

# Nordic Energy Technology Perspectives

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Pathways to a Carbon-Neutral Energy Future



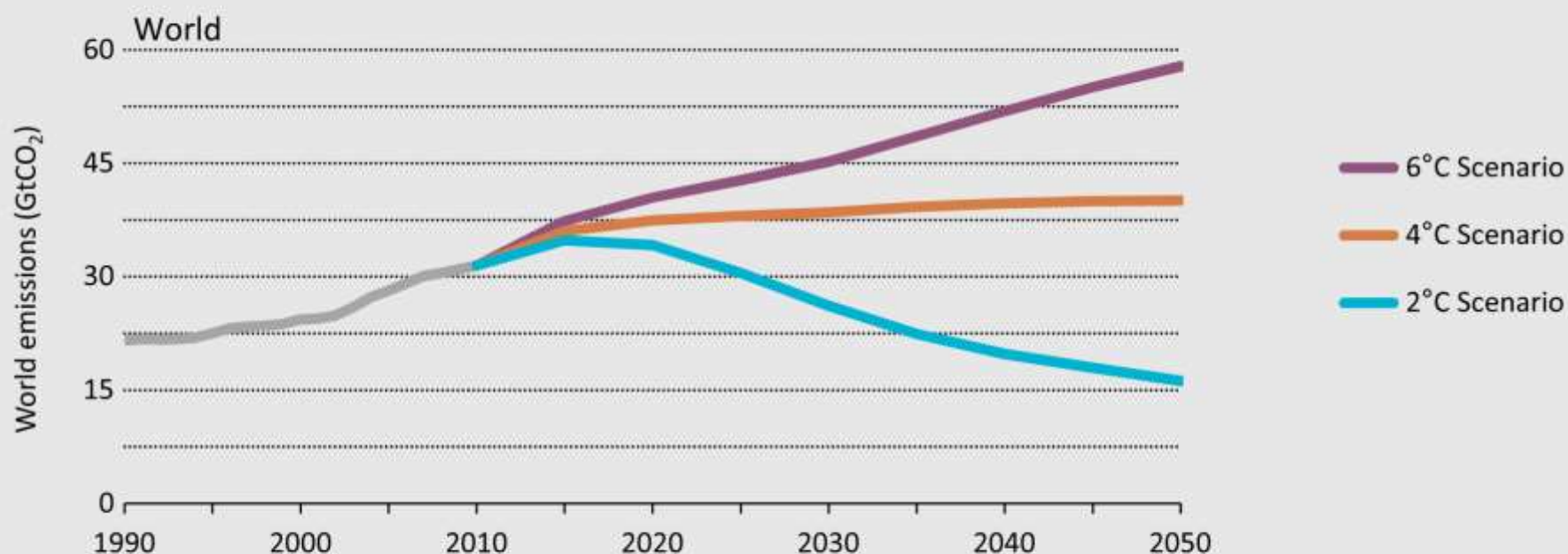
norden

Nordic Energy Research

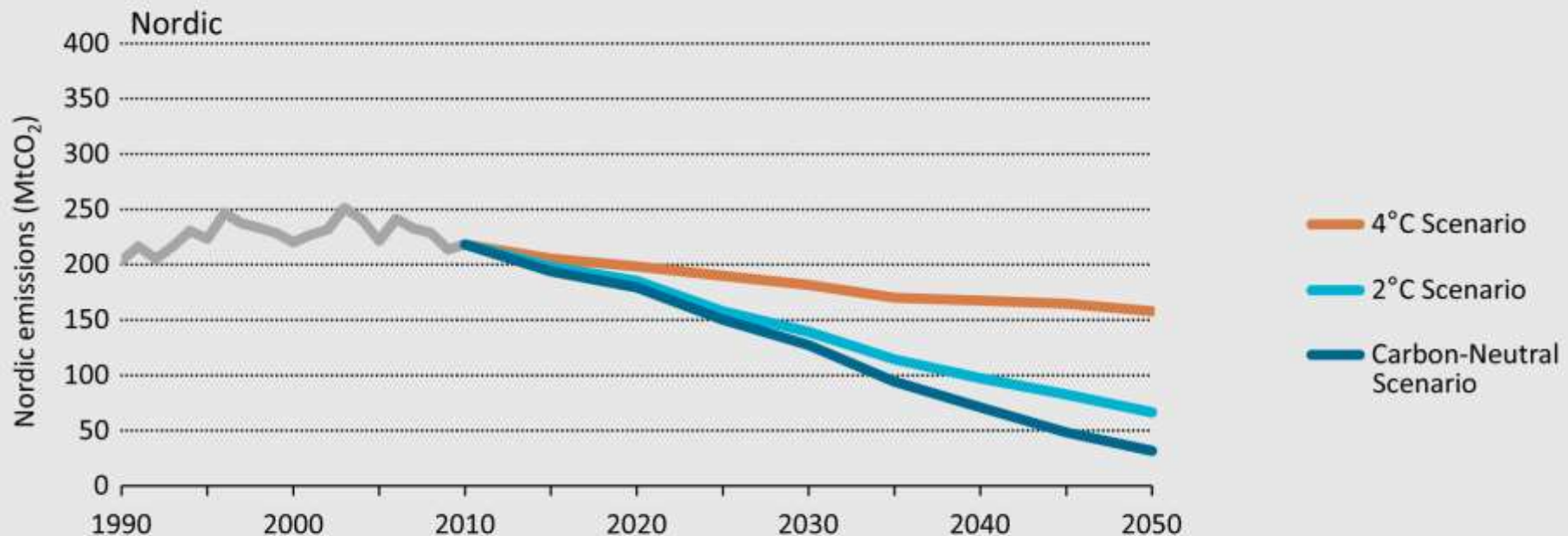


International  
Energy Agency

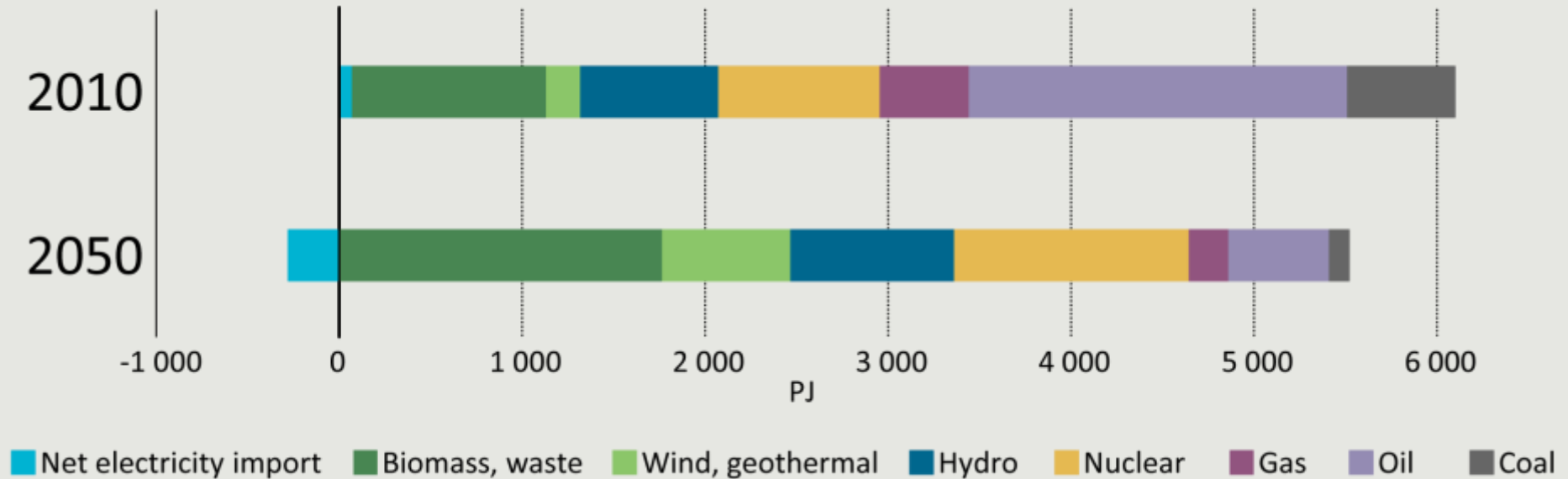
# Global energy-related CO<sub>2</sub> emissions



# Nordic energy-related CO<sub>2</sub> emissions



# Nordic total primary energy supply



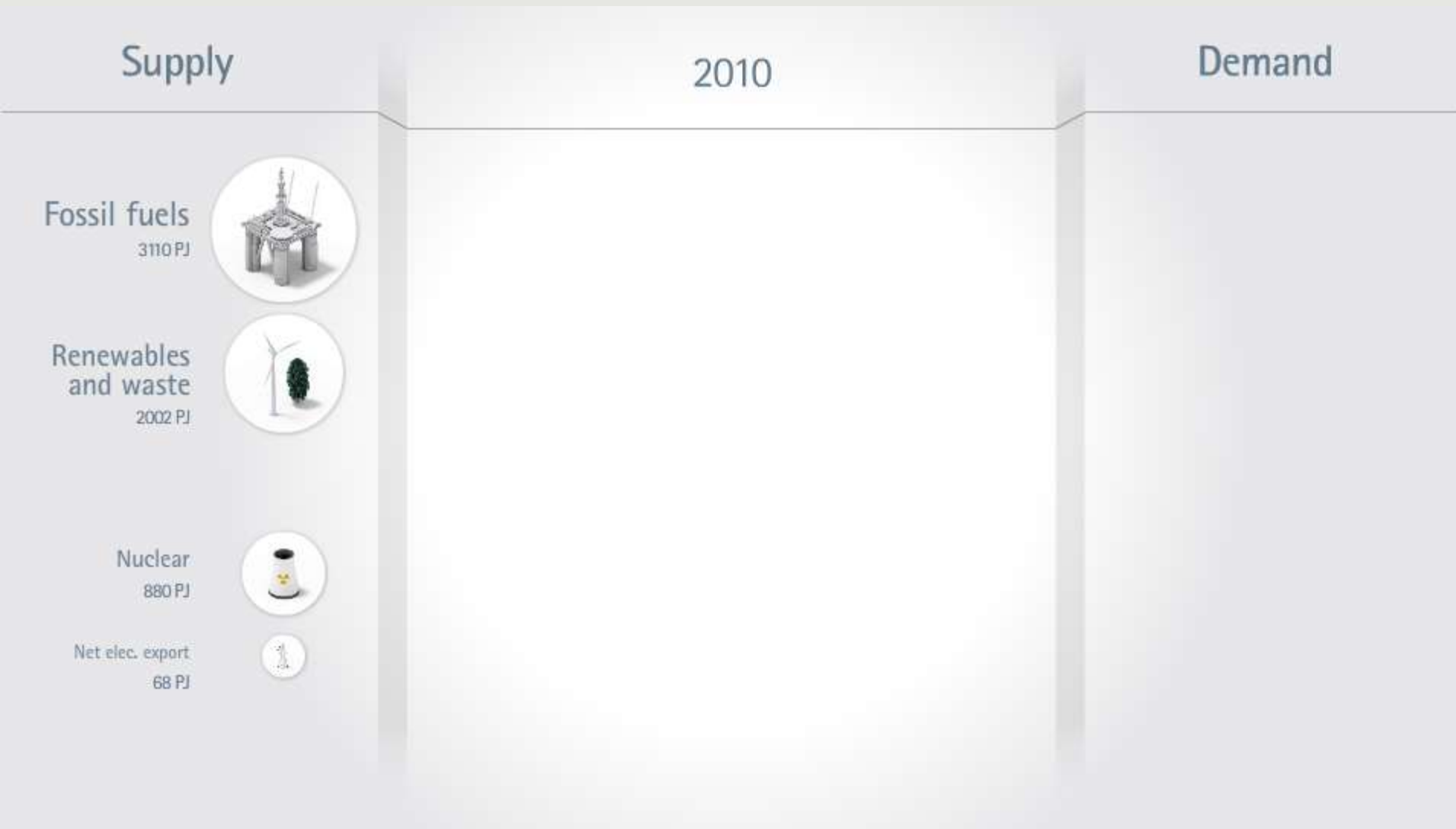
# Nordic energy flows

Supply

2010

Demand

# Nordic energy flows



# Nordic energy flows

Supply

2010

Demand

Fossil fuels

3110 PJ



Renewables  
and waste

2002 PJ



Nuclear

880 PJ



Net elec. export

68 PJ



Refineries and  
transformation

1750 PJ

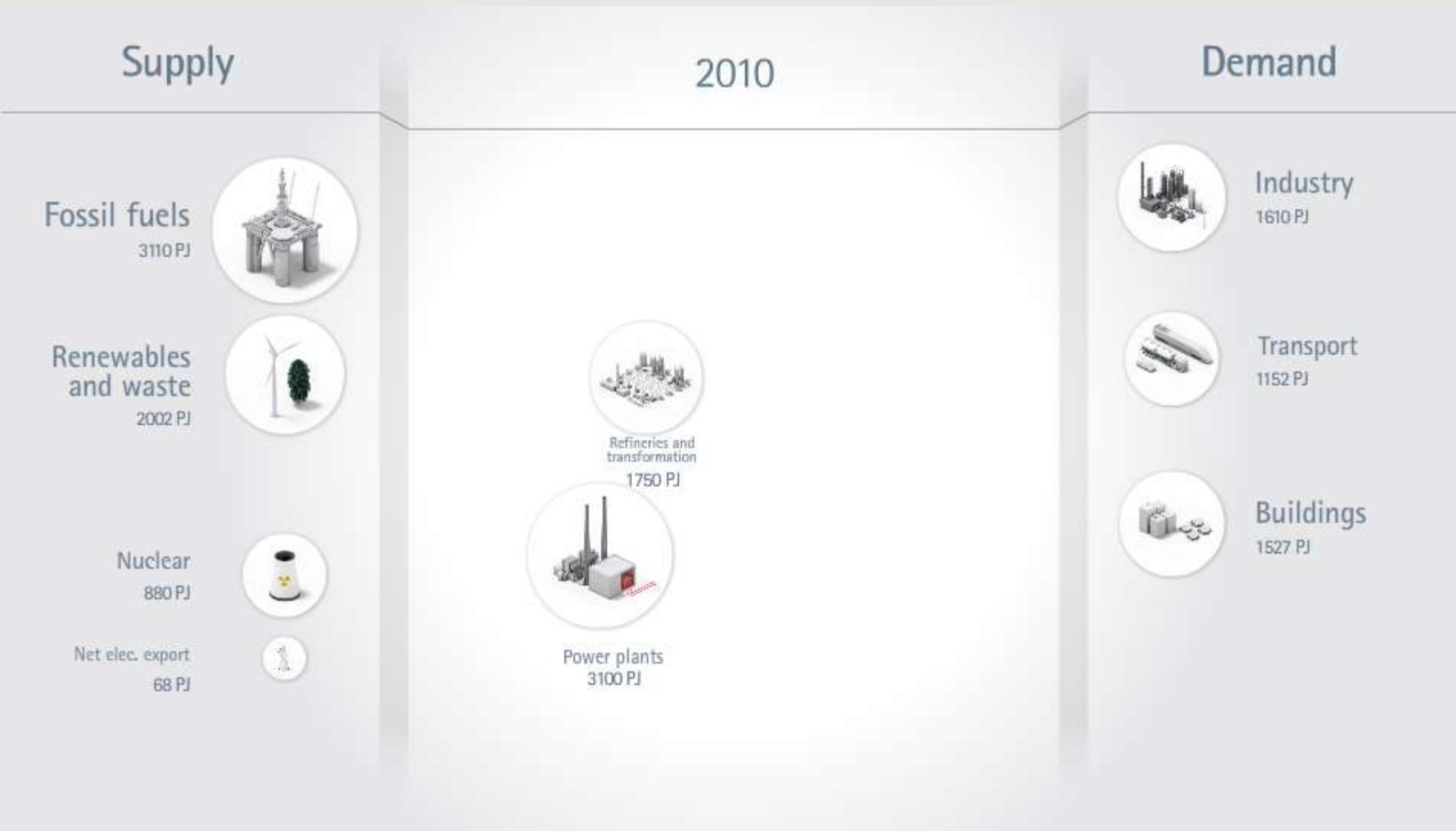


Power plants

3100 PJ

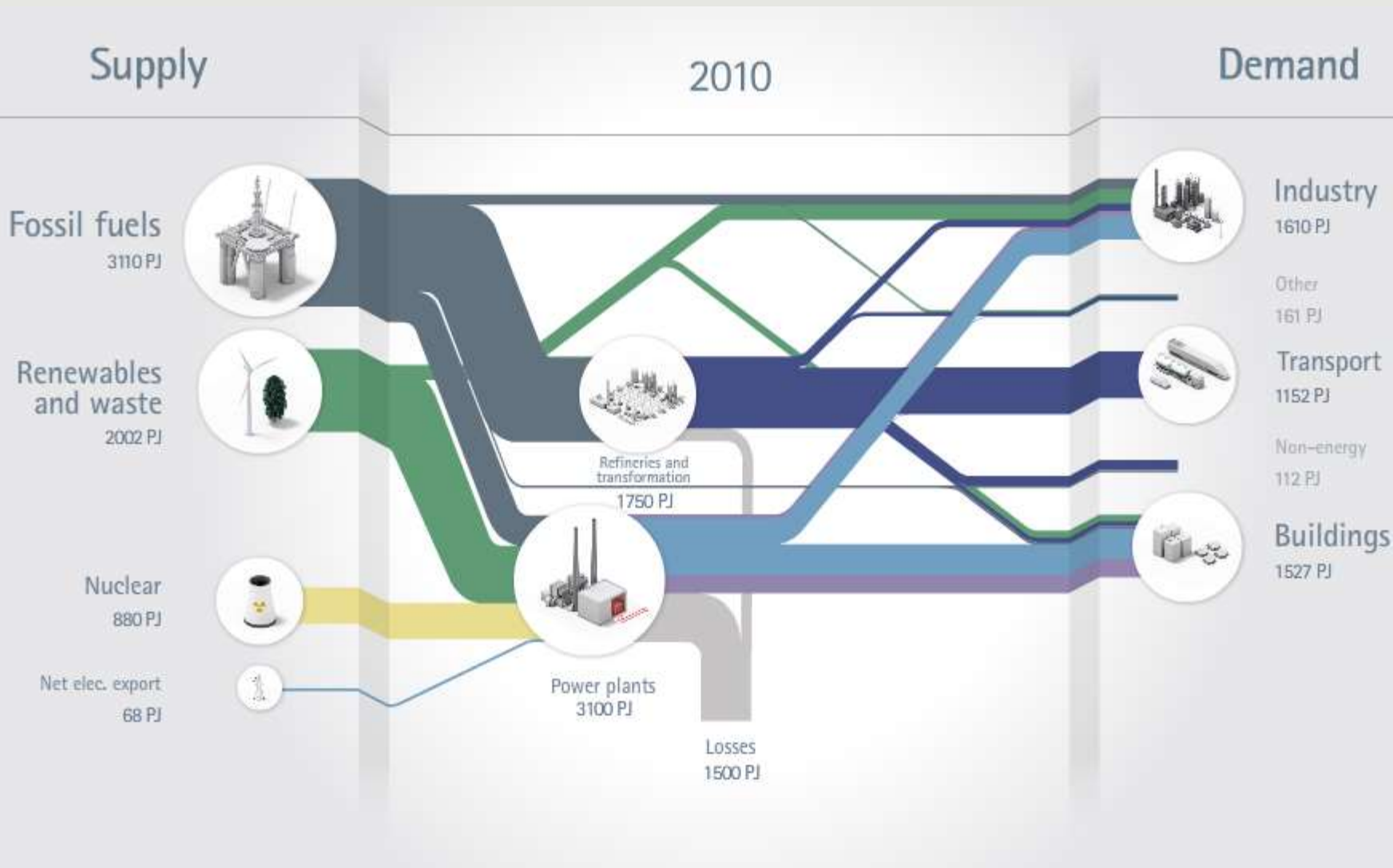


# Nordic energy flows

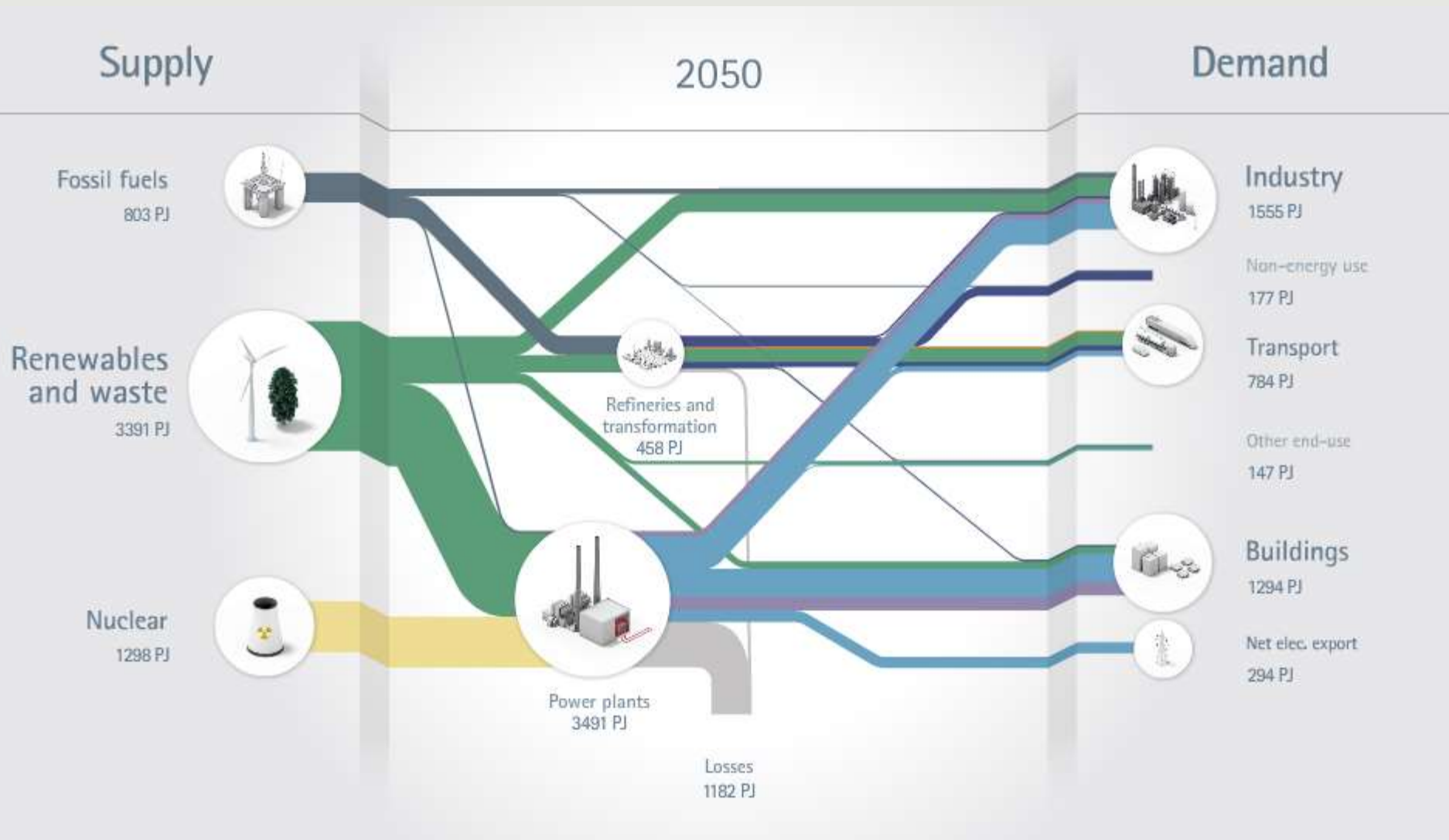




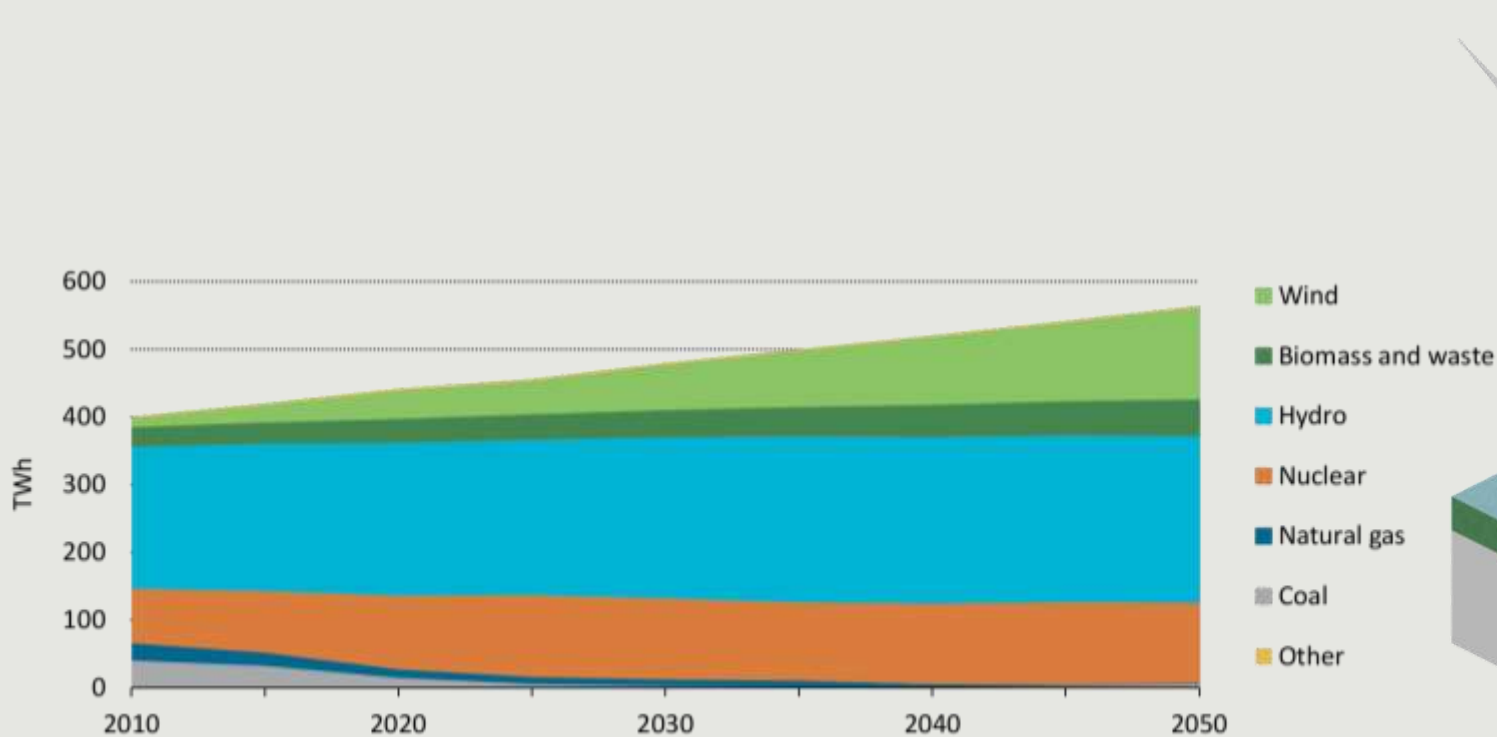
# Nordic energy flows



# Nordic energy flows

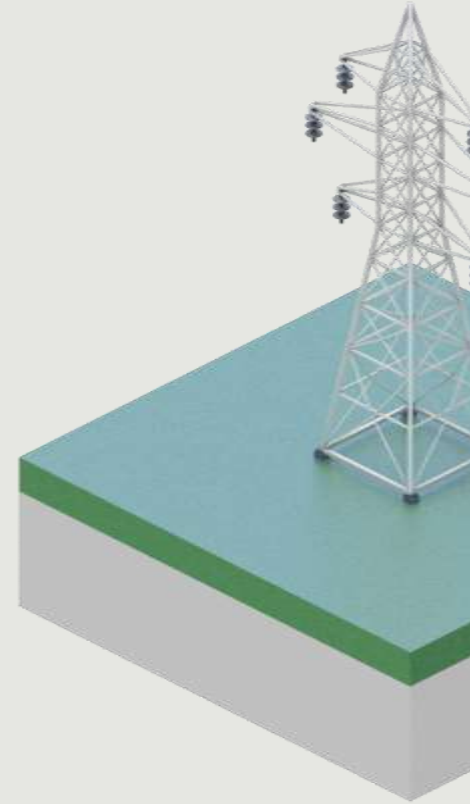
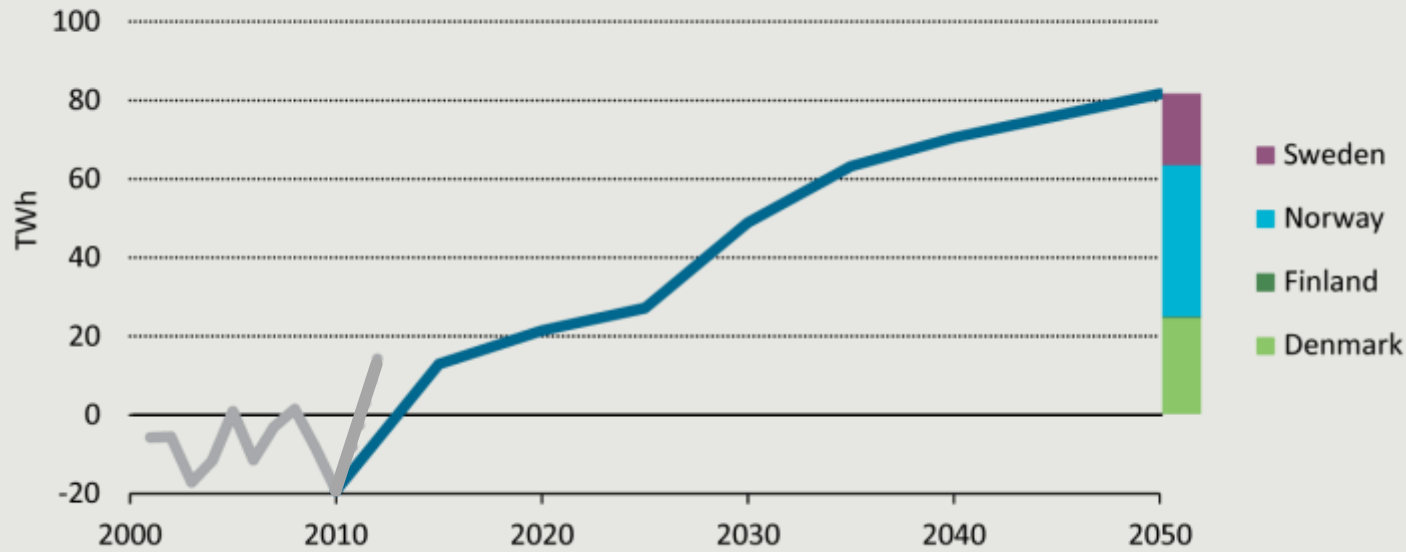


# Nordic electricity generation



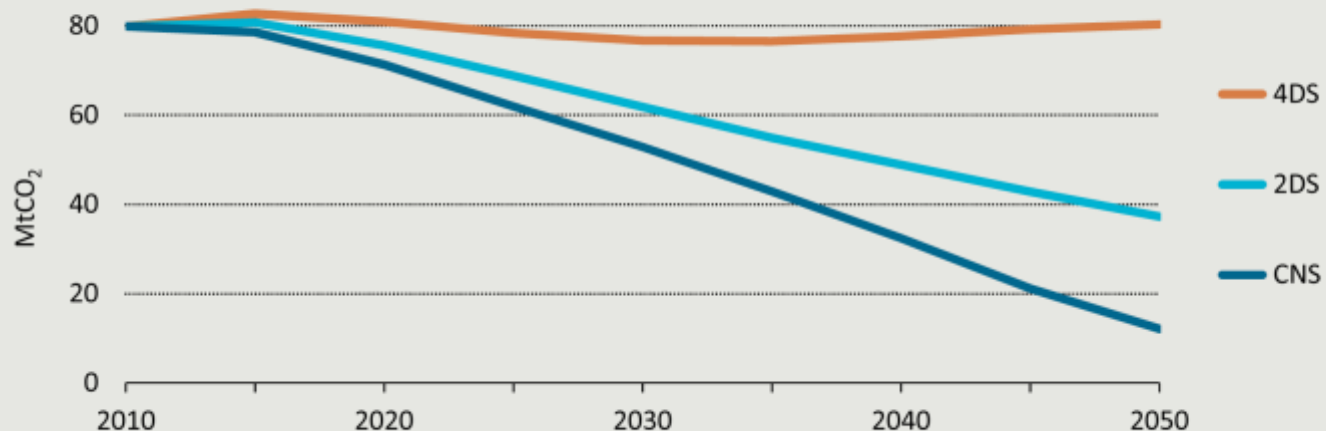
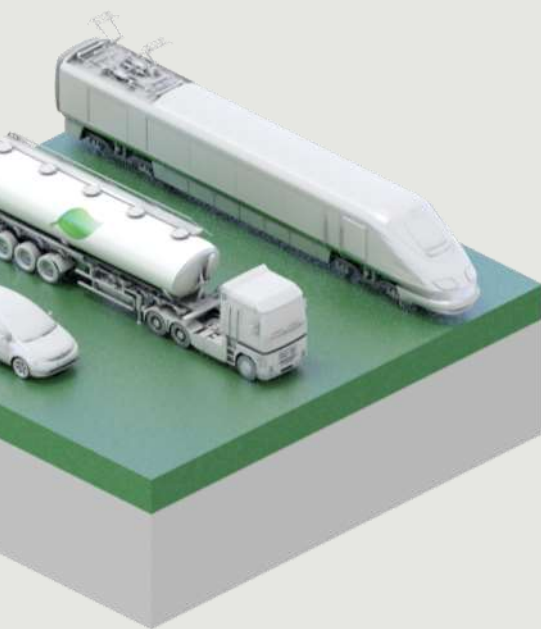


# Nordic net electricity export

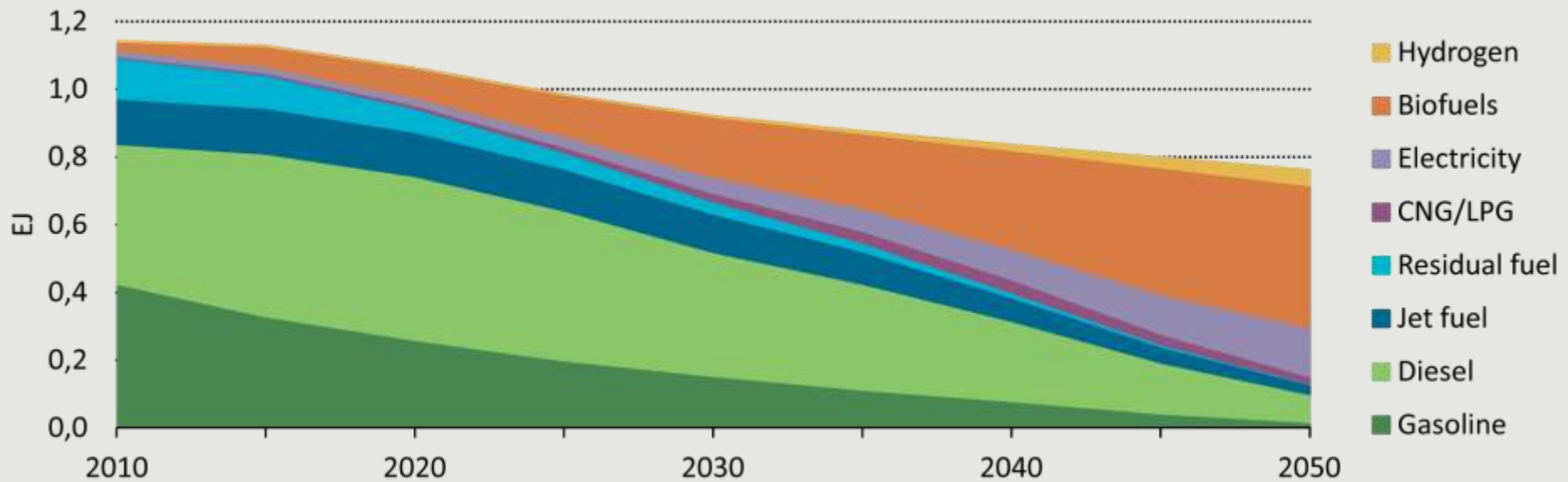




# Nordic CO<sub>2</sub> emissions from transport

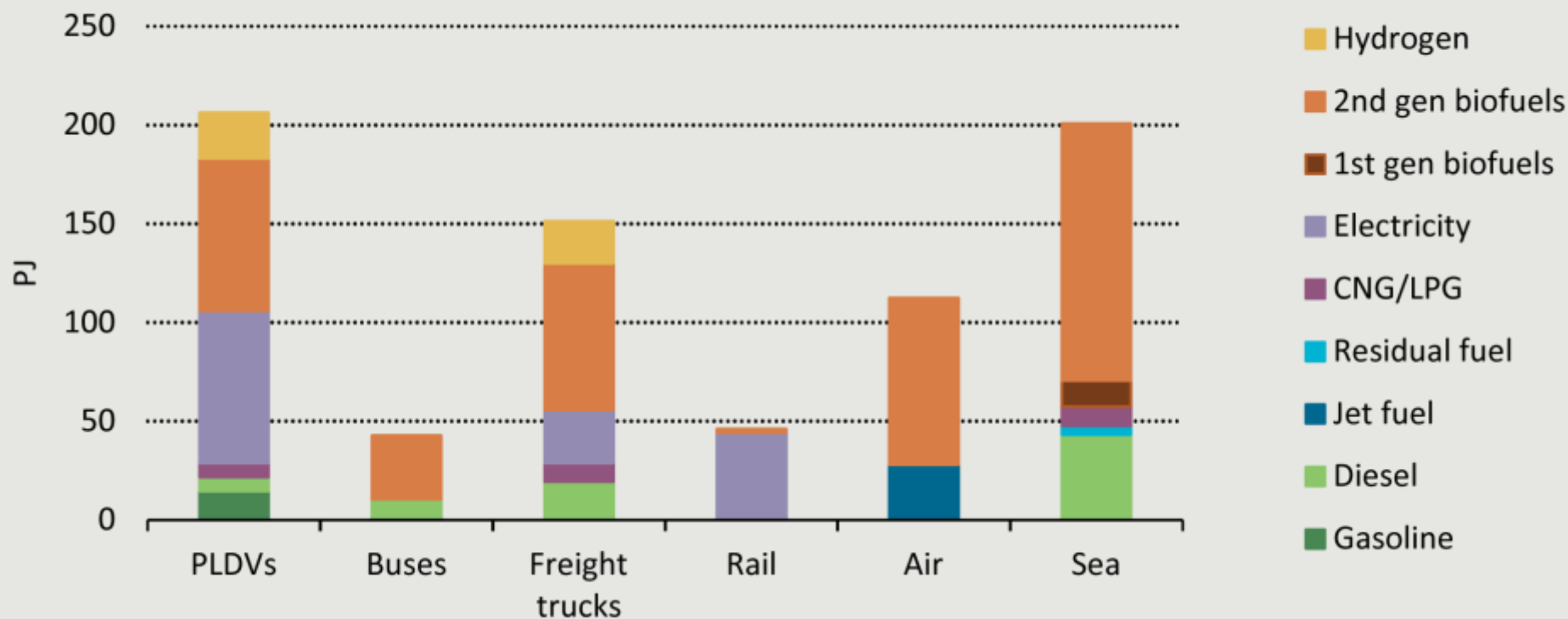


# Nordic energy use in transport

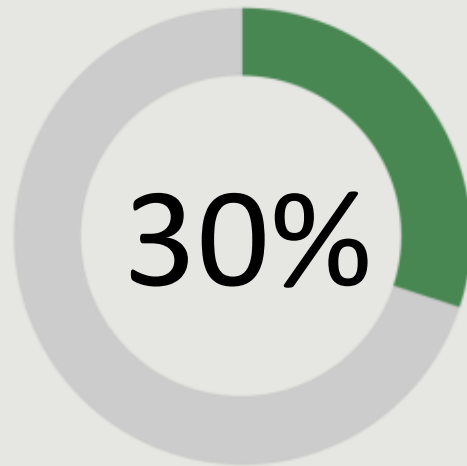




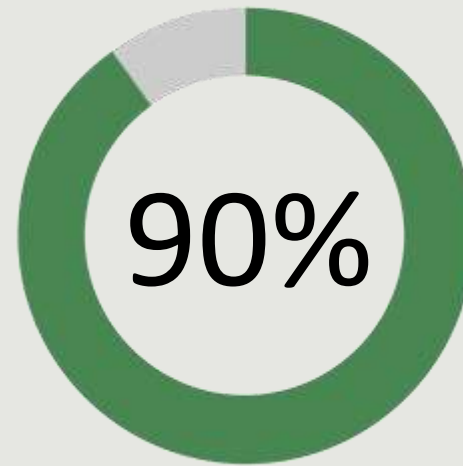
# 2050 energy use in transport



# EV share of total Nordic car sales

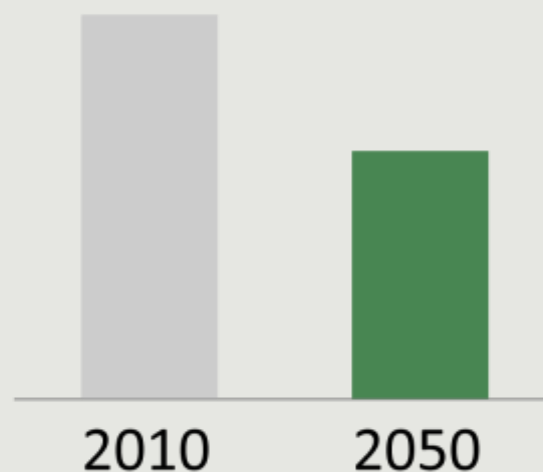
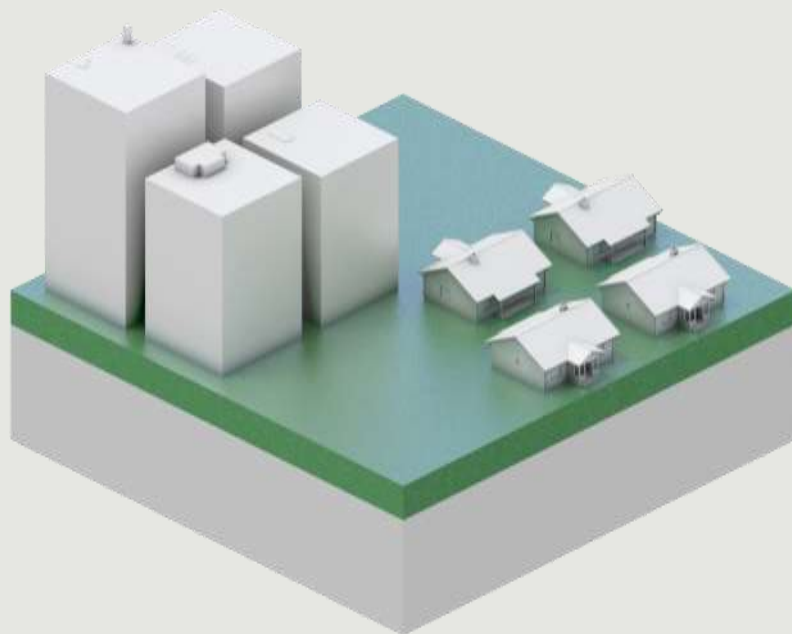


in 2030



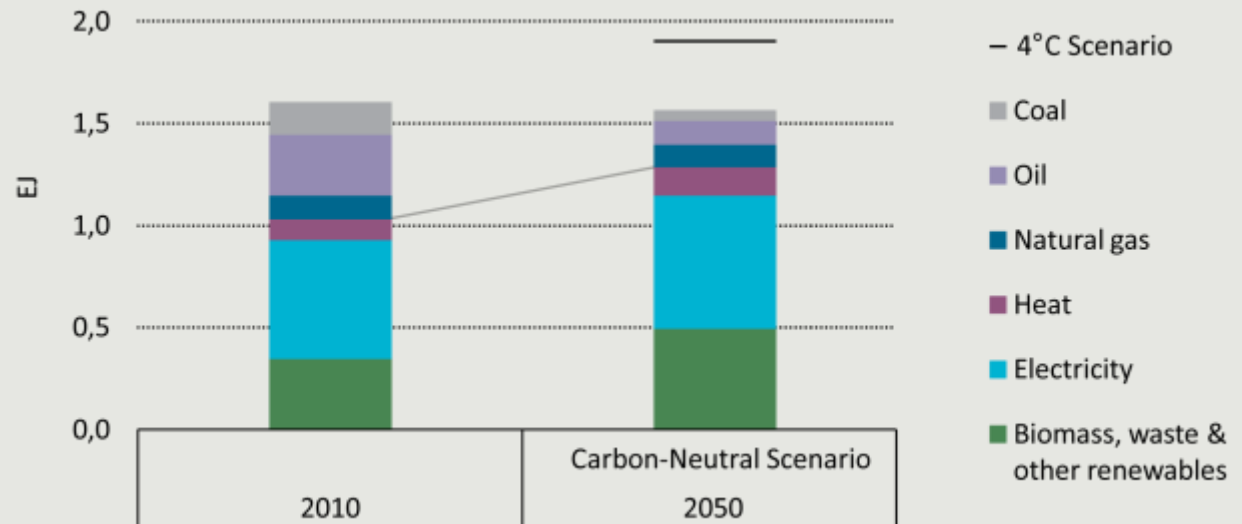
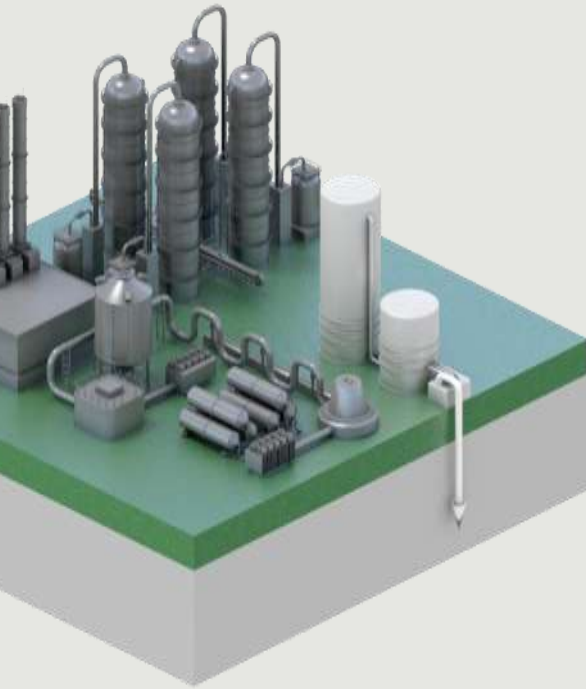
in 2050

# Buildings: Energy efficiency improvements

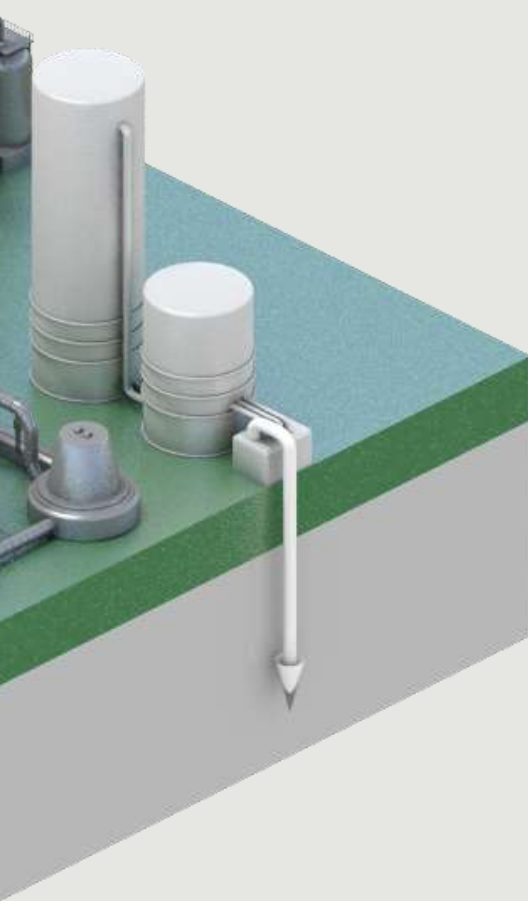


35% drop in residential  
energy use per m<sup>2</sup>

# Final energy consumption in Nordic industry



# CCS utilisation in industry in 2050

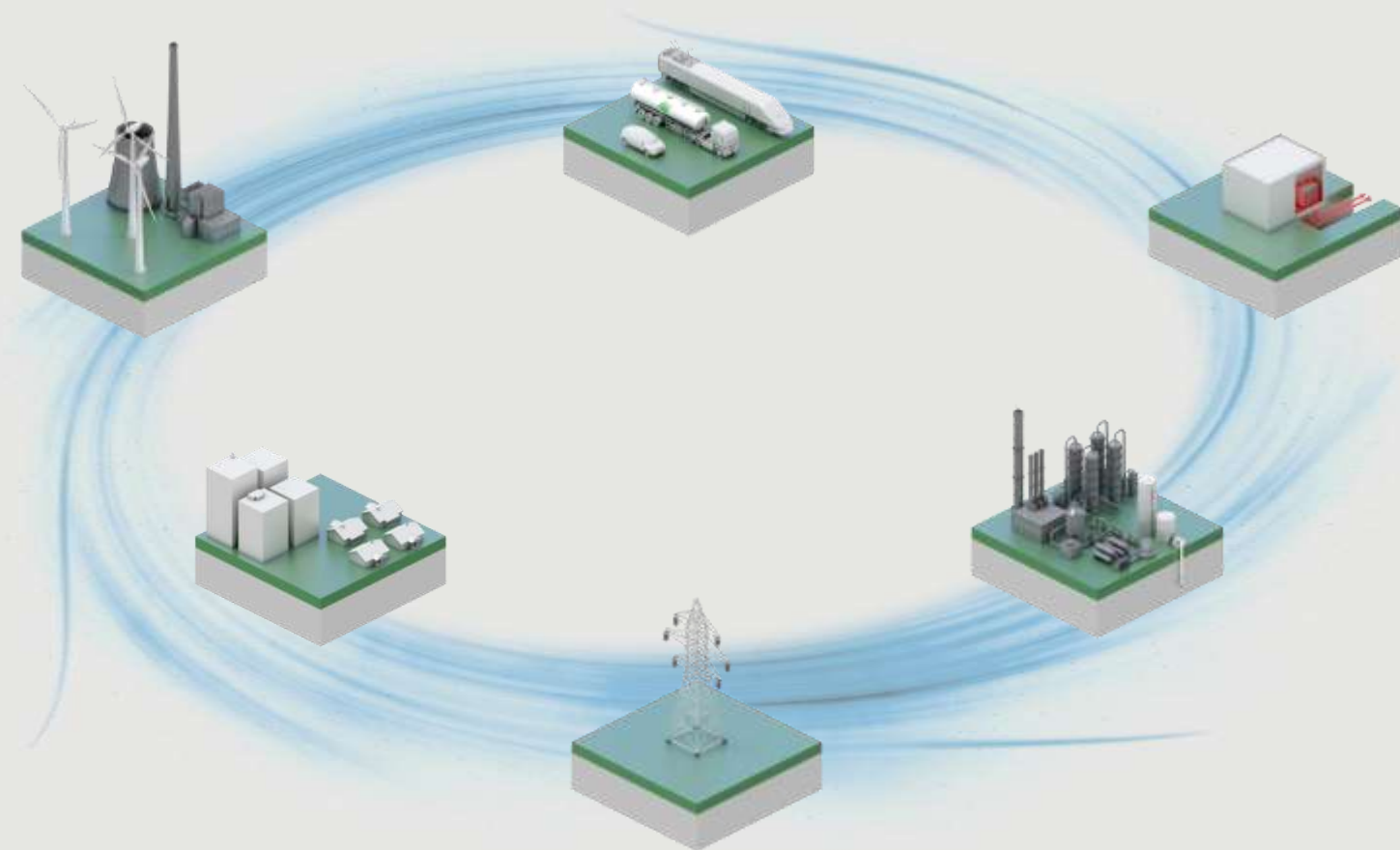


of cement plants



of iron & steel,  
chemical plants

# System integration



# Nordic technology cooperation







## Smartgrids

- Visibility and social acceptance
- Facilitator or stumbling block



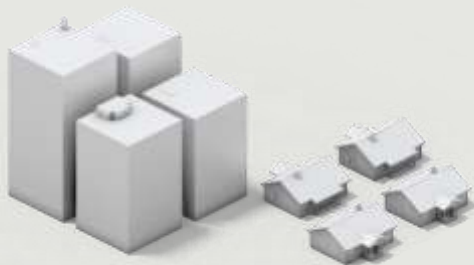
## Bioenergy

- Net import sustainability
- Advanced biofuel RD&D



## CCS

- Critical for industry
- Nordic cooperation



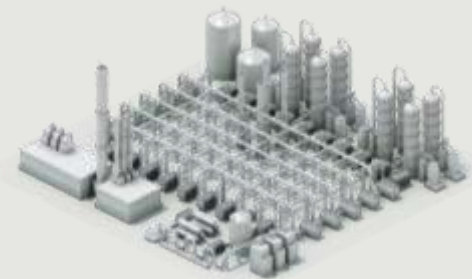
## Buildings

- Energy efficiency renovation
- Integration with other sectors



## Transport

- Modal shifts
- Technology ramp up



## Industry

- Industrial ecology
- Integration with other sectors