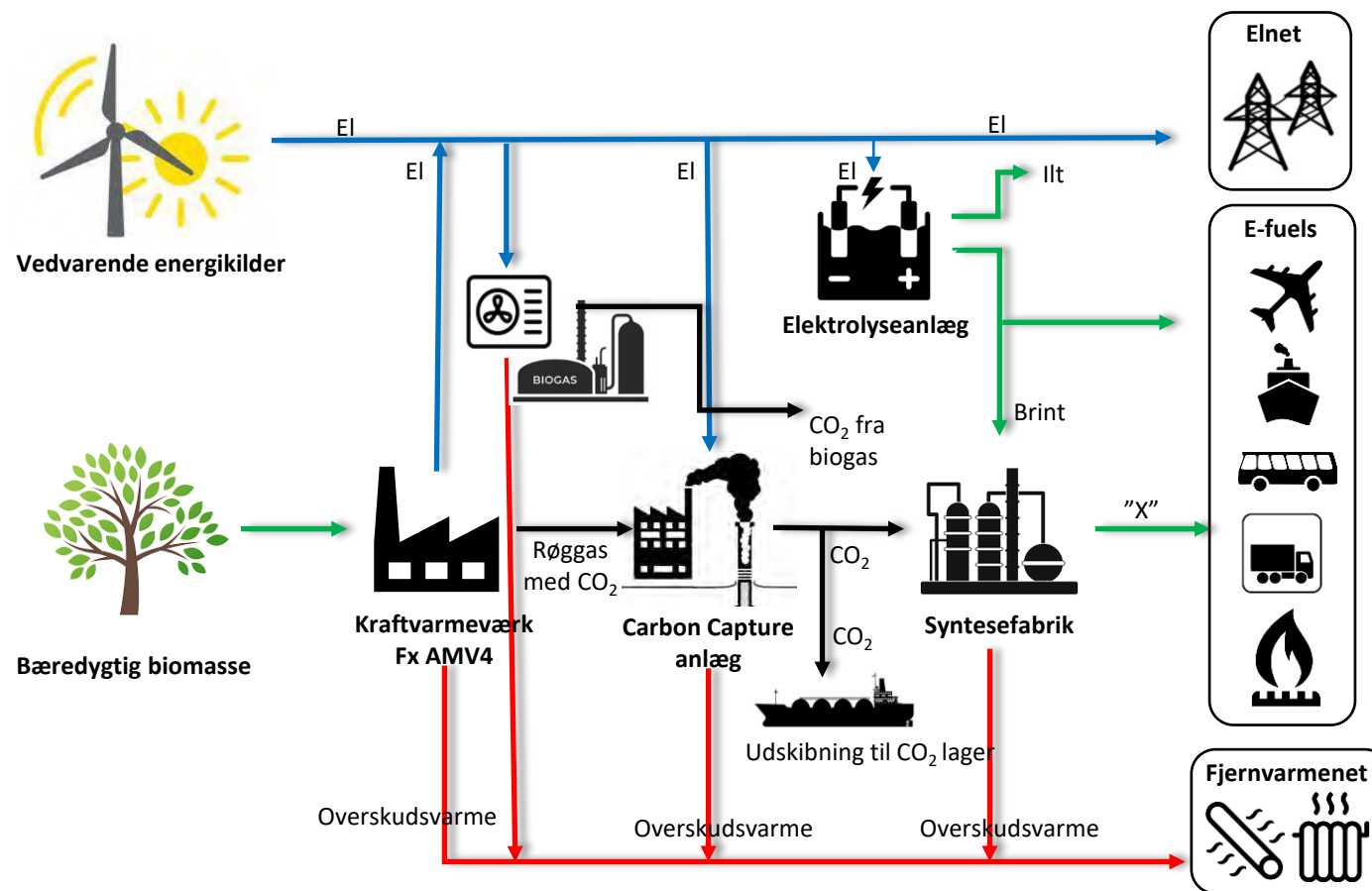


Production distribution of district heating delivered to the capital in 2022 (based on the Environmental Declaration for District Heating 2022)

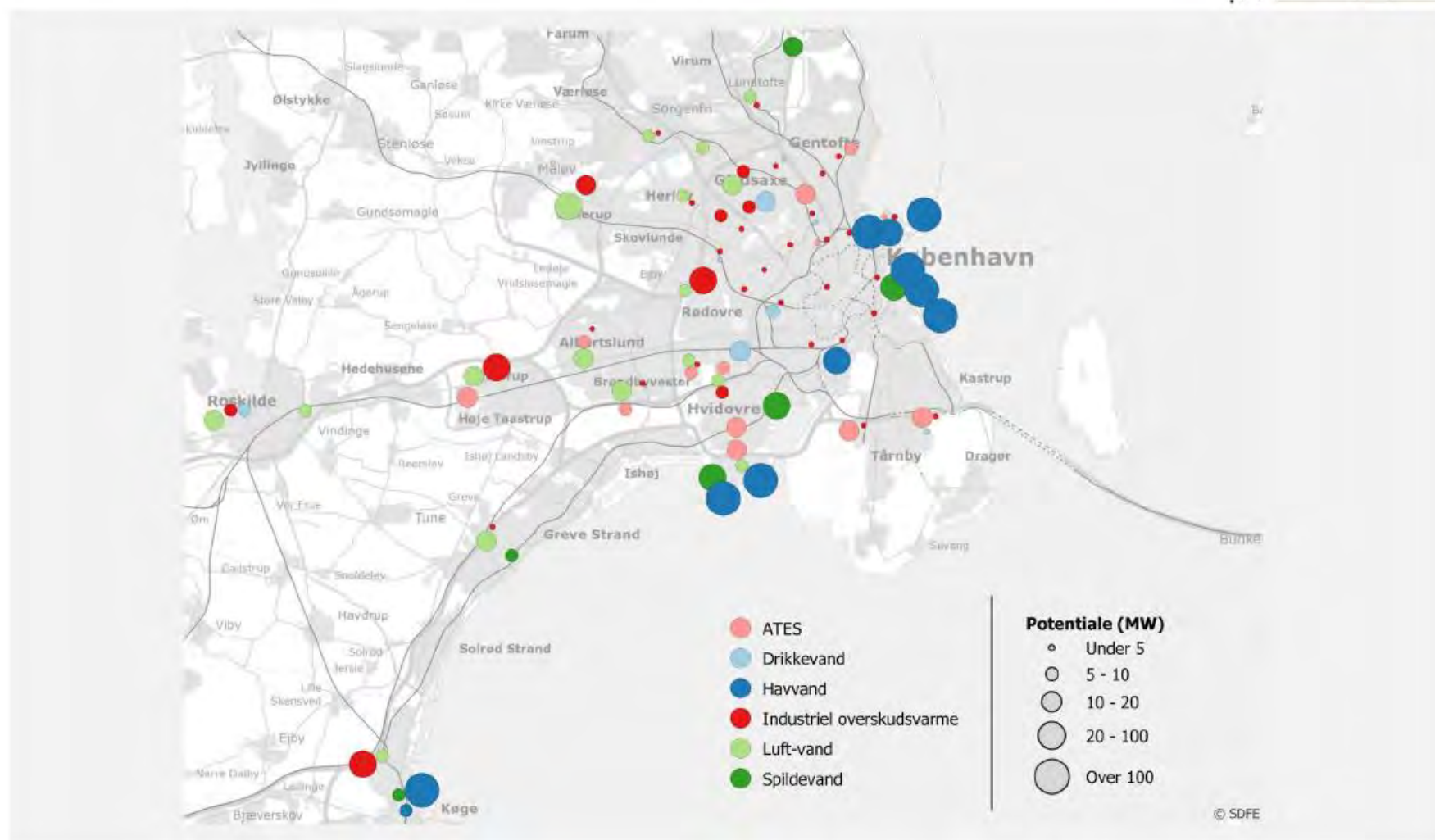
# Energy System today



# Energy System in the future



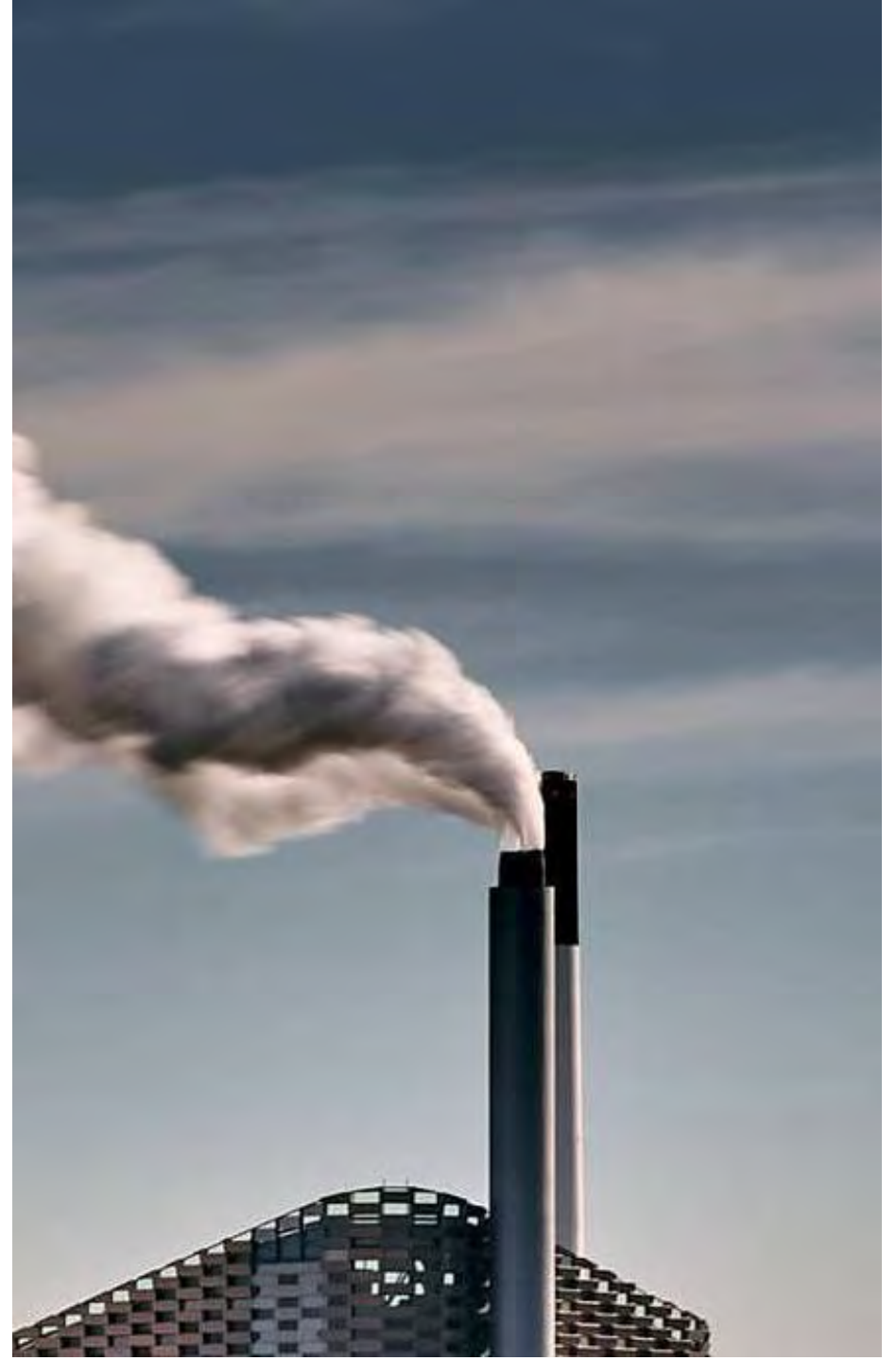
## Heat pumps: The biggest potentials are in Copenhagen





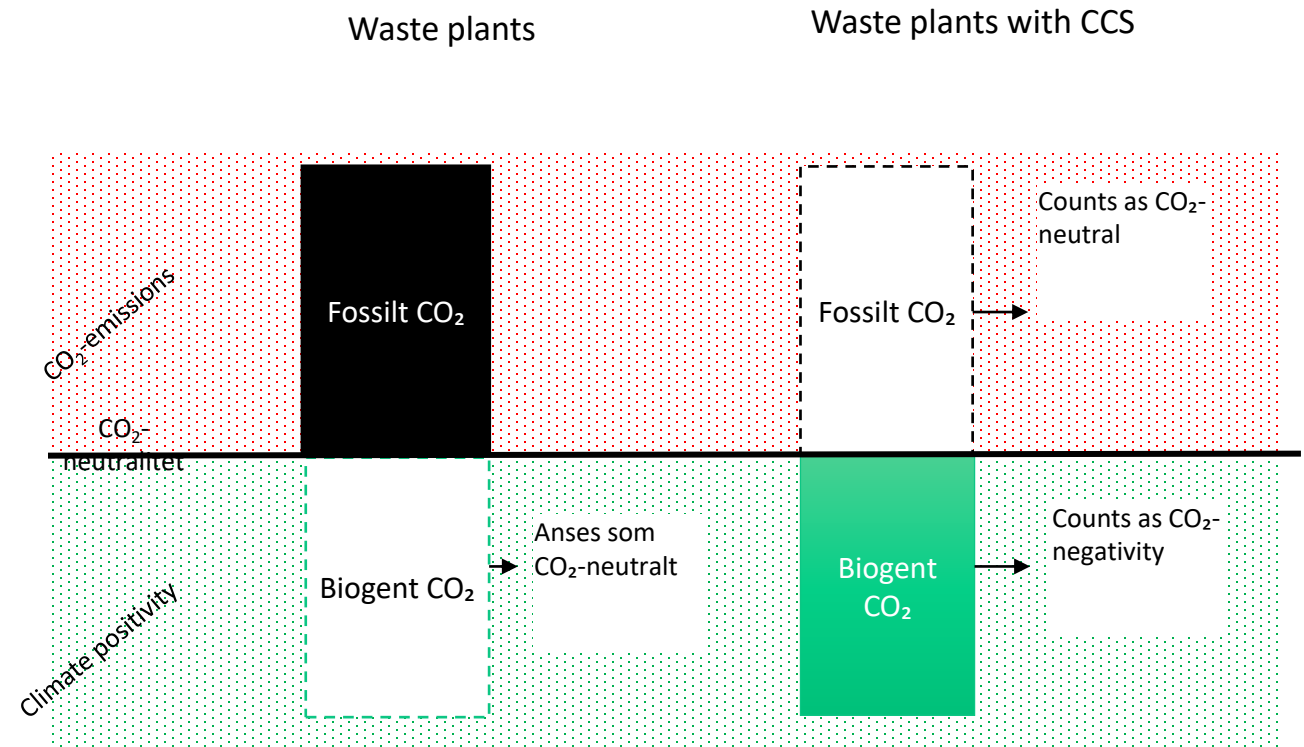
# Carbon Capture and Storage

- CCU/S catches the CO<sub>2</sub> from the power plants chimneys
- It is a climate technology that generates surplus heat, which can be integrated in the DH system



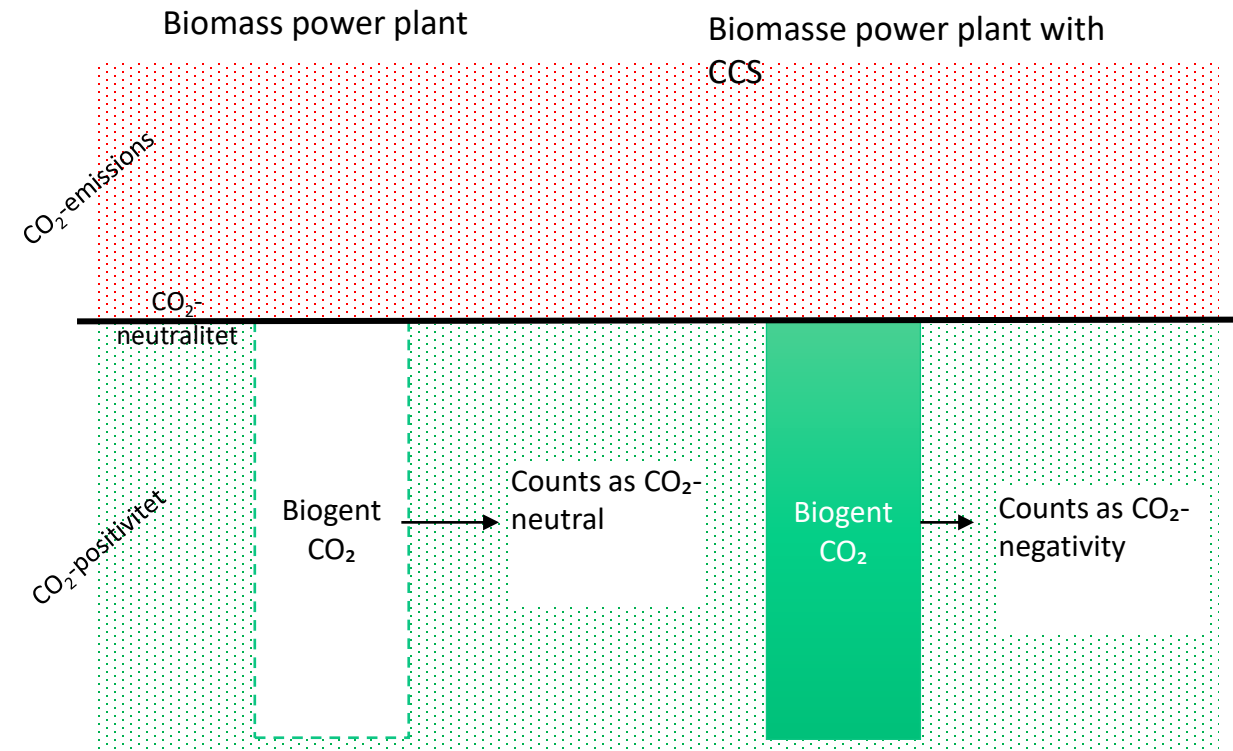
# CCS on waste incineration plants

- CCS can capture 2 types of CO<sub>2</sub> depending on what is burned:
  - biogenic CO<sub>2</sub> (cardboard, food waste, garden waste, etc.)
  - fossil CO<sub>2</sub> (coal, oil, etc.)
- A facility fx power plant can be considered CO<sub>2</sub>-neutral by capturing and storing fossil CO<sub>2</sub>, and can achieve climate positivity by capturing and storing biogenic CO<sub>2</sub>.

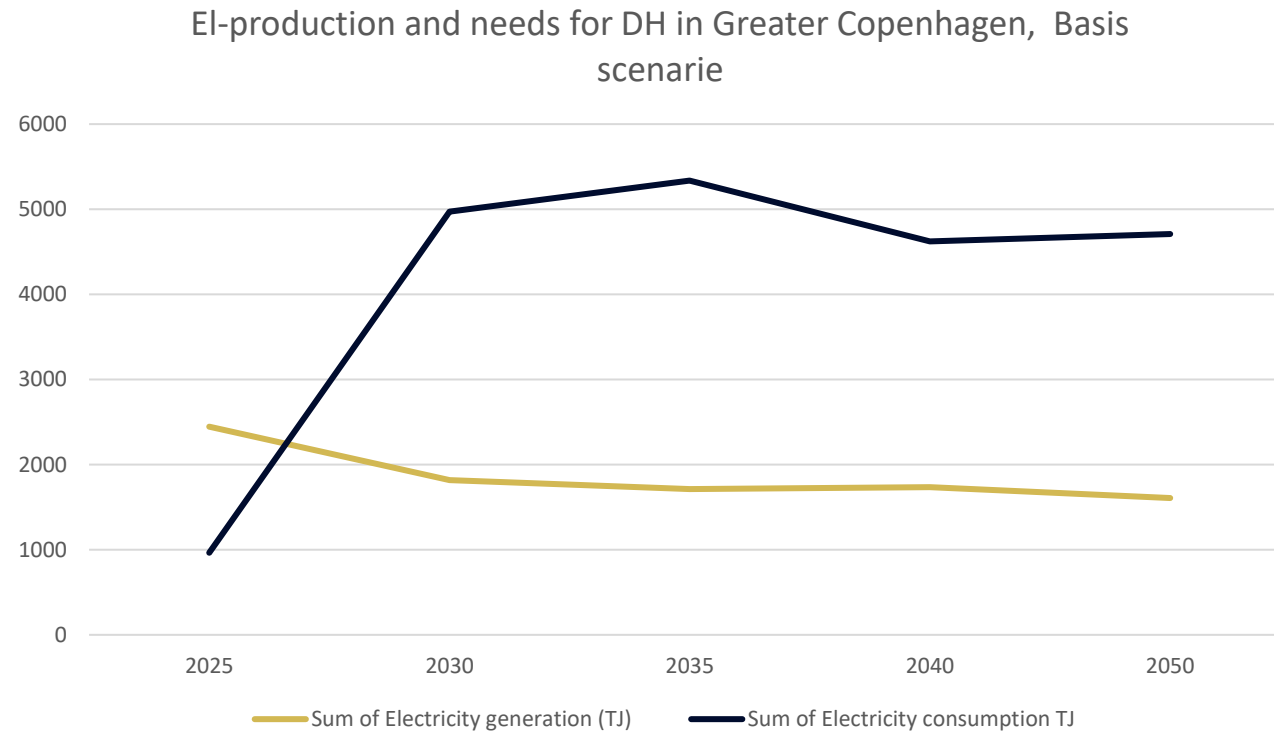


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# Electricity balance for electricity and heat production in Greater Copenhagen



# Towards 2035

**Consumption-based emissions for citizens in Denmark: 11-17 tons CO<sub>2</sub> pr. capita**

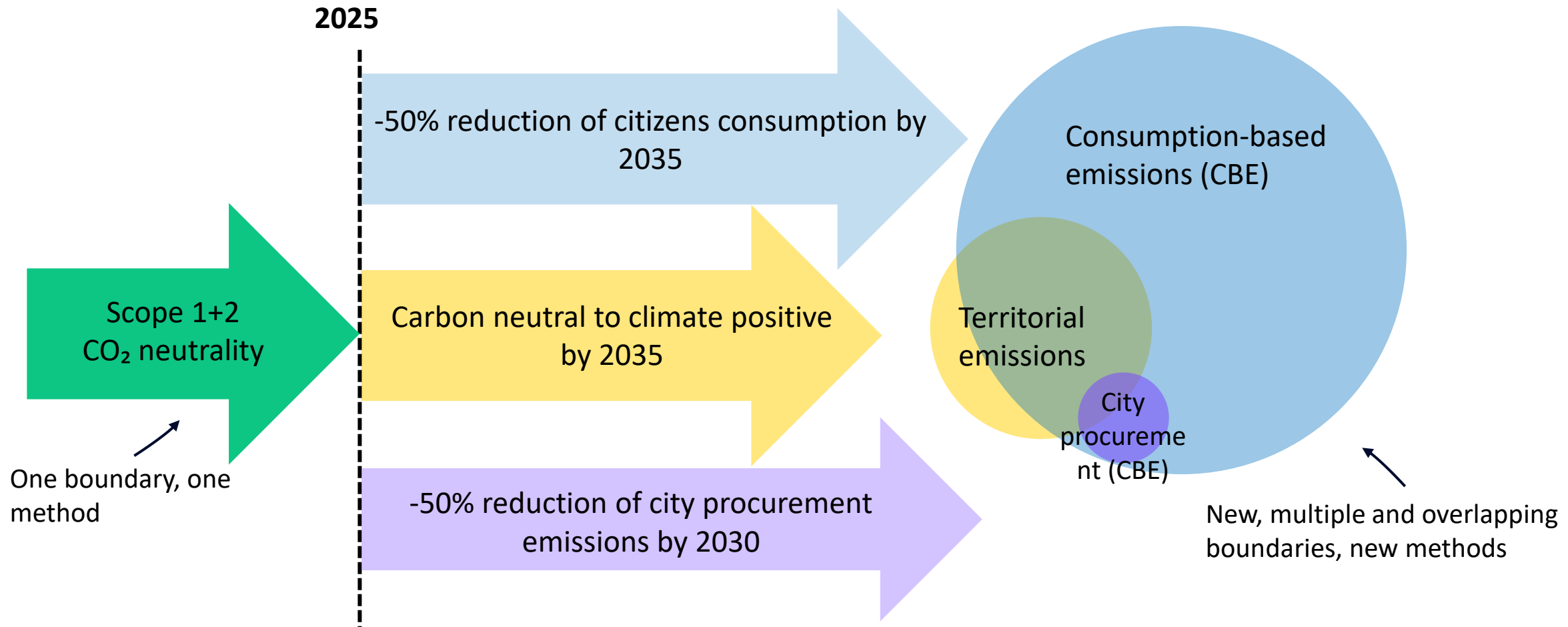
**Reduce CO<sub>2</sub> emissions of citizens' Consumption by 50%**

**Reduce CO<sub>2</sub> emissions in public procurement by 50%**

**Electrification of the integrated energy system**

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# New boundaries and methods



# Different types of consumption

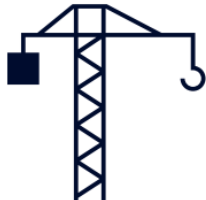


## **Private consumption –**

Residents' private consumption of goods/services both at home and when they are travelling



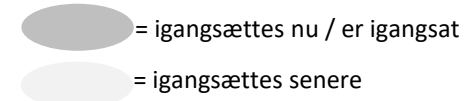
**Public consumption –** the state's, region's and/pr city's own consumption/procurement



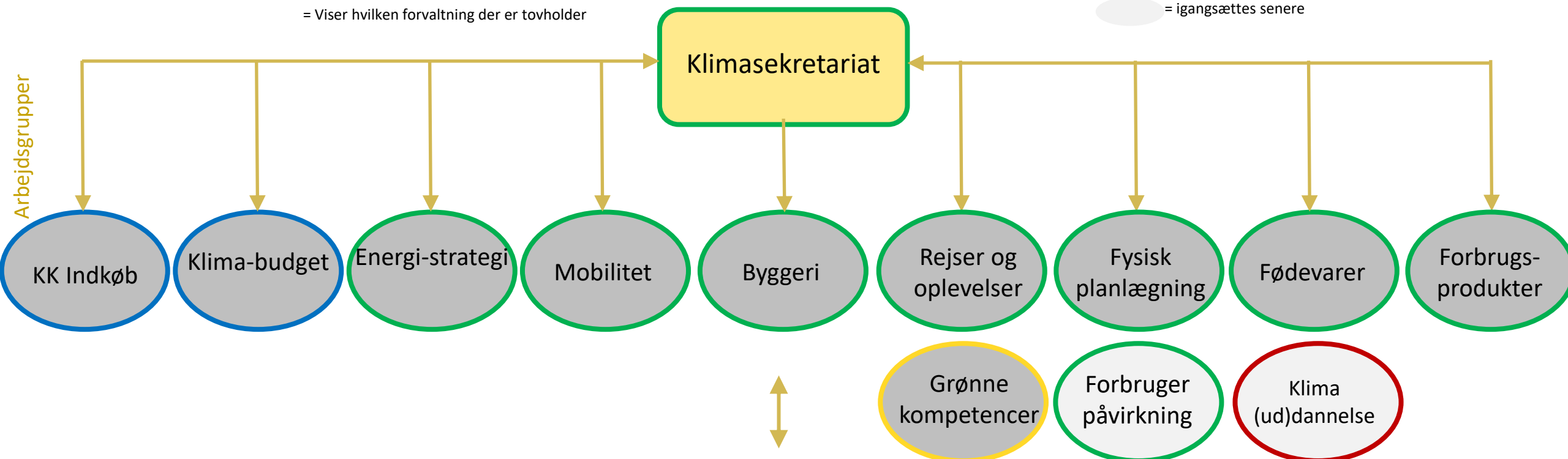
**Capital investments** - investments in buildings, plant, machinery and other 'permanent' infrastructure



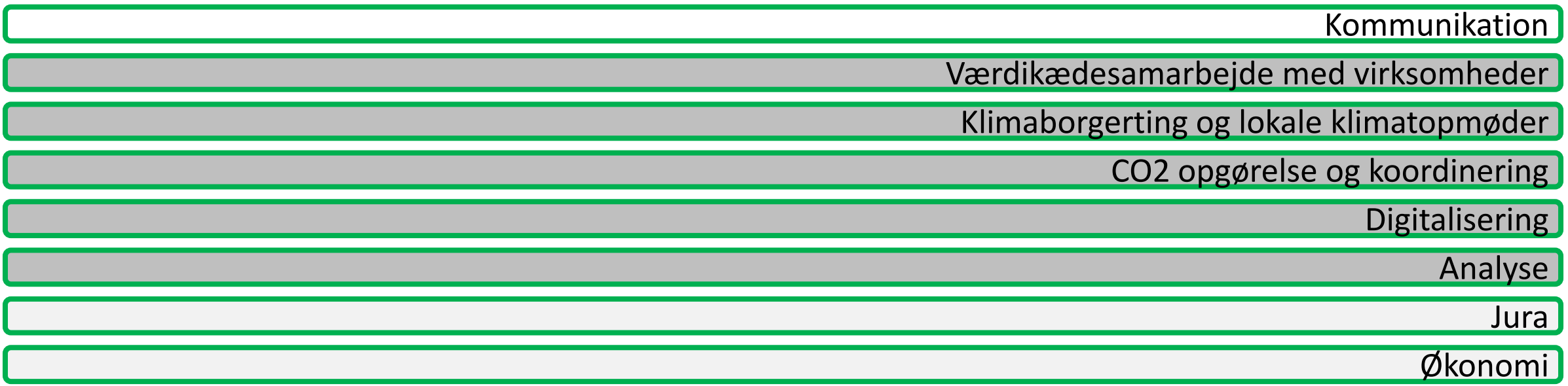
= Viser hvilken forvaltning der er tovholder



Arbejdsgrupper



Understøtter og koordinerer





# THANK YOU

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[www.kk.dk/climate](http://www.kk.dk/climate)

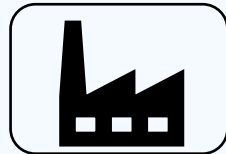


# Climate positivity

## Ways to remove CO<sub>2</sub> from atmosphere

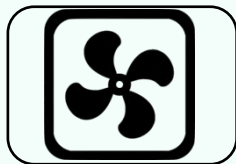


Natural CO<sub>2</sub> sinks



Technological CO<sub>2</sub> capture

## Ways to be climate positive



Capture more CO<sub>2</sub> than you emit



Buy CO<sub>2</sub> certificates or other accounting method

## Largest point sources of CO<sub>2</sub> in CPH

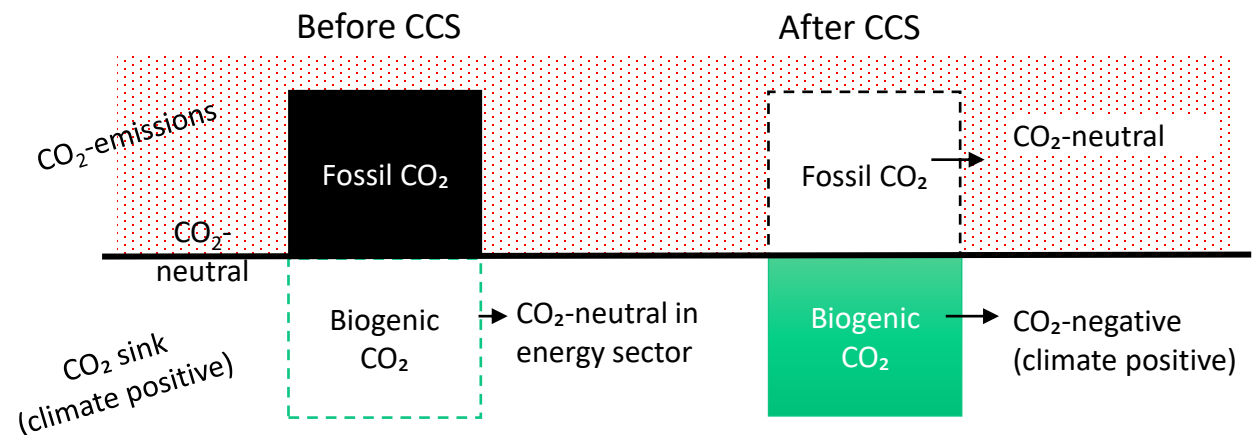


ARC



HOFOR

## Emissions... sinks... positive... negative...





# COPENHAGEN

## CAPITAL OF DENMARK



### INHABITANTS

City of Copenhagen  
**652.000**

The metropolitan area  
**1.359.000**

Greater Copenhagen  
**4.400.000**

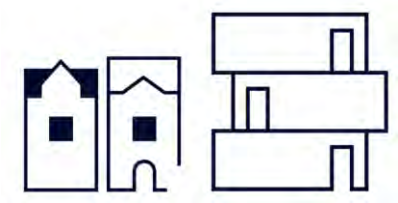
New inhabitants per month in Copenhagen  
**500**

Average age  
**36 years**

### AREA

City of Copenhagen  
**92,4 km<sup>2</sup>**

Inhabitants / km<sup>2</sup>  
**7.000**



### HOUSING

Homes  
**336.000**

Public Housing  
**19,9 %**

Apartments (2022)  
**93%**

Housing per capita (2022)  
**41,3 m<sup>2</sup>**

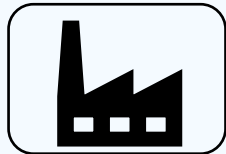


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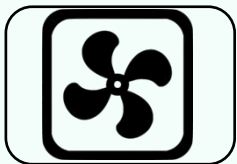


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