



Copenhagen  
Carbon Neutral  
by 2025

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# CPH CARBON NEUTRAL 2025

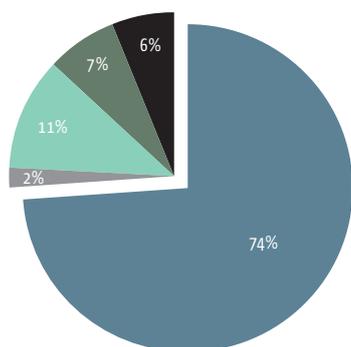
## - ENERGY PRODUCTION

By 2025, Copenhagen's electricity and heating will be mainly based on wind, biomass, geothermal energy and waste. The goal is to make district heating carbon neutral by 2025 and to ensure electricity generation based on renewable energy which in total exceeds the city's electricity consumption.

Energy production combining several different renewable energy sources ensure greater flexibility in the energy system. Flexible energy production allows you to meet the varying energy needs Copenhagengers and the city's businesses have throughout a twenty-four hour period in such a way that the use of energy resources is optimised. Meanwhile, the dependence on each individual energy source is reduced.

The energy production initiatives offers opportunities for green jobs. Partly in relation to the conversion to existing energy technologies, partly in relation to the development and demonstration of future green energy solutions in the world's major cities.

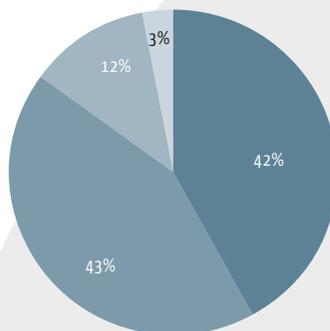
SHARE OF TOTAL CARBON REDUCTION



835.000  
TON CO<sub>2</sub>

ALLOCATION OF REDUCTIONS FROM  
ENERGY PRODUCTION INITIATIVES

- New initiatives
- Energy production
- City administration initiatives
- Mobility
- Energy consumption



- Wind turbines
- New biomass-fired combined heat and power plant
- Separation of plastic from burnable waste
- Conversion to biomass-fired peak load production

### MAJOR GOALS FOR 2025

- District heating in Copenhagen is carbon neutral.
- Electricity production is based on wind and biomass and exceeds total electricity consumption in Copenhagen.
- Plastic waste from households and businesses is separated.
- Collection of organic waste for biogas to be investigated.

### MAIN INITIATIVES

#### WIND TURBINES

The City of Copenhagen has launched an ambitious wind turbine project with the goal of installing over 100 wind turbines by 2025. The work includes the installation of wind turbines inside or outside the municipal boundary as well as onshore and offshore.

- Designation of four sites for seven wind turbines on Prøvestenen and Kalvebod South in 2012/13. The municipality attaches great importance to anchoring activities and initiatives in the local community as well as involving the citizens. The City of Copenhagen and Copenhagen Energy will therefore be giving Copenhagengers the opportunity to buy shares in wind turbines - initially in wind turbines in Copenhagen. It will also examine how businesses in Copenhagen can have an opportunity to contribute actively to the development of renewable energy.



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## - ENERGY PRODUCTION

- Wind turbines in other municipalities. Copenhagen Energy negotiating with landowners about sites.
- Amongst other actions, suitable locations for coastal offshore wind turbines in the Sound need to be found up to 2016.
- Additionally, Copenhagen Energy has been mandated to participate in joint ventures that can bid on government tenders for wind turbines at for example, Krieger's Flak.

### HEAT GENERATION AND BIOMASS

- The City of Copenhagen wants an energy system to be set up with multiple sources of energy that can supplement each other, so the city will have a flexible electricity and heat supply. This means, amongst other things, that biomass-fired CHPs must adapt energy production when the wind is not blowing, as the turbines will produce less energy.
- By 2025, Copenhagen must be supplied by carbon neutral heating, based primarily on biomass and geothermal energy. The power stations at Amager and Avedøre will be converted to biomass, and a new biomass-fired CHP (combined heat and power plant) capacity will be established in Copenhagen.
- Conversion of peak load and off-peak loads to the production of carbon neutral fuels.
- Today, there is a geothermal demonstration plant at Amager power station, where a certain amount of operational experience has been gained that can be used for the future. Within the next few years, a final decision must be taken on the role of geothermal energy in energy production in Copenhagen, including Copenhagen Energy's role in any such production.

### WASTE AND ENERGY SUPPLY

Amager incineration plant is wearing out, and work is therefore being carried out to construct a new plant where incineration will possibly be complemented by other technologies that can increase the recycling of plastics and the production of biogas from organic waste.

Copenhagen must take more steps to prevent, separate and recycle plastics from households and industry. When plastic waste is incinerated, it contributes to the energy supply. However, it emits carbon because the plastic is a petroleum product.

- New high-tech waste treatment plant.
- Collection and processing of organic waste into biogas by 2025.
- Plastics to be sorted for recycling by 2025.

### ECONOMY

Copenhagen Energy construction costs for 360 MW of wind turbines are estimated to be DKK 5.5 bn. The City of Copenhagen will stand guarantor for Copenhagen Energy borrowing money for profitable wind projects. The guarantee will be made after political examination, in tune with the maturing of each project.

Investment in electricity and heat generation is partly funded by energy companies and partly funded by district heating charges. However, the City of Copenhagen may decide to make loan guarantees for:

- wood-fired CHP of 115-350 MW, representing an investment of DKK 1.5-4 bn.
- A geothermal plant (65 MW), representing an investment of about DKK 1 bn.
- A heat storage tank (capacity 200 MW), representing an investment of DKK 0.2 bn.

Initiatives in the area of waste management are rate funded. It is estimated that a Clean Science plant with a capacity of 80,000 tons of waste per year costs DKK 0.4 bn in capital expenditure, while a biogas plant with a capacity of 50,000 tons of waste per year is estimated to cost DKK 120-150 million in capital expenditure.