

Nordic Energy Technology Perspectives

Pathways to a Carbon-Neutral Energy Future



norden

Nordic Energy Research



International
Energy Agency

Energy Technology Perspectives 2012

Pathways to a Clean Energy System



Project participants



Project
management



UNIVERSITY OF ICELAND



Ea Energy Analyses



SINTEF



ROYAL INSTITUTE OF TECHNOLOGY



CHALMERS



Working Group



The Research Council of Norway



Swedish Energy Agency



DANISH ENERGY ASSOCIATION



NORWEGIAN MINISTRY OF PETROLEUM AND ENERGY



TVÖ-ARBEIÐS- OG VÆÐINGAMINISTARÍÐIÐ
ARBEIÐS- OG VÆÐINGAMINISTARÍÐIÐ
MINISTRY OF EMPLOYMENT AND THE ECONOMY



Finnish Energy Industries



JRC

EUROPEAN COMMISSION



Tekes



ORKUSTOFNUN

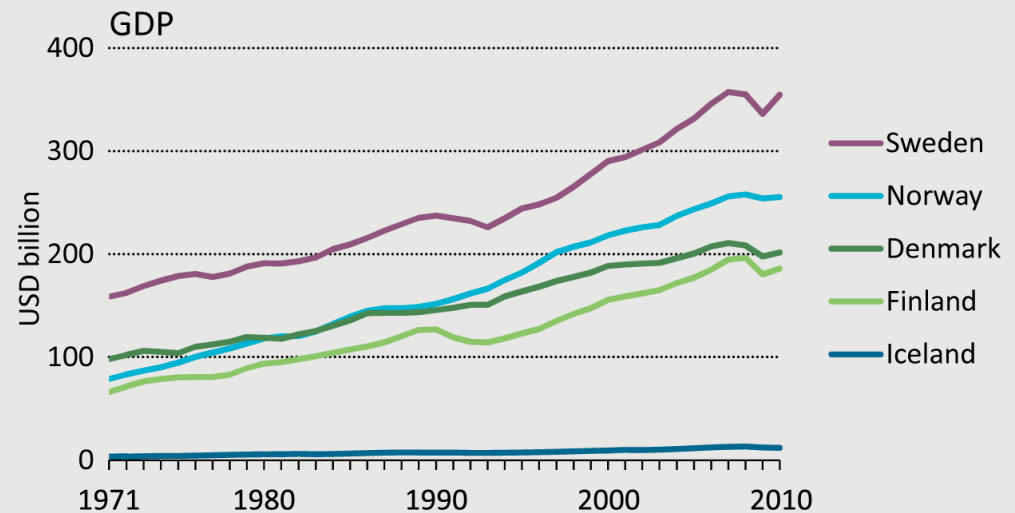
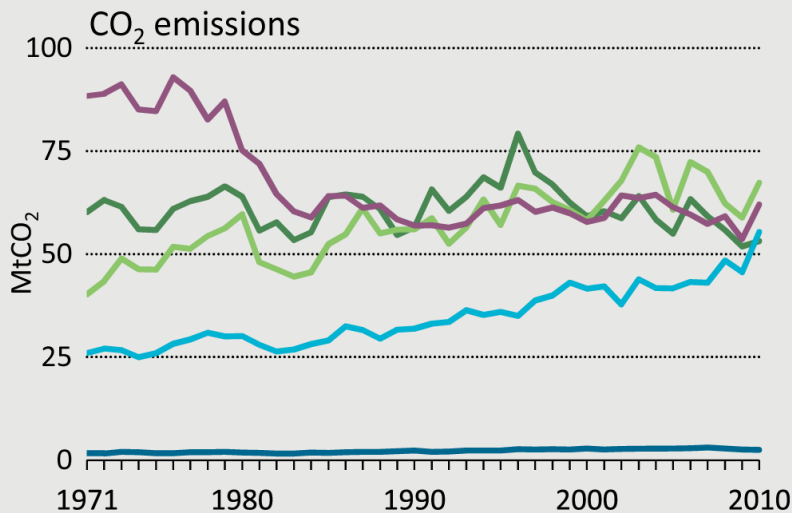
National Energy Authority



NORDENERGI

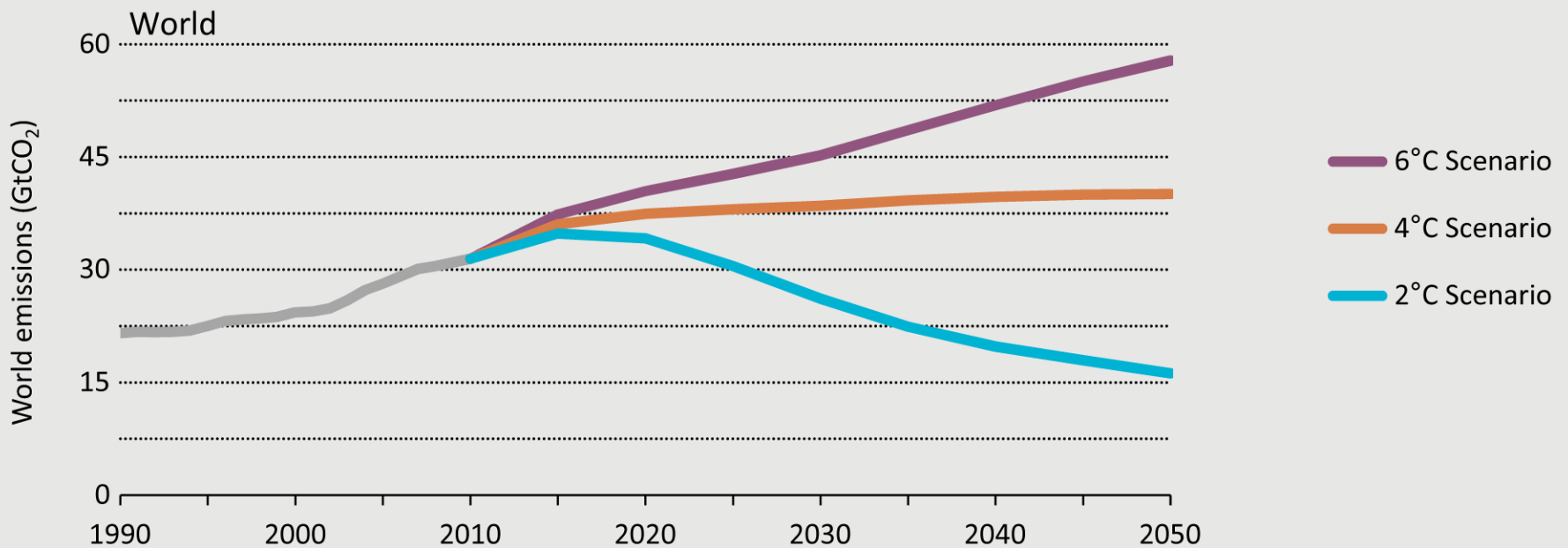
Reference Group

Decoupling of Nordic CO₂ emissions and GDP

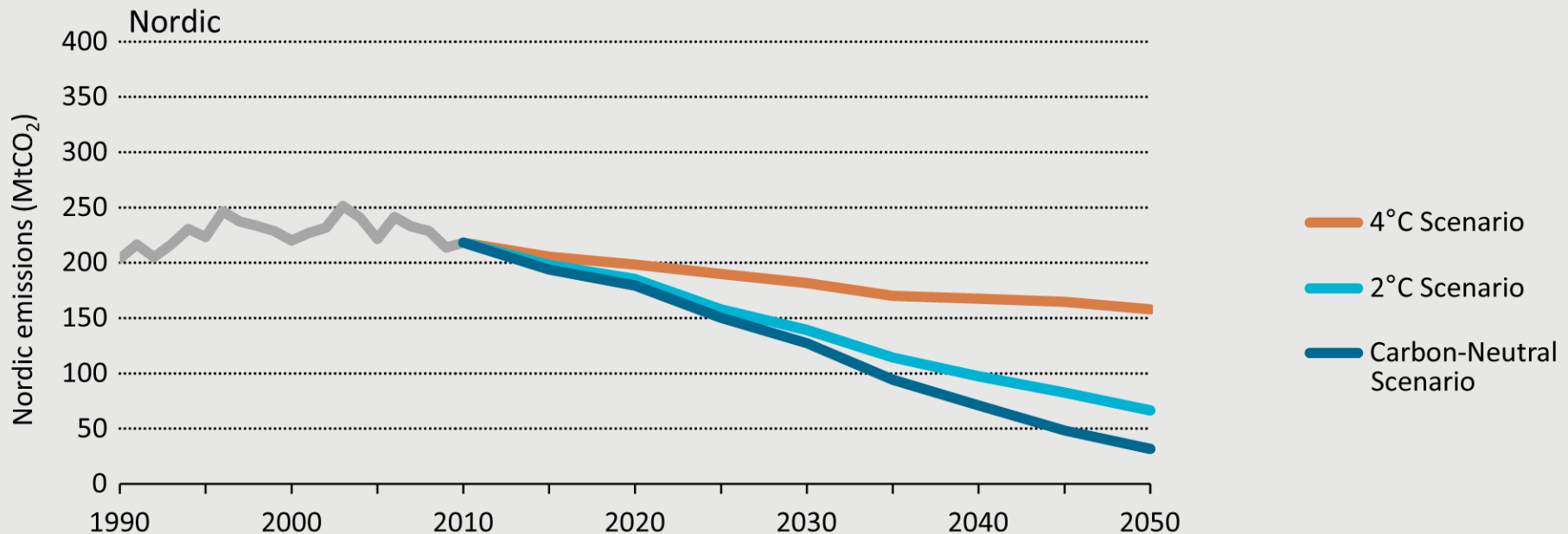


The Nordic region has seen a steady increase in GDP while limiting CO₂ emission growth

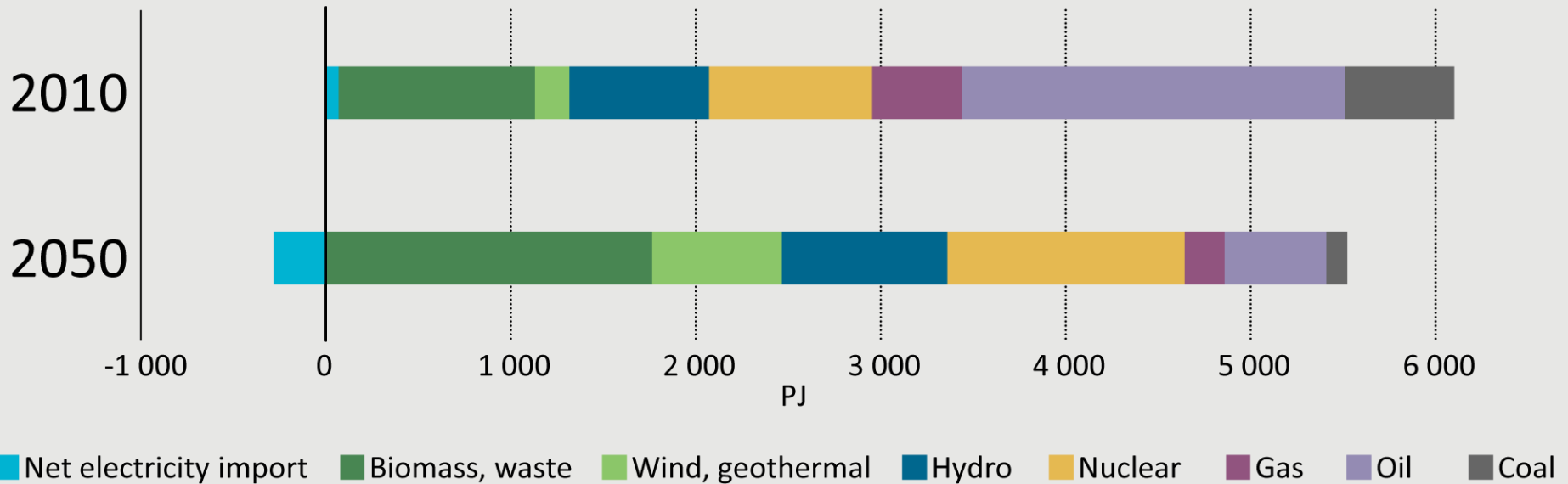
Global energy-related CO₂ emissions



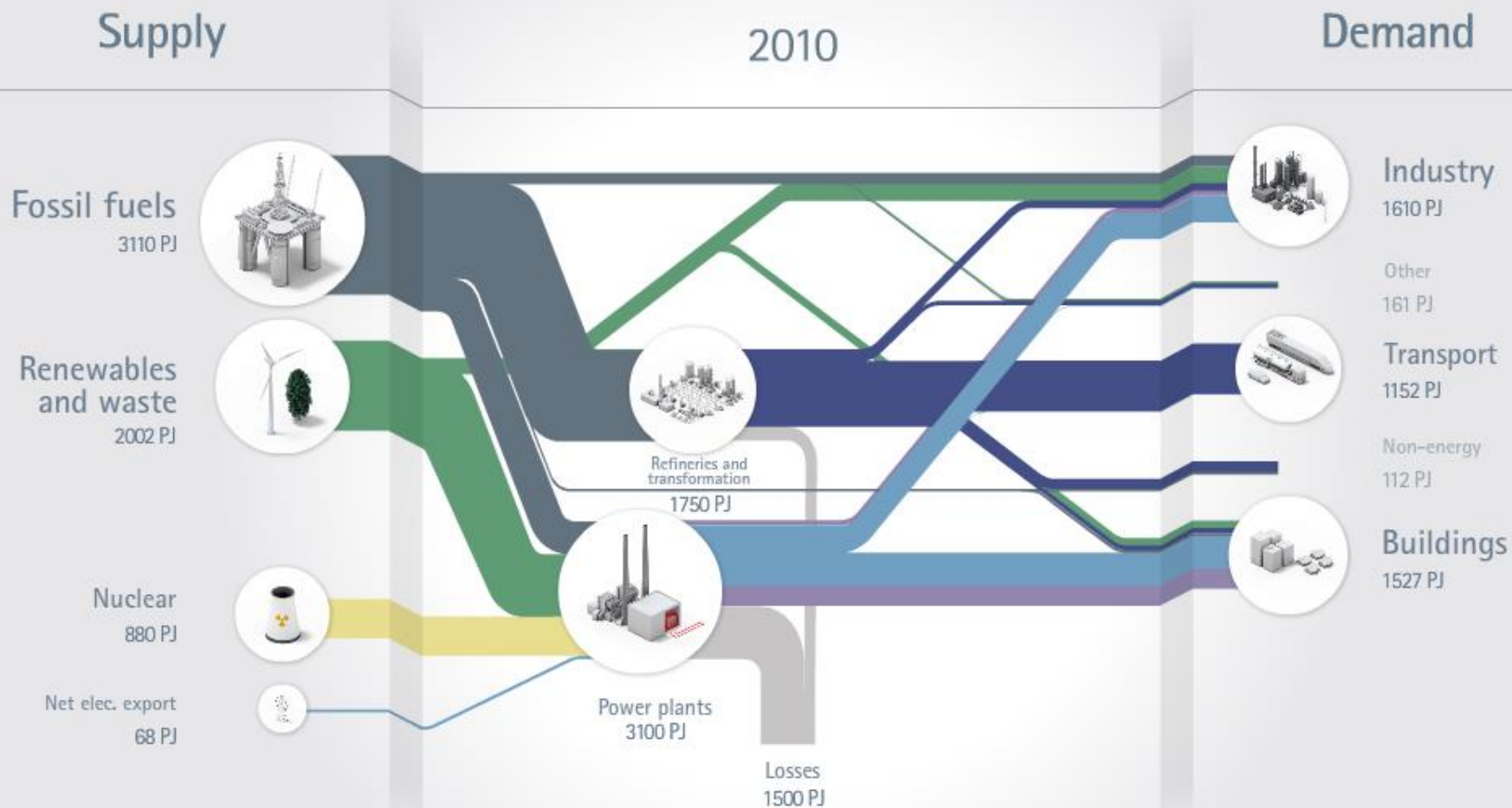
Nordic energy-related CO₂ emissions



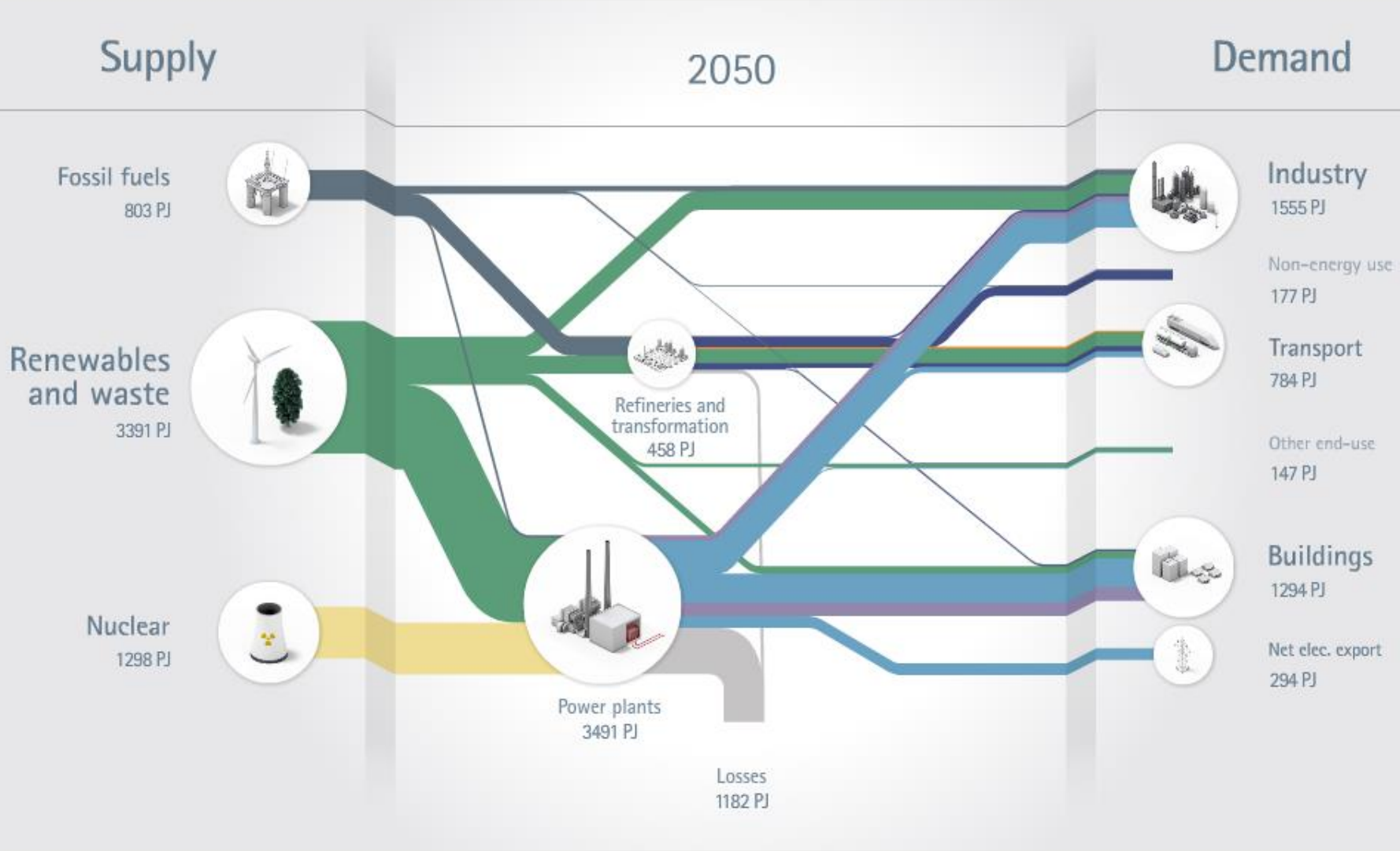
Nordic total primary energy supply



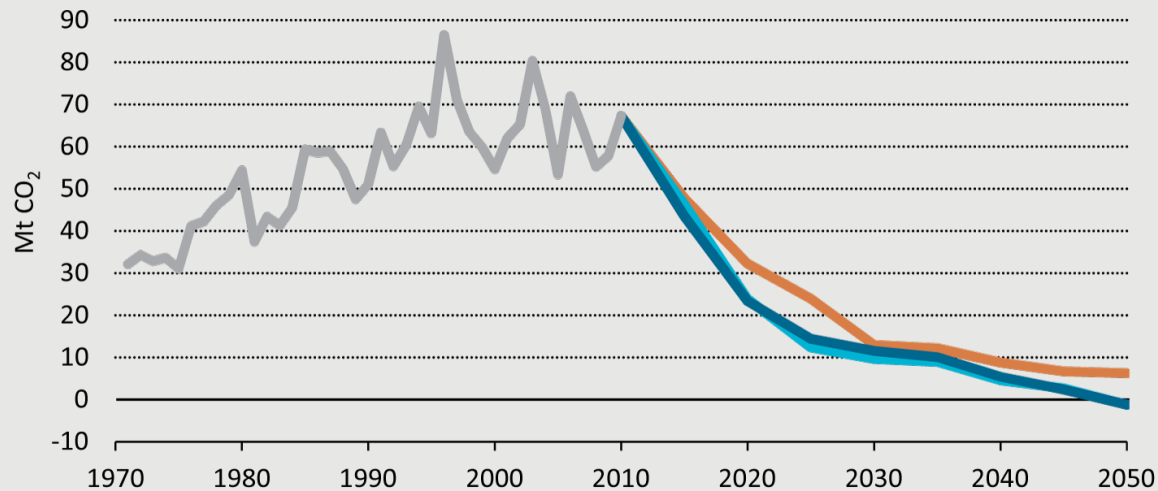
Nordic energy flows



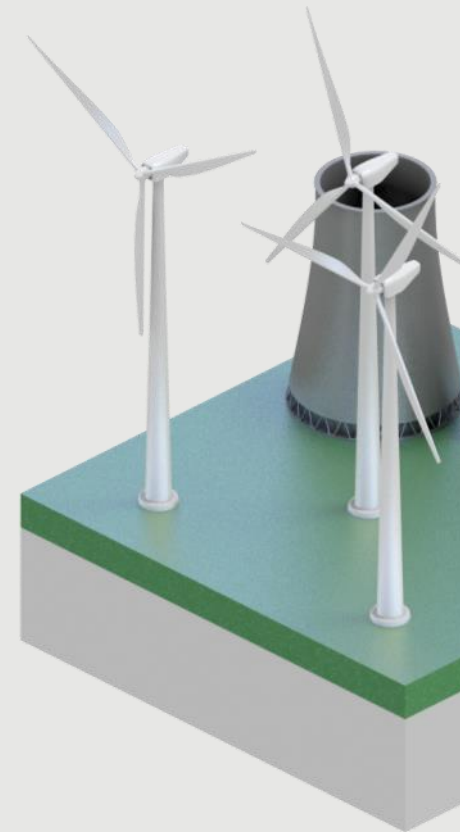
Nordic energy flows



Nordic CO₂ emissions from power and heat generation

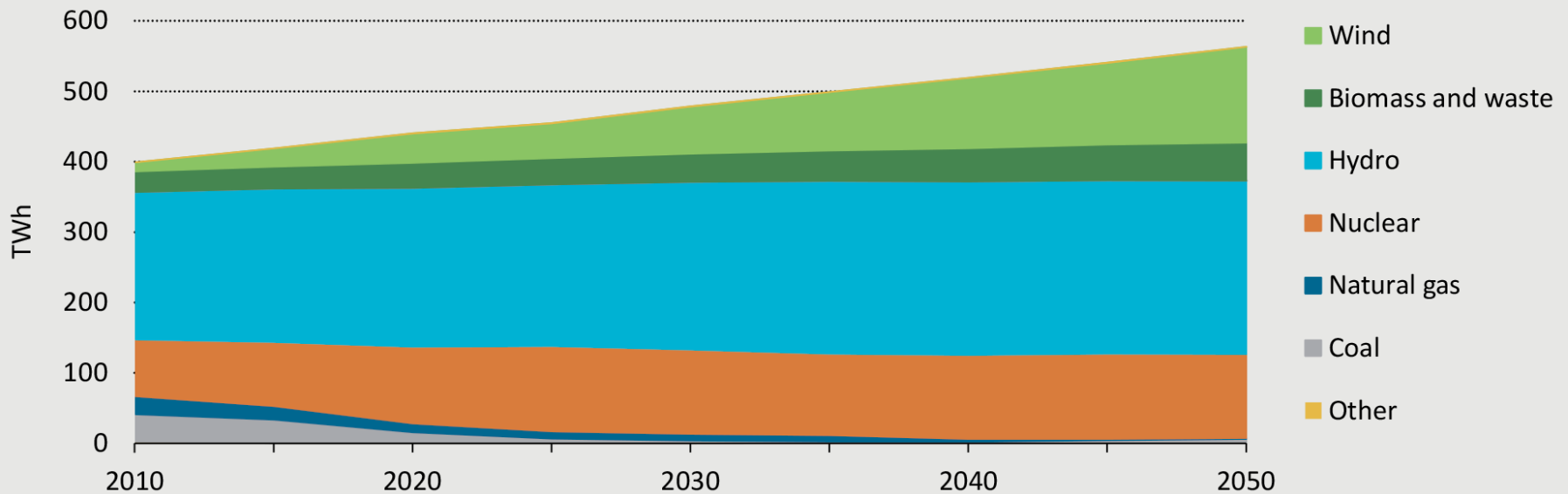


- 4°C Scenario
- 2°C Scenario
- Carbon-Neutral Scenario

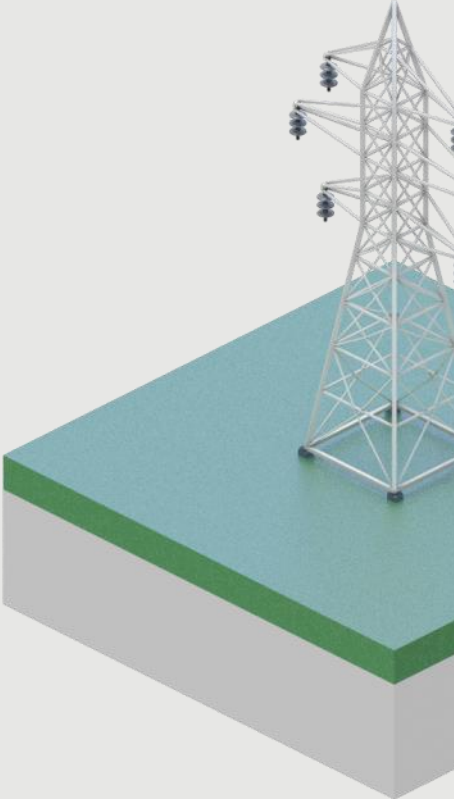
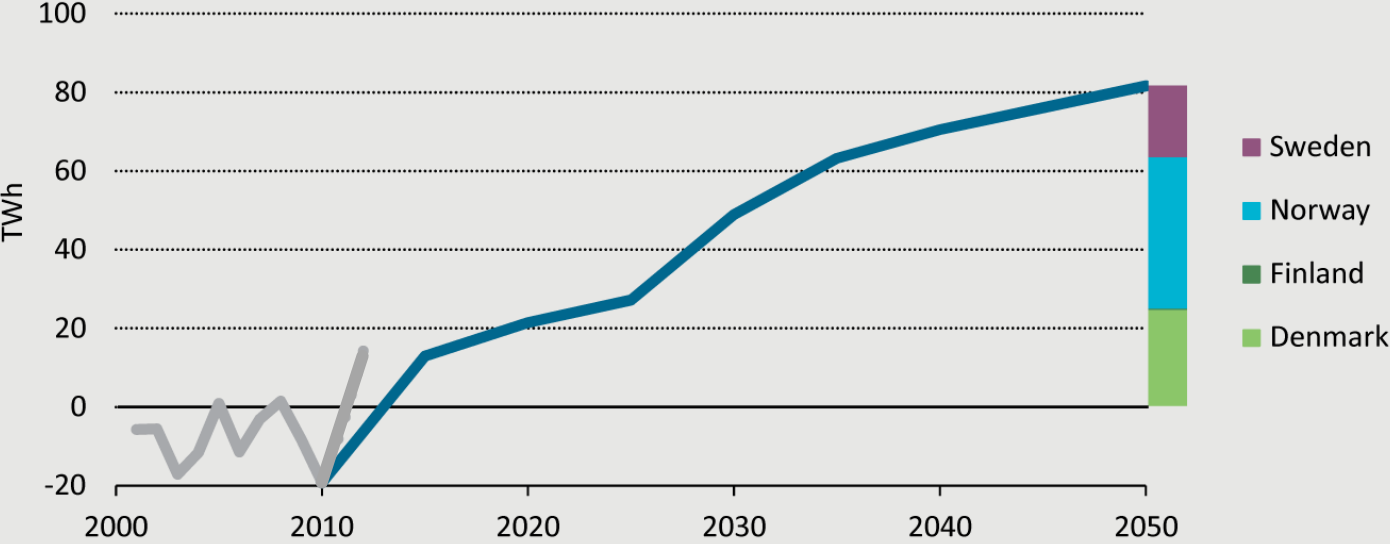


Power and heat is decarbonised in all scenarios

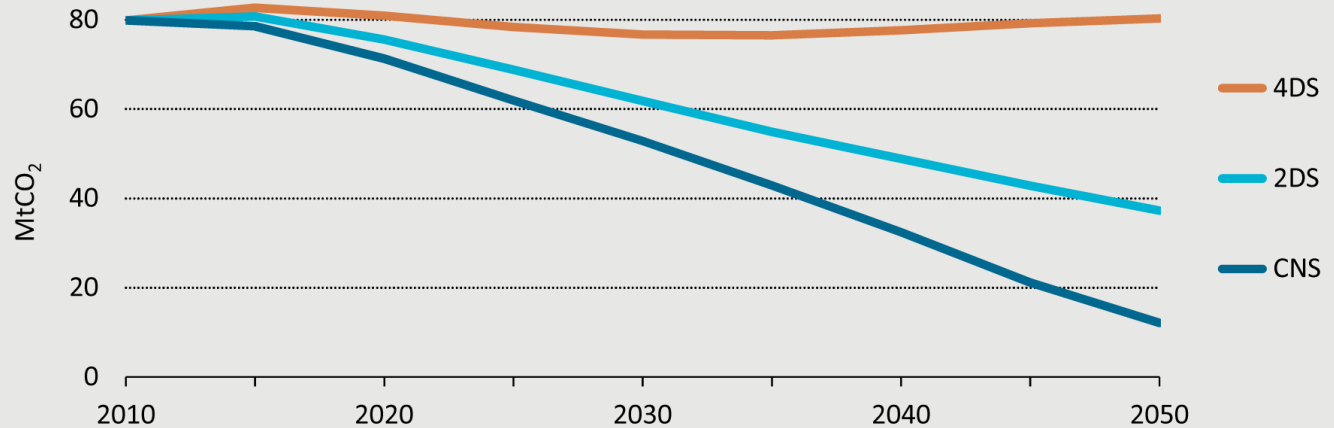
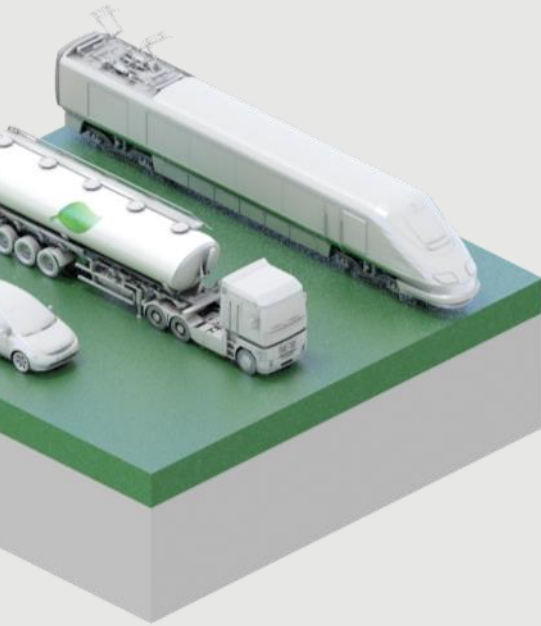
Nordic electricity generation in the Carbon-Neutral Scenario



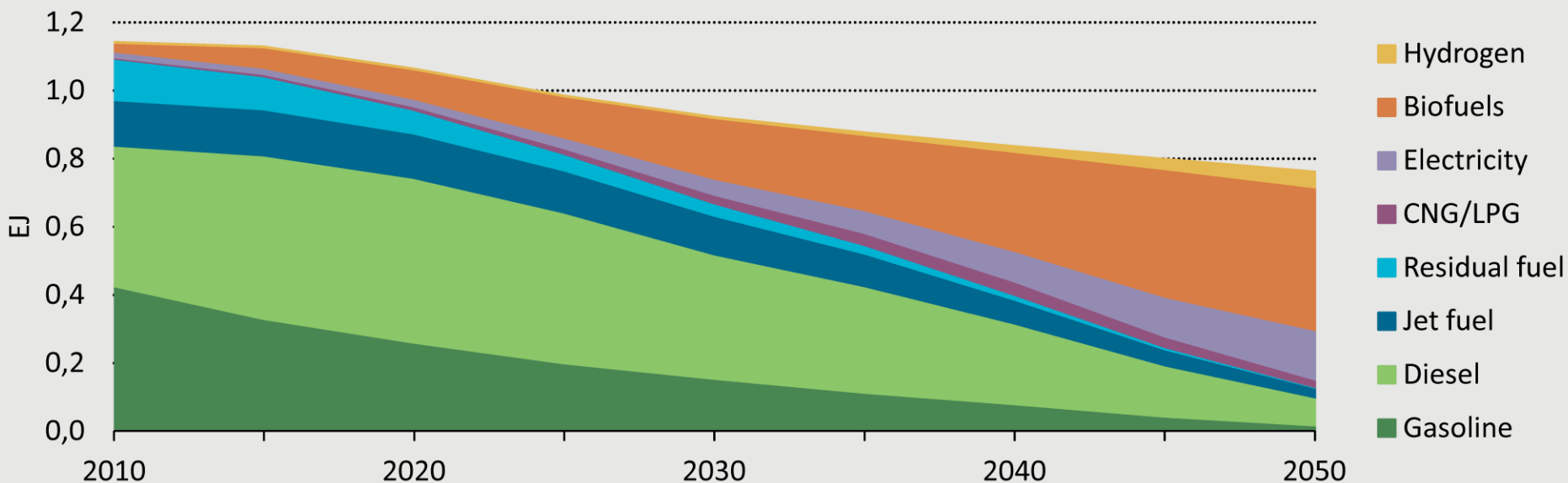
Nordic net electricity export in the Carbon-Neutral Scenario



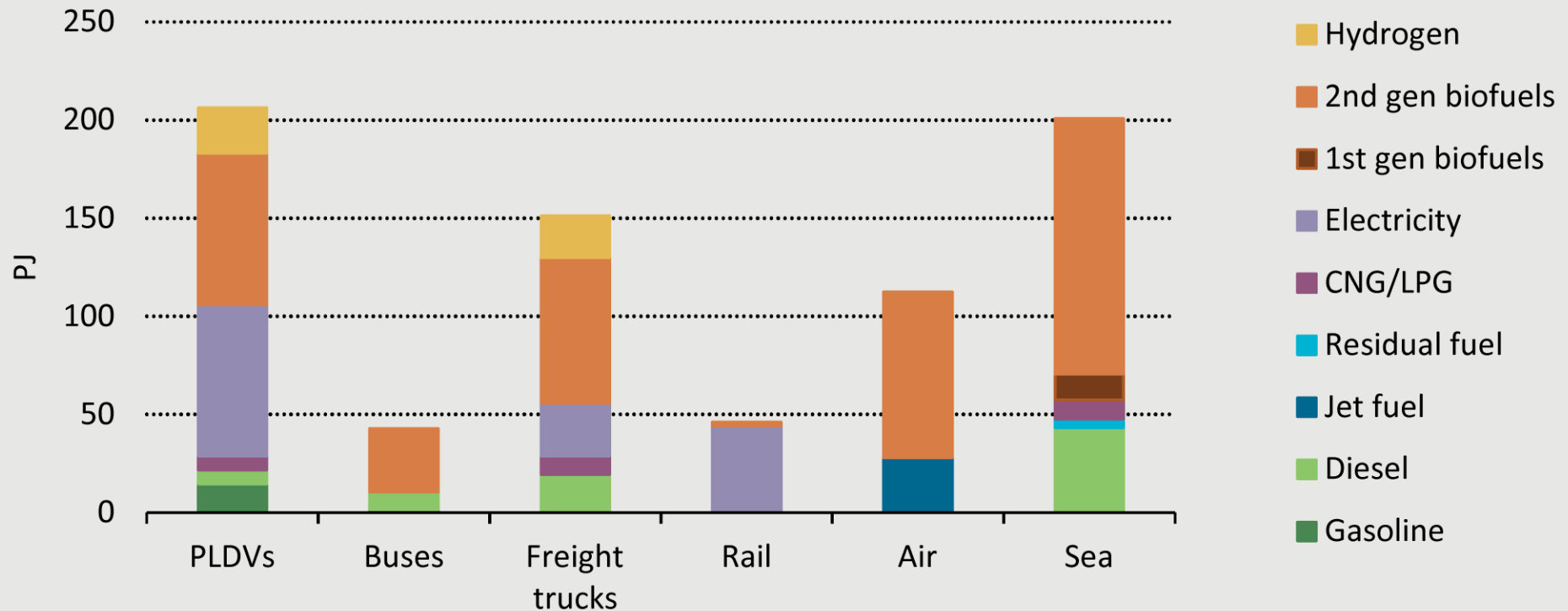
Nordic CO₂ emissions from transport



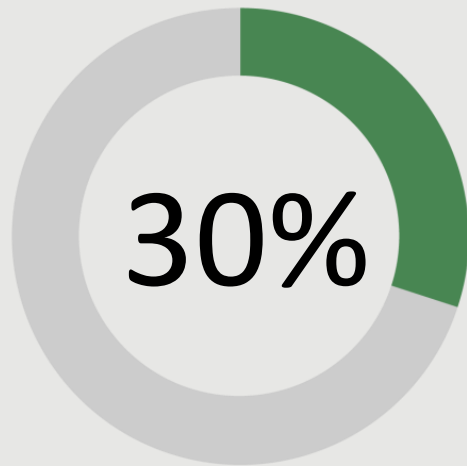
Nordic energy use in transport



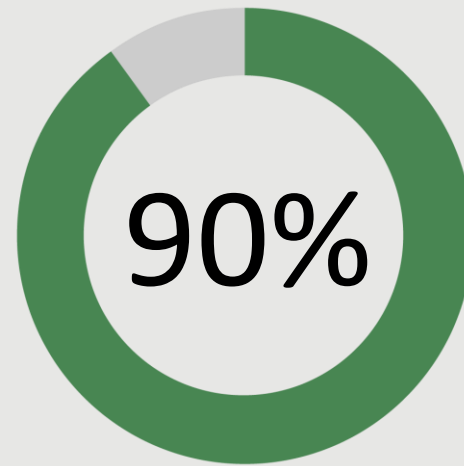
2050 energy use in transport



EV share of total Nordic car sales

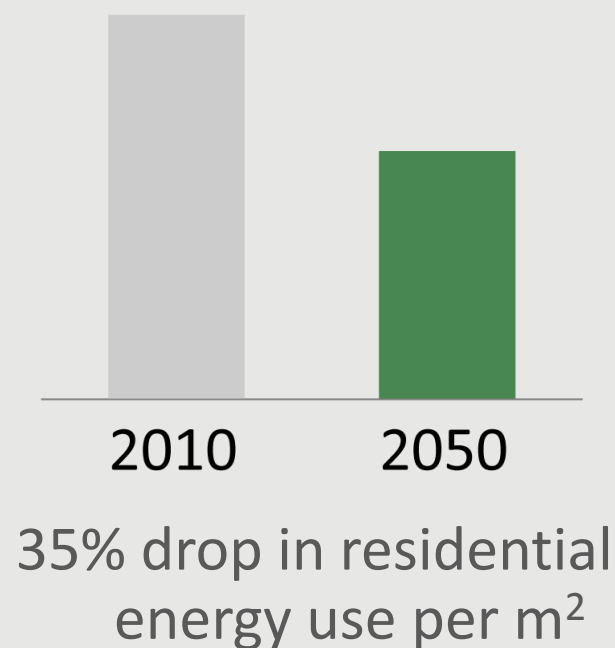
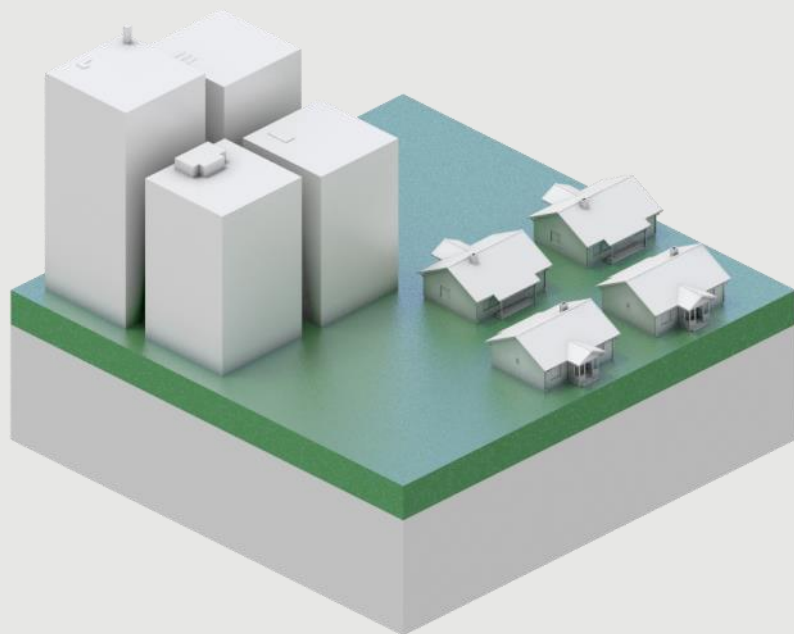


in 2030

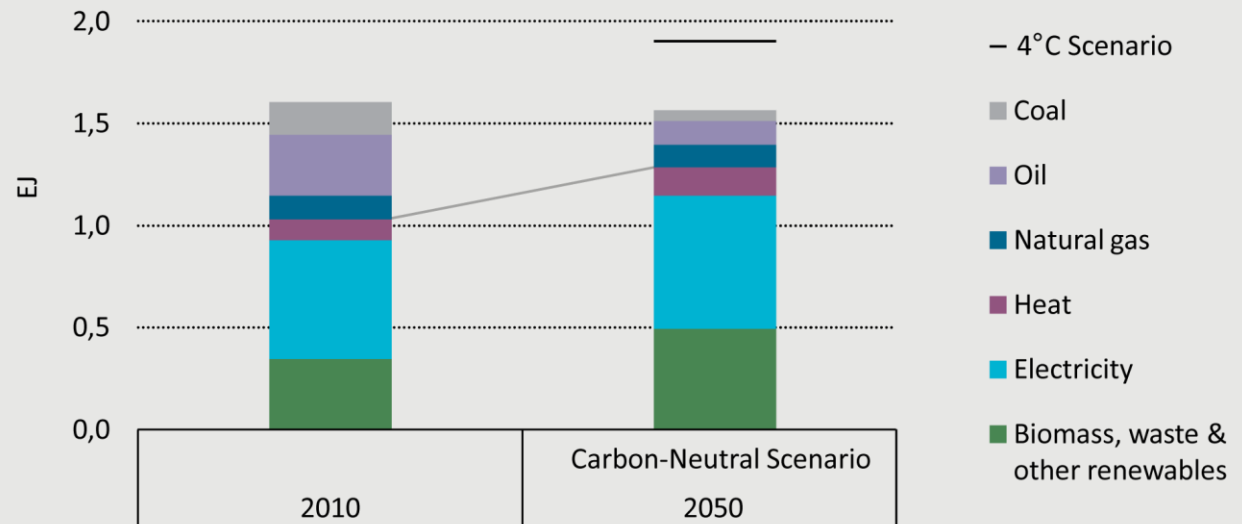
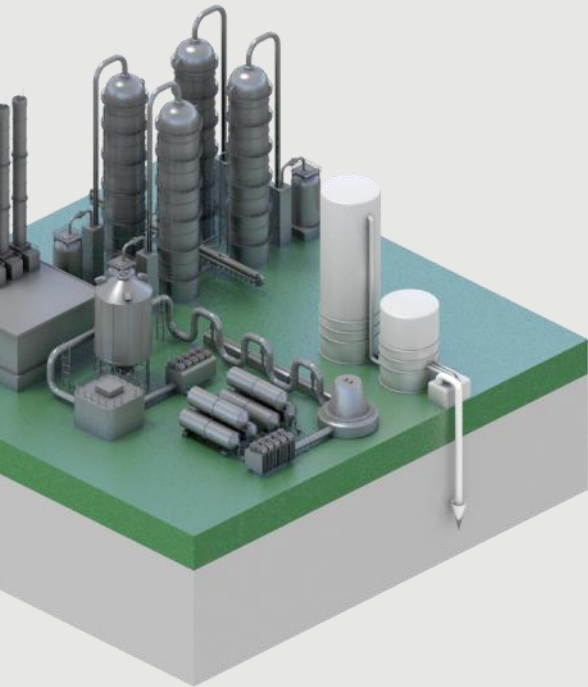


in 2050

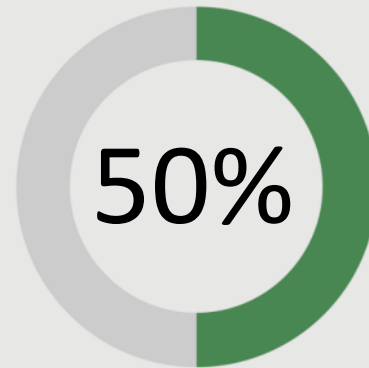
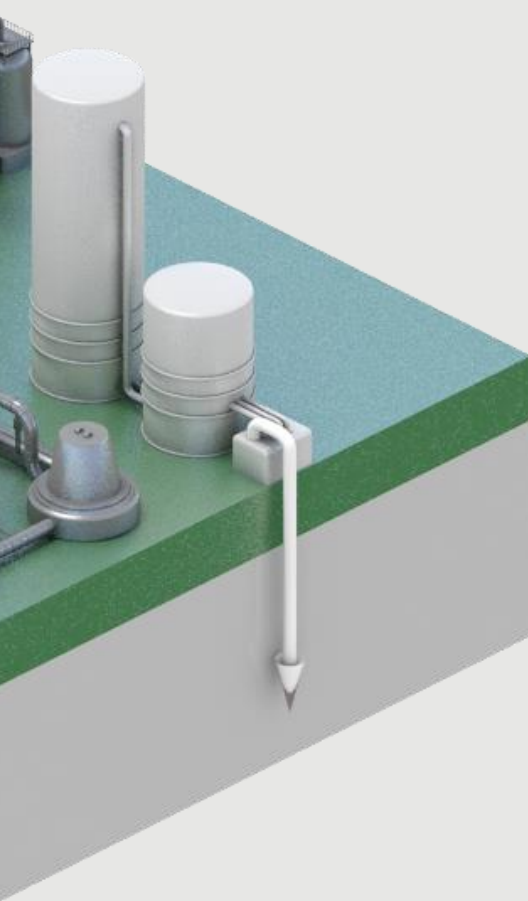
Buildings: Energy efficiency improvements in the Carbon-Neutral Scenario



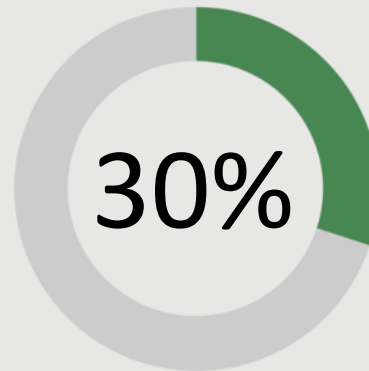
Final energy consumption in Nordic industry



CCS utilisation in industry in 2050

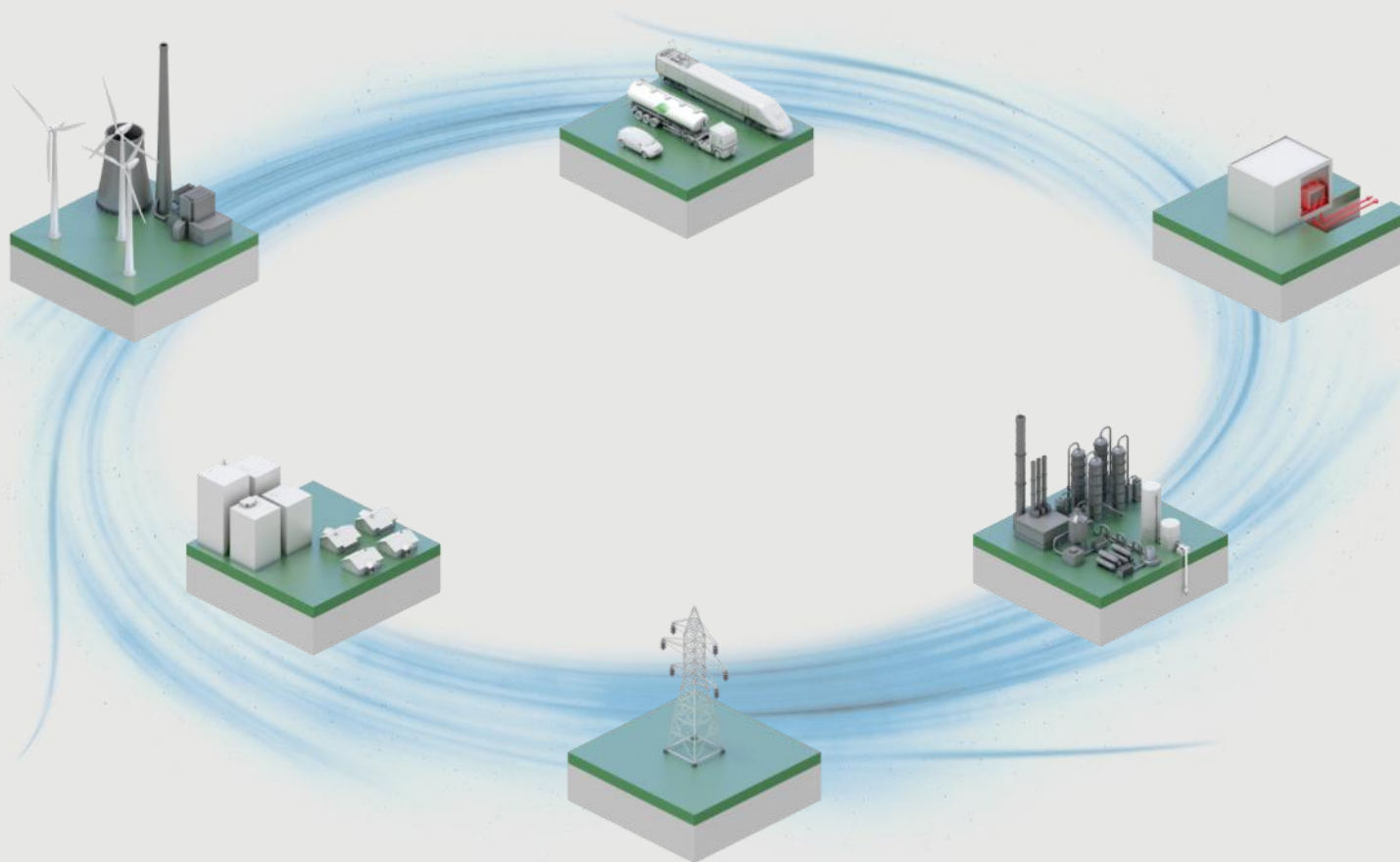


of cement plants



of iron & steel,
chemical plants

System integration



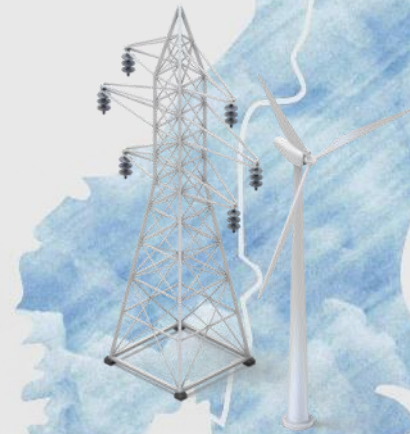
Key challenges



Energy
Efficiency



CCS



Infrastructure



Biomass
Supply

