



CLAS: Colby Liberal Arts Symposium

May 1st, 9:00 AM - 10:00 AM

Copenhagen: a Case Study of one of the Most Sustainable Cities in the World

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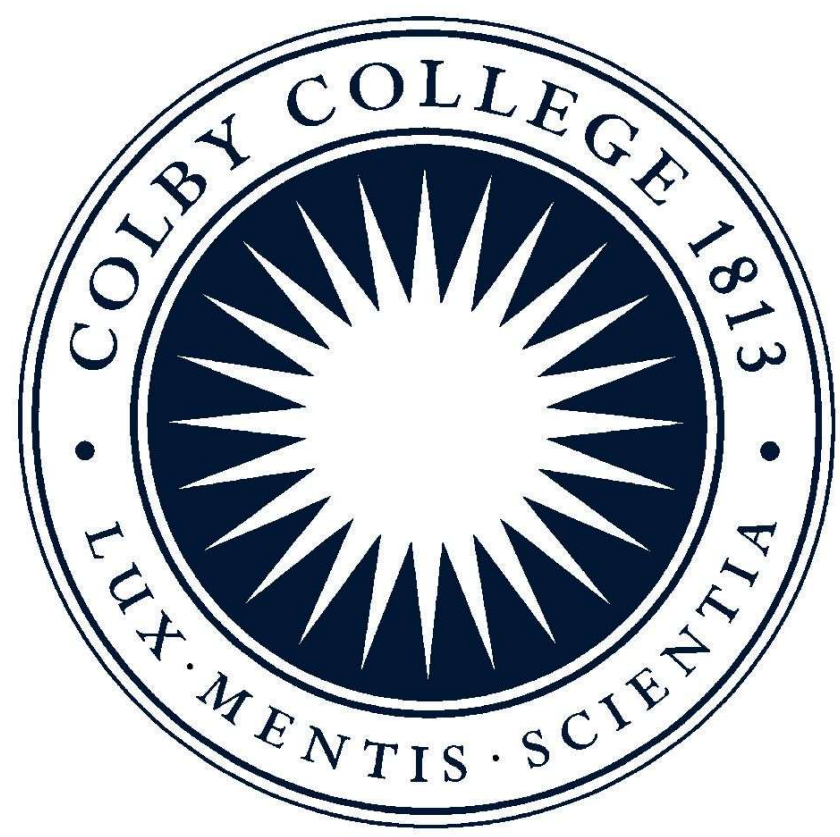
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COPENHAGEN: BECOMING ONE OF THE MOST SUSTAINABLE CITIES IN THE WORLD

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ES 276: Exploring the Anthropocene, Environmental Studies Program, Colby College, Waterville, ME

Copenhagen is a coastal city in Denmark that is leading the way in sustainable development. Through innovative technologies and policies, they provide the globe with a model for mitigating human's impact on the earth.

Copenhagen aims to be Carbon Neutral by 2025

- Integrating Climate into Energy Supply
- Greener Transport
- Energy Efficient Buildings
- Copenhagengers and Climate
- Climate in Urban Development
- Adapting to the Future Climate

MEASURES FOR 2025	REDUCTION POTENTIAL, TONNES CO ₂
ENERGY SAVINGS	230,000
ENERGY SAVINGS IN THE MUNICIPALITY'S OWN OPERATIONS	19,000
CONVERSION OF BIOMASS	300,000
GEOTHERMAL POWER	25,000
SOLAR HEATING	1,000
HEAT PUMPS AND ELECTRICAL ELEMENTS	65,000
IMPROVED WASTE SEPARATION	9,000
INCREASED WINDMILL CAPACITY	925,000
URBAN DEVELOPMENT	30,000
REDUCED ROAD TRAFFIC	150,000

Energy Efficient Buildings

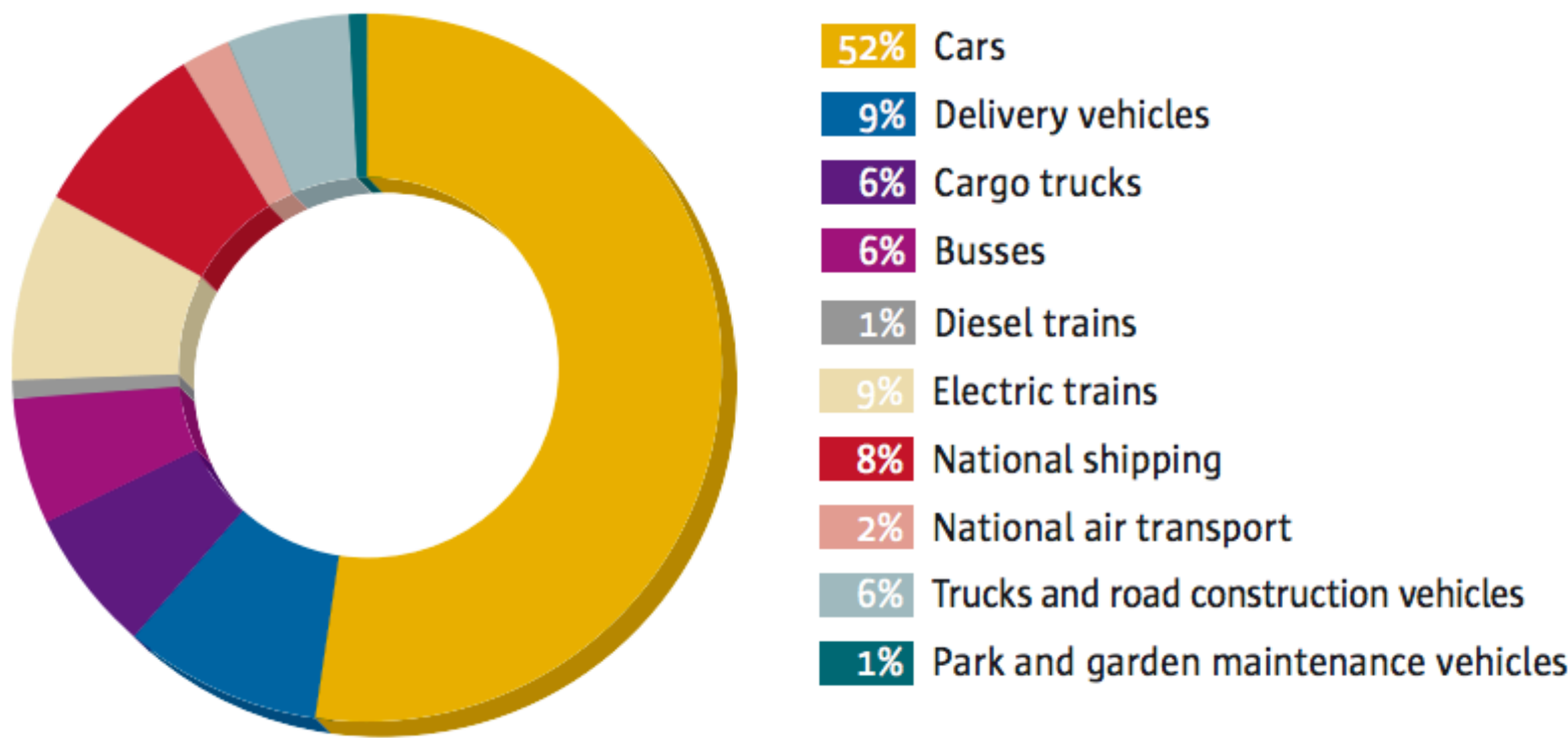
Goals: 10% of total CO₂ reductions will be achieved through construction and renovation projects

- Expected savings of 2 million Euros/year in energy savings from municipal buildings
- The Adelgade cooling plant takes cold seawater from canals and pumps it through pipes to cool homes. Every degree Celsius saved by using this system saves 15% on electricity
- Heating will come from biomass fuel and geothermal systems

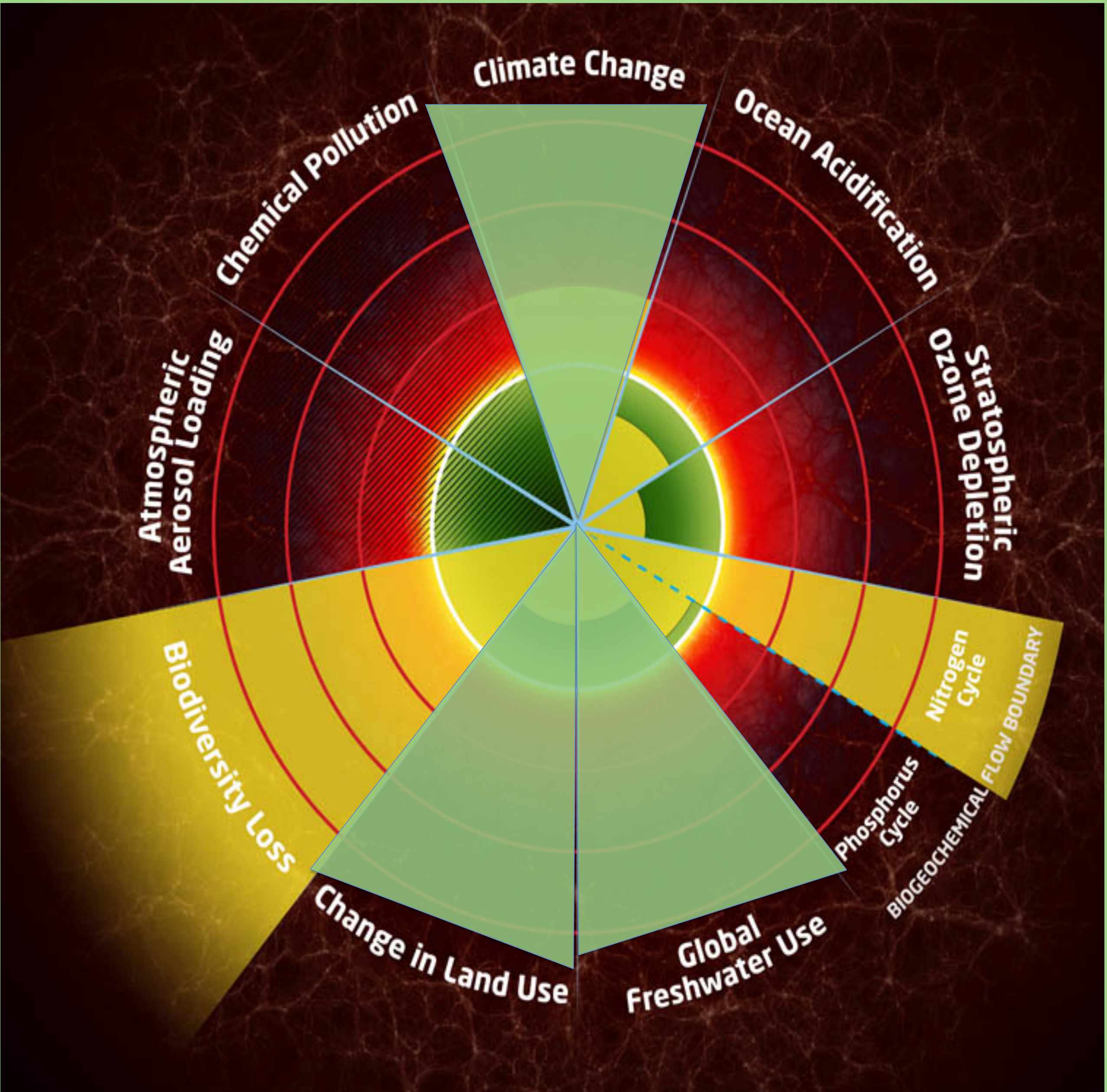
Greener Transport

Goals: By 2015, 85% of the city's vehicles will be electric, hydrogen, or hybrid powered.

- Electric cars will run on wind energy
- By 2015, 50% of Copenhagengers will commute on bicycles



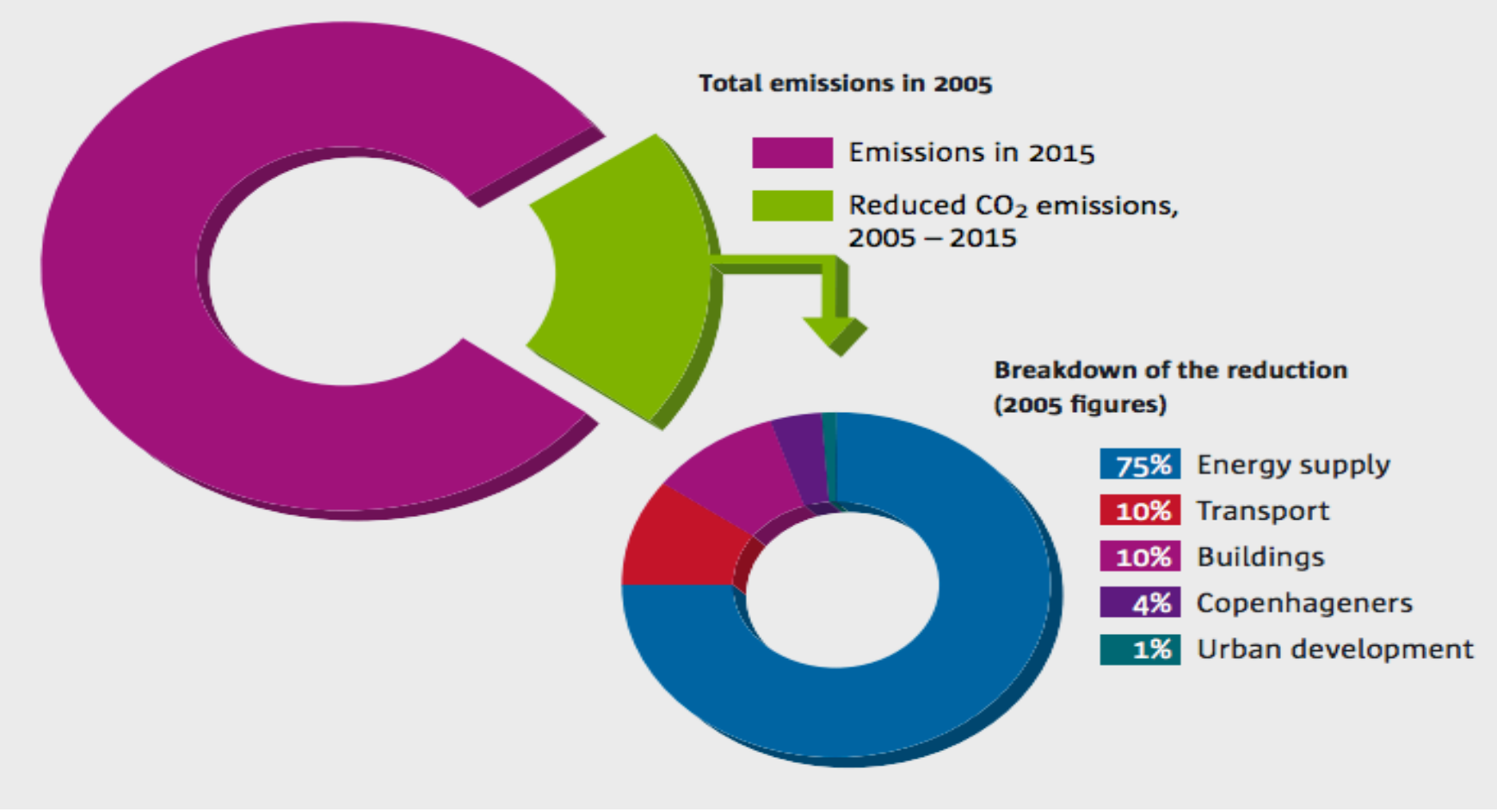
Aspects of the Anthropocene Copenhagen Working to Improve



Integrating climate into Energy Supply

Goals: By 2015, Copenhagen will meet 75% of combined CO₂ reduction by upgrading its energy supply

- By 2020, 50% of electricity will be supplied by **wind power**
 - Citizens can buy shares in turbines to make yearly profits
- Plan to implement 100 wind turbines by 2025
- Biomass** will replace 40% of traditional coal at Amager power station
- Heating **with geothermal energy** will increase 6-fold at Margretheholm facility



Copenhagengers and Climate

- After switching from a collective water bill shared by apartment buildings to individual water meters, water consumption fell by 26%.

Moving forward:

- Through citizens' daily efforts, Copenhagen will achieve 4% of its CO₂ reduction goal.
- Copenhagen will establish new educational institutions, such as its new virtual climate science center, which will motivate Copenhagengers to participate in sustainable practices.

Adapting to the Future Climate

The most pressing issues for the coastal city of Copenhagen are sea level rise and increased precipitation, which can lead to damaging floods. Also, as population rises, cities around the world are vulnerable to the "heat island effect", so Copenhagen must also plan for and minimize heat waves.

Pocket parks & Green Roofs



- Reduces the heat island effect that contributes to many cities' heat waves and demand for energy consuming artificial cooling.
- Green roofs, green wall, and pocket parks increase the amount of infiltration into groundwater and relieves sewage systems of excess water, restoring natural water cycles as much as possible
- Bicycle routes have been created to enable an easy transportation alternative to driving
- By 2015, 90% of Copenhagengers will live within 15 minutes walking distance of a public park and 14 pocket parks will be established throughout the city.

Adaptive Urban Planning

- Convex streets to redirect excess or storm water to the harbor
- Planting trees along roads to mitigate flooding to decrease impervious land area
- Establish new bicycle lanes to encourage cycling

Water

Copenhagen has taken measures to modernize its **sewage** system and **wastewater** treatment plants, which has reduced urban flooding, reintroduced biodiversity, saved energy, and created space for recreation

- Instead of draining wastewater into the harbor, it is stored in rainwater reservoirs until there is adequate space in the sewage system
- Excess sludge at sewage plants undergoes a conversion process to be used as energy and heat.
 - This process fuels 77% of energy consumption of the treatment plants, and surplus can be used to heat nearby homes.
- Careful cooperation with neighboring coastal cities prevents overexploitation of freshwater resources.