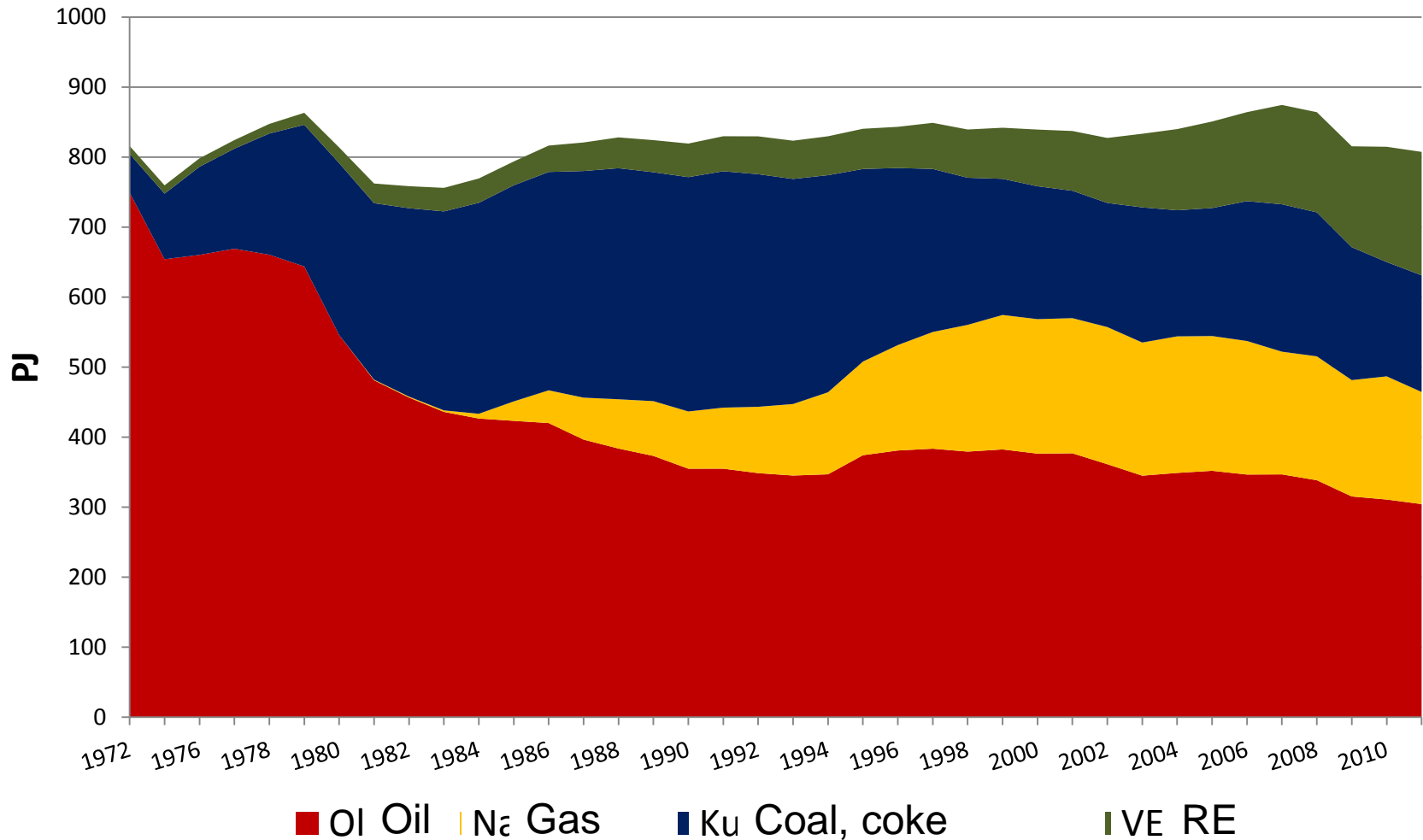


WtE in the Green Energy System

Jacob H. Simonsen
(Danish Waste Association)

Net energy consumption in Denmark

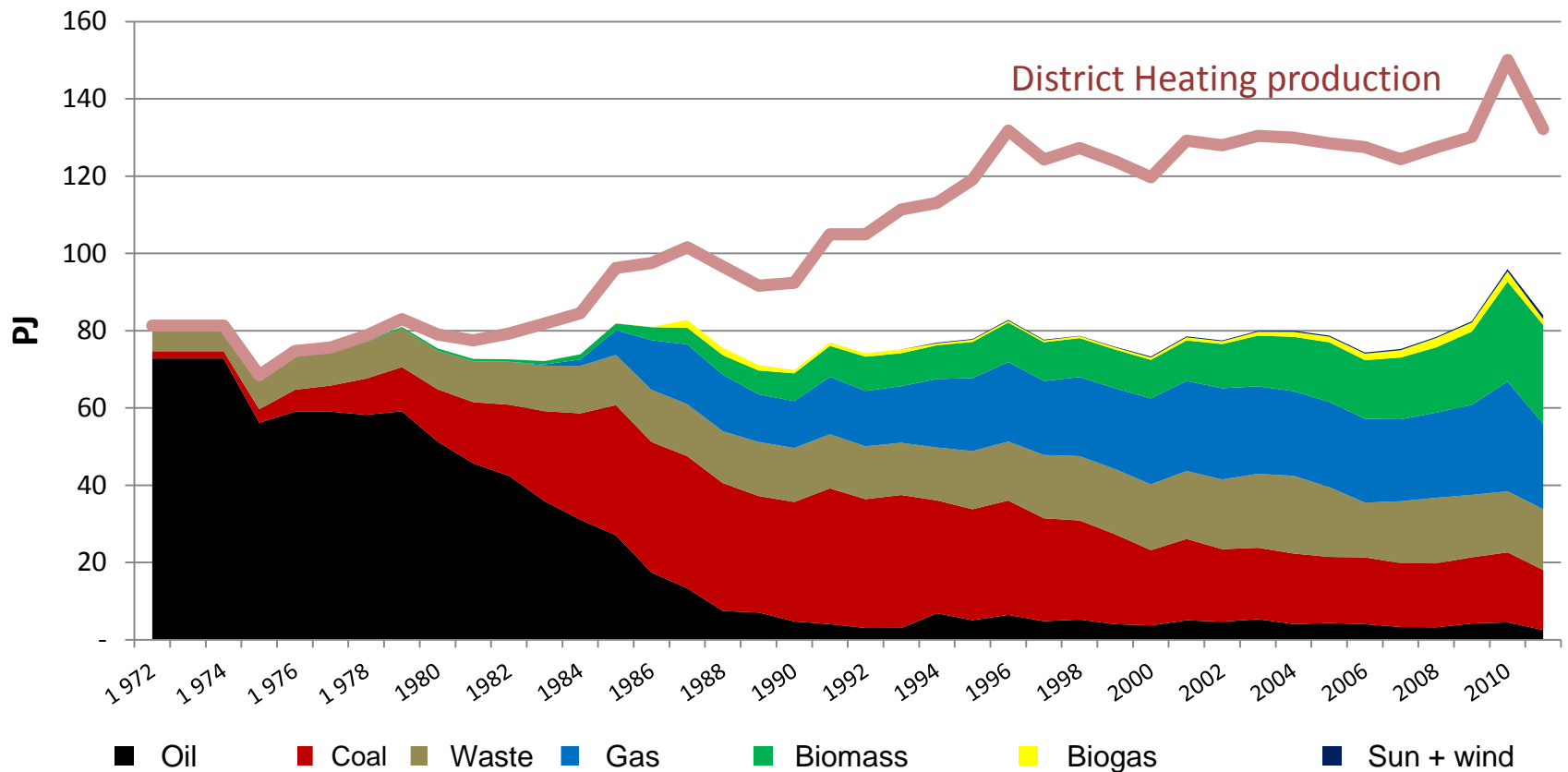
1972 - 2011



Source: Danish Energy Agency, energy statistics 2011

District Heating in Denmark

1972 - 2011



Source: Danish Energy Agency, energy statistics 2011

The role of waste in the future Energy system

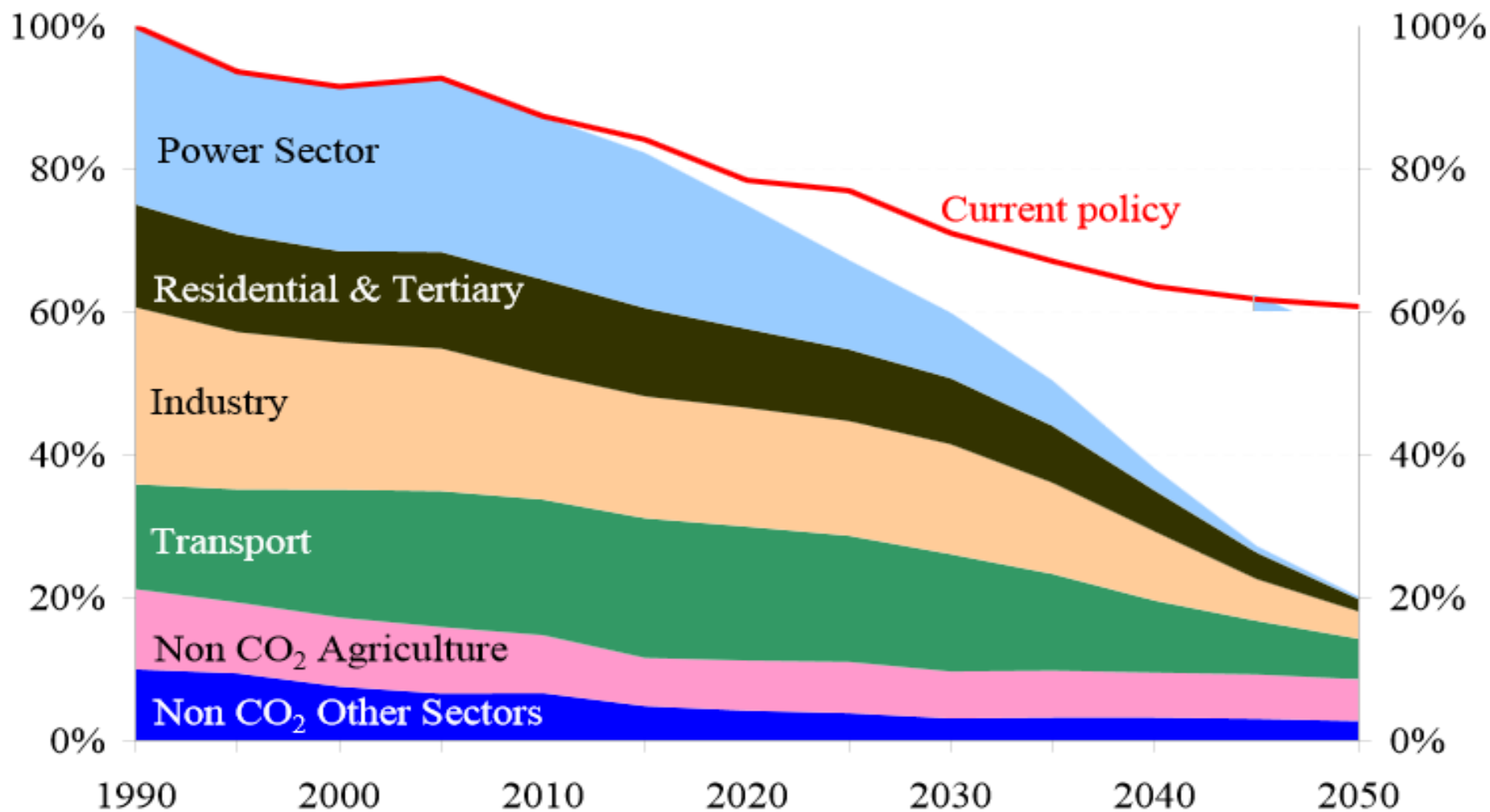


Energy efficiency



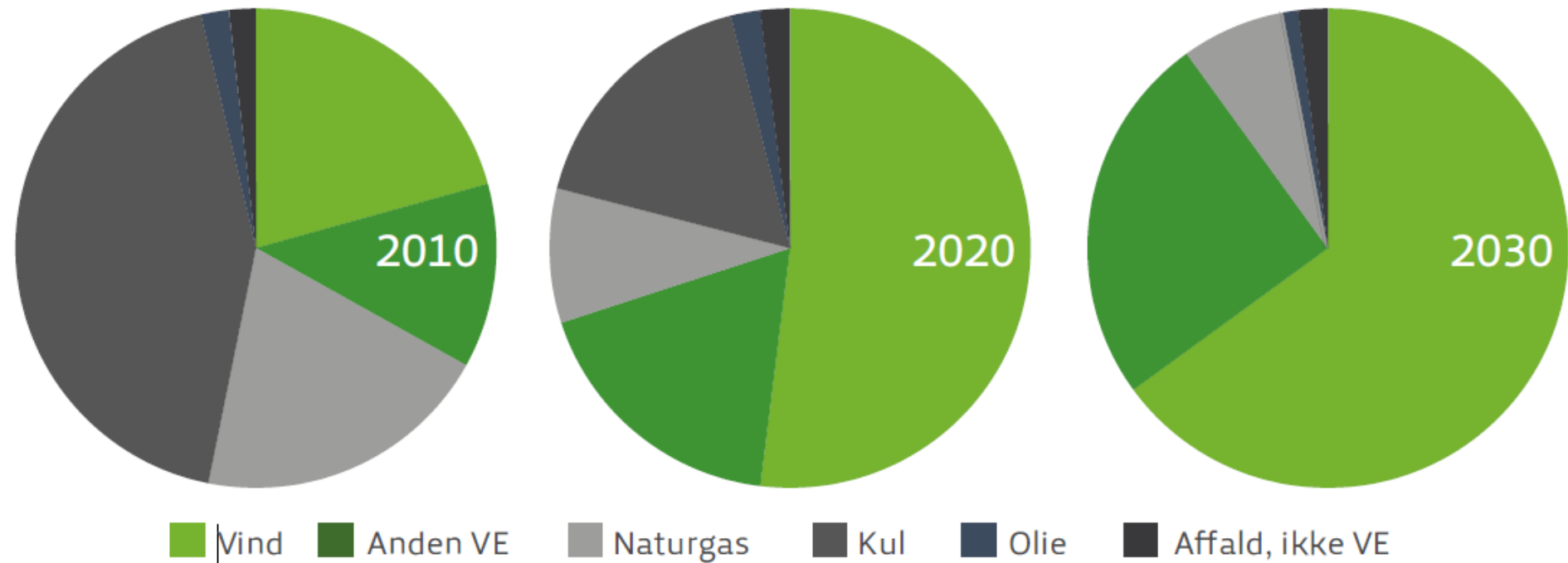
A Roadmap for moving to a competitive low carbon economy in 2050

Figure 1: EU GHG emissions towards an 80% domestic reduction (100% =1990)





Future electricity production



Figur 3.2 El-produktion fordelt på energikilder (korrigeret for elhandel)

District Heating Analysis

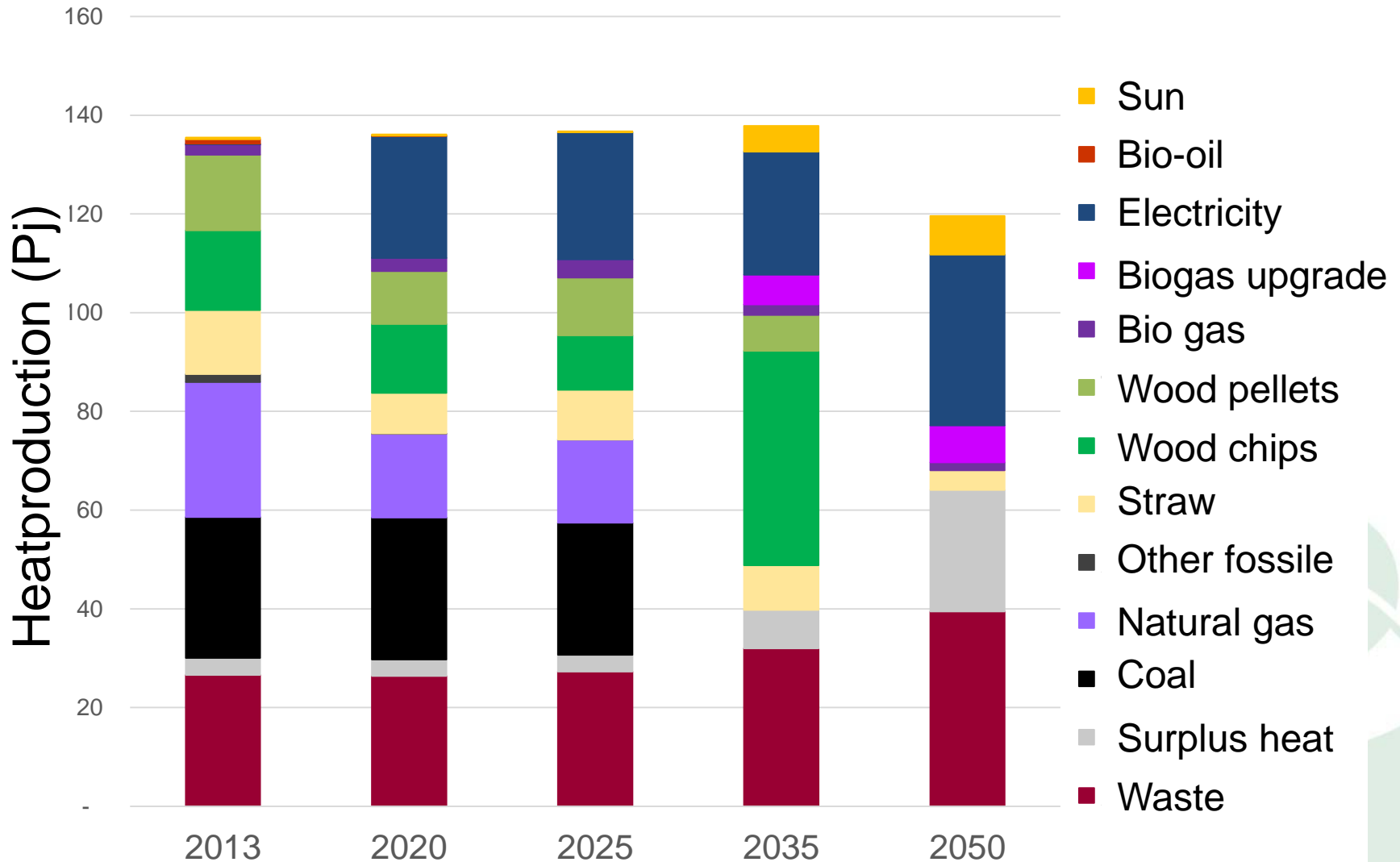
Draft report, November, 2013

COWI

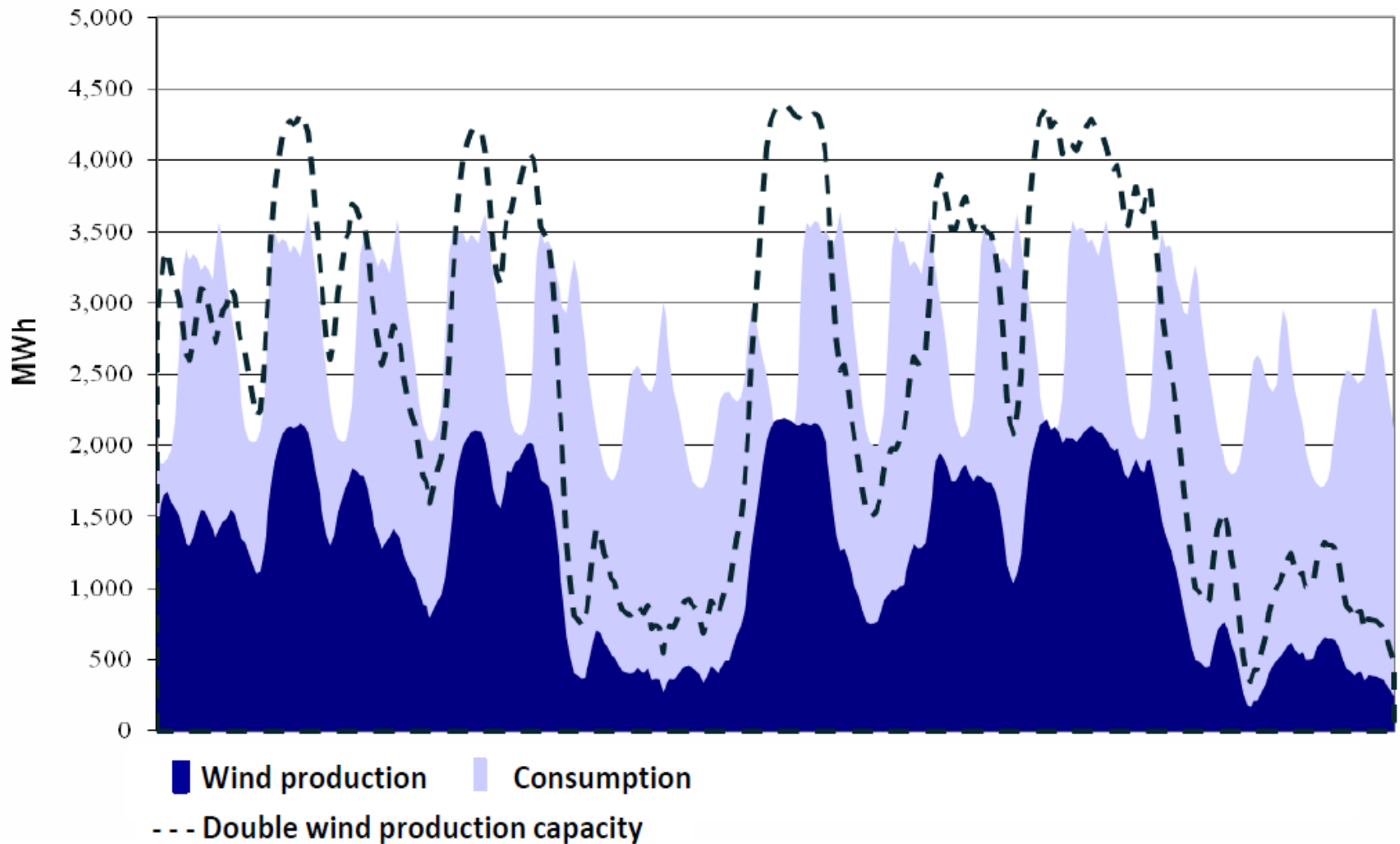


District Heating production

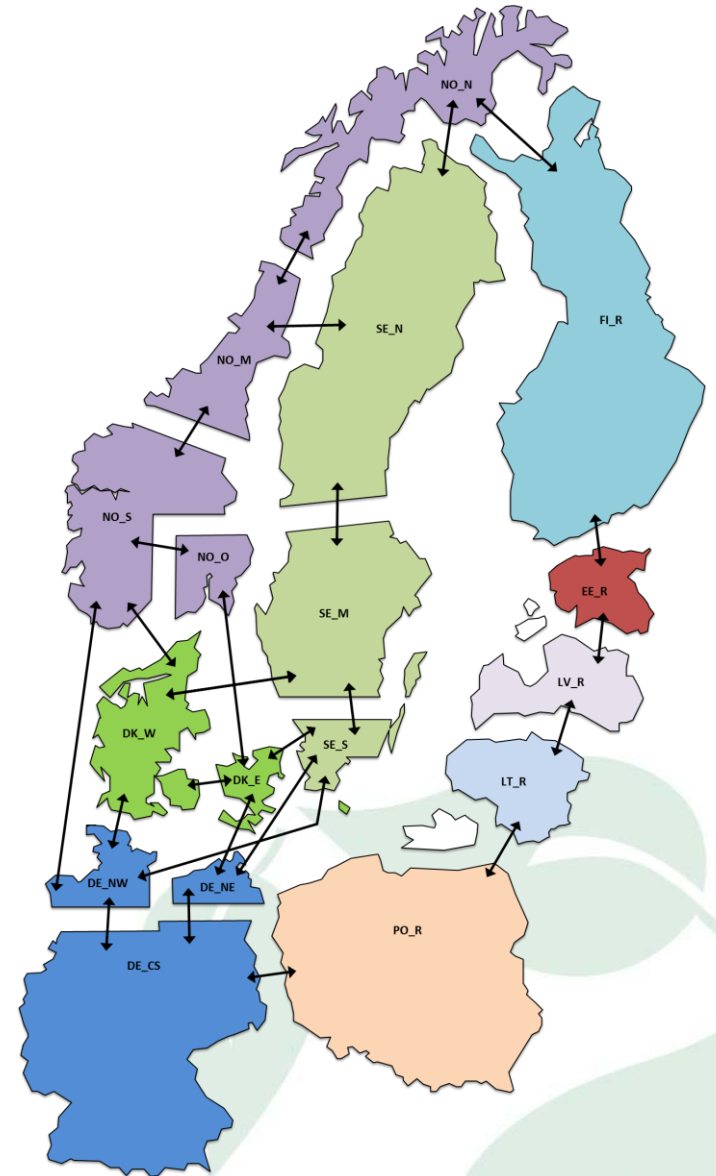
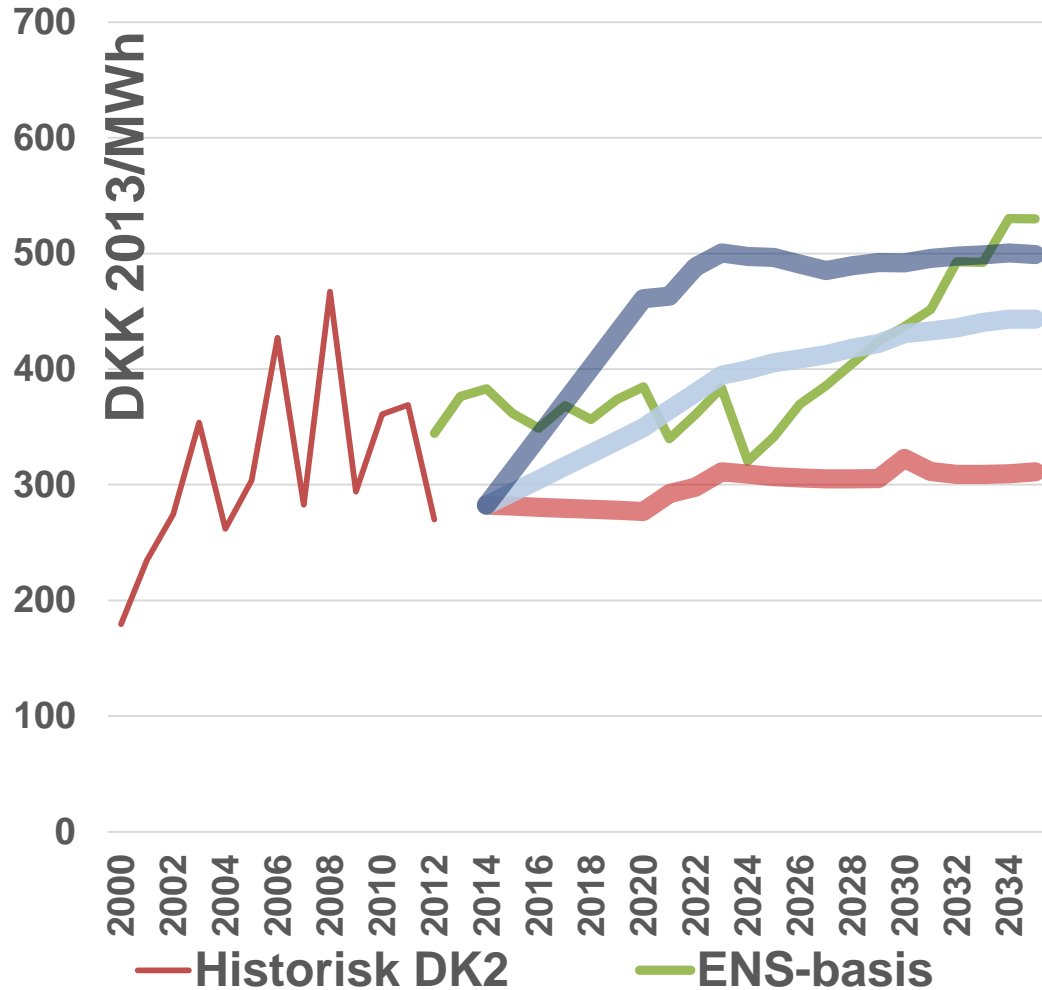
(socio-economic most efficient)



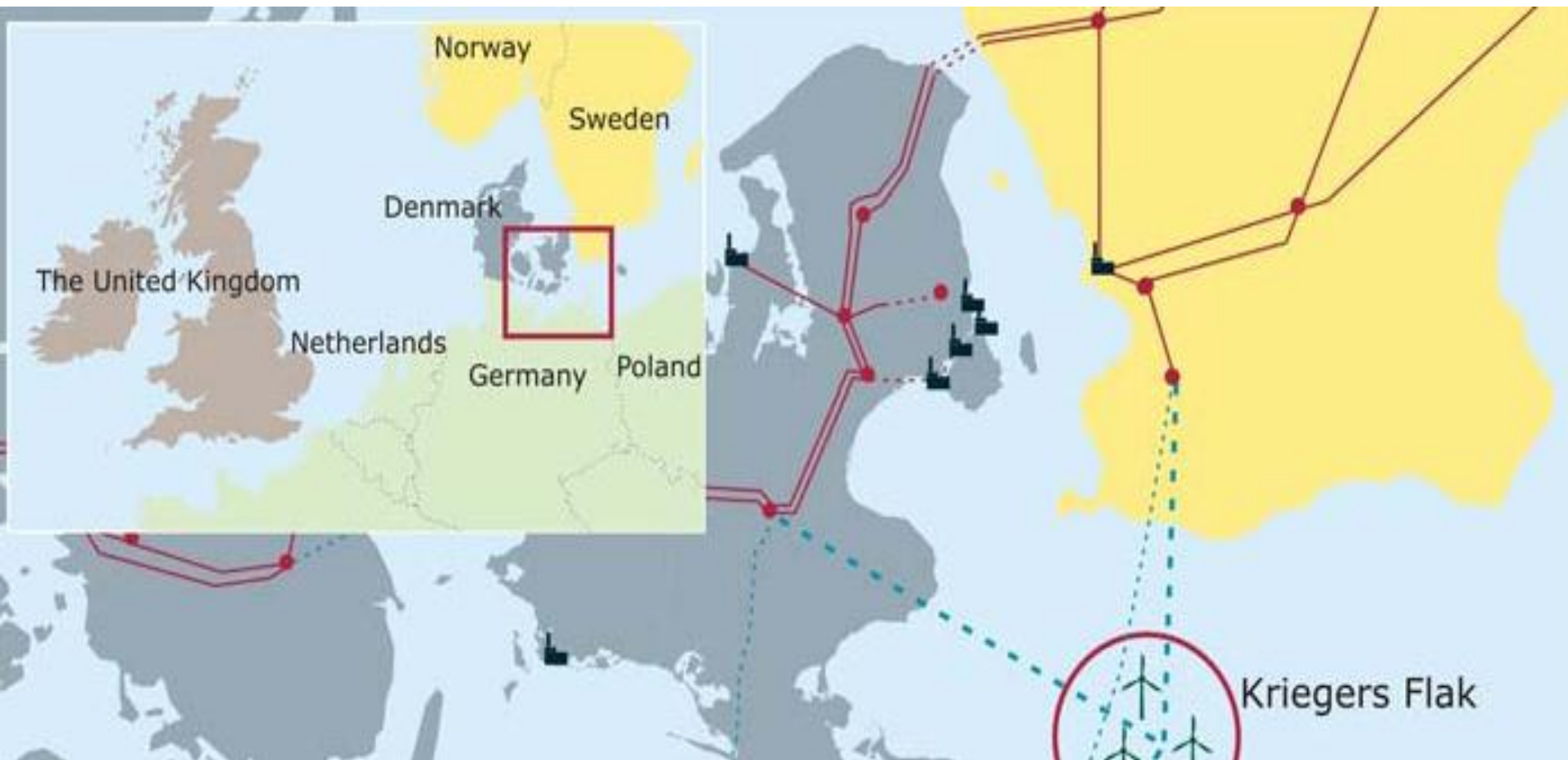
Consumption and wind energy production in West Denmark from 4-17 December 2006



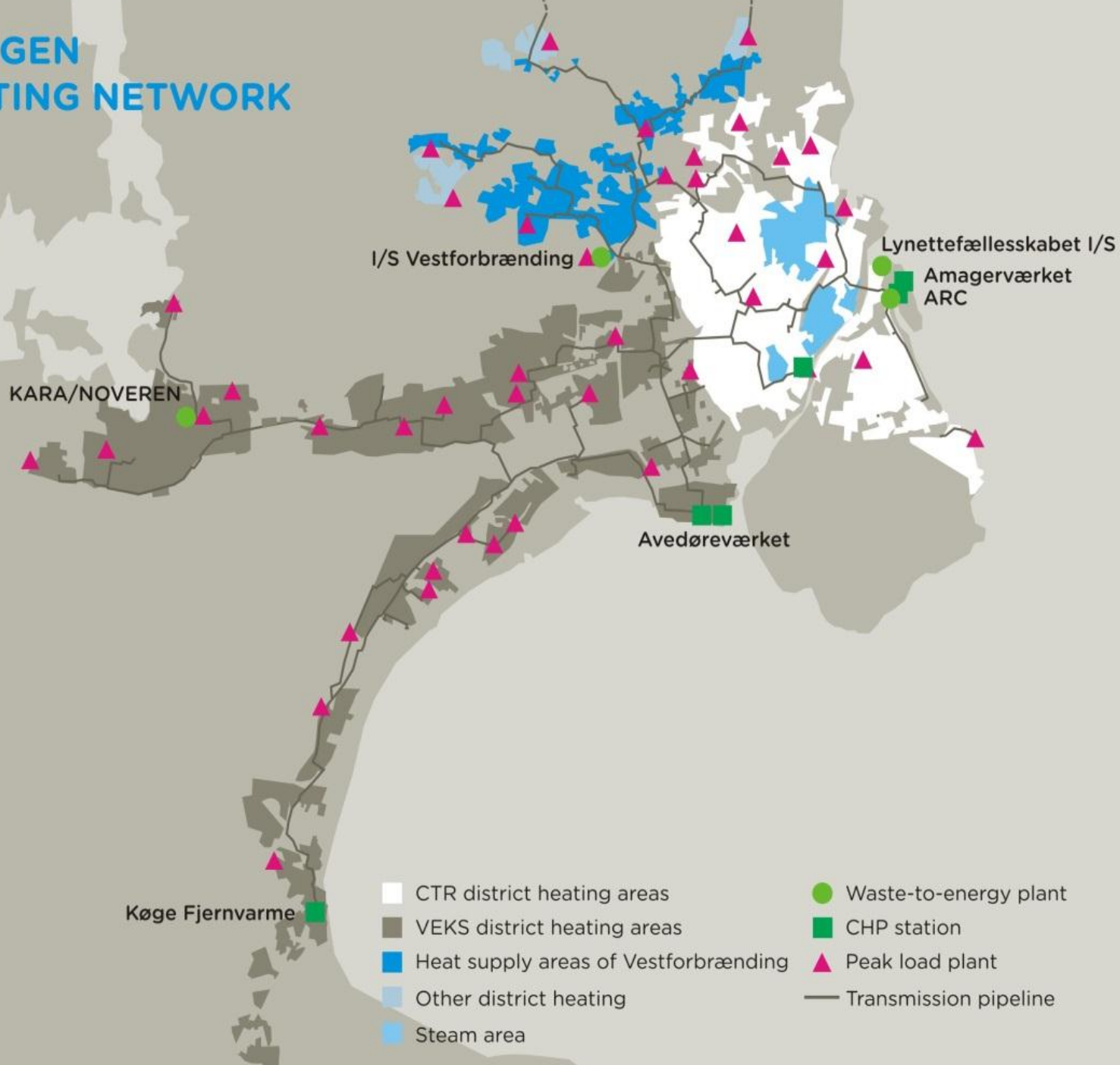
Electricity price scenarios



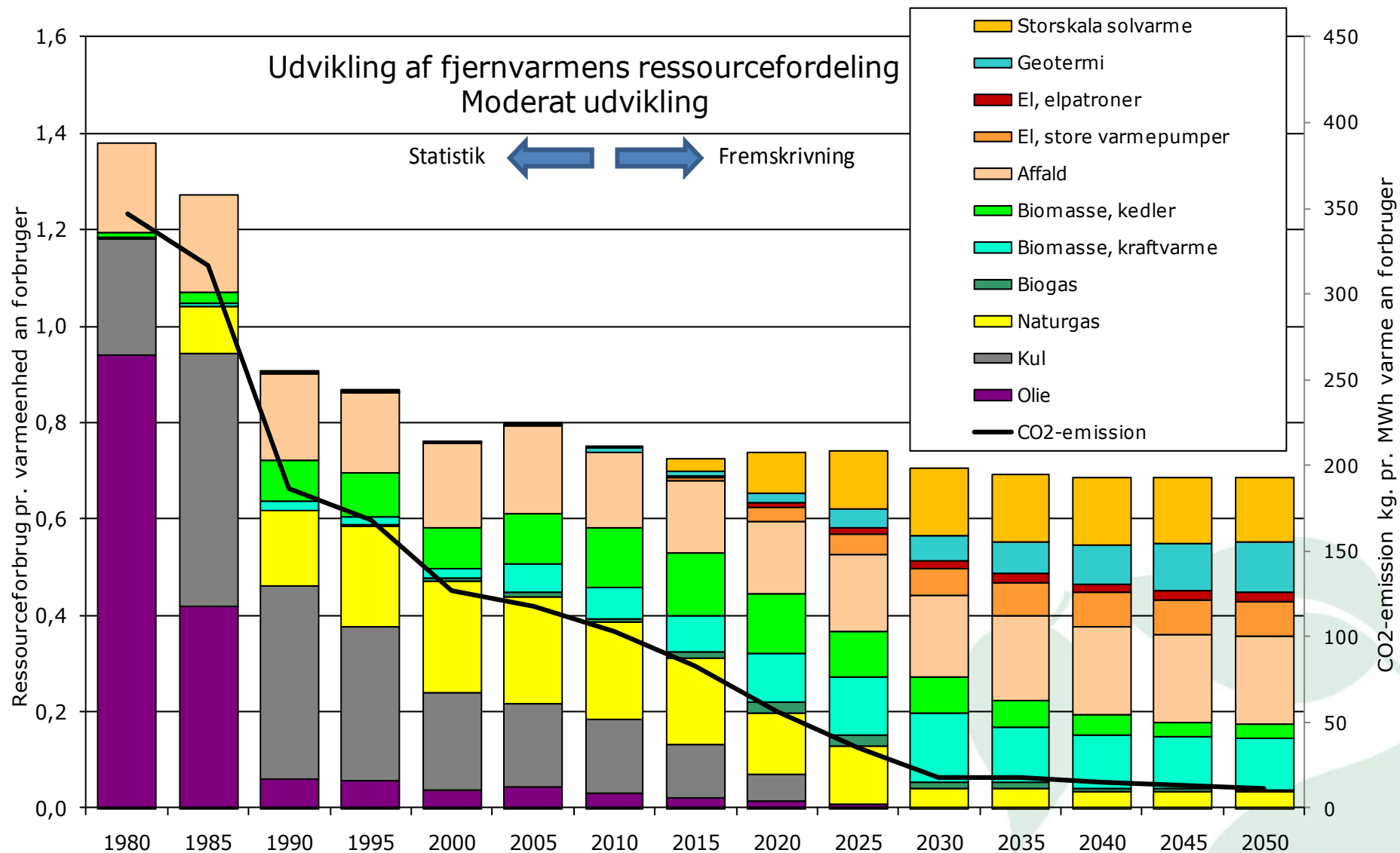
Electricity production in Copenhagen



THE COPENHAGEN DISTRICT HEATING NETWORK



Fossil fuel replaced by bio and wind



Smart cities have Smart Back Yards

AVEDØRE

- New power plant site located with respect to the heat market
- CHP multi-fuel gas, coal, straw, wood pellets
- CHP with 2x22.000 m³ heat accumulators
- Waste water treatment plant
- Wind

AMAGER

- CHP biomass, coal
- Waste-to-energy
- Geothermal energy
- Waste water treatment plant
- Sludge incineration
- Biogas to city gas
- Wind



Smart WtE

- Turbine bypass
- Boiler regulation 40% load not 70%
- Stop waste flow
- District cooling
- Heat storage
- Big size waste bunkers

