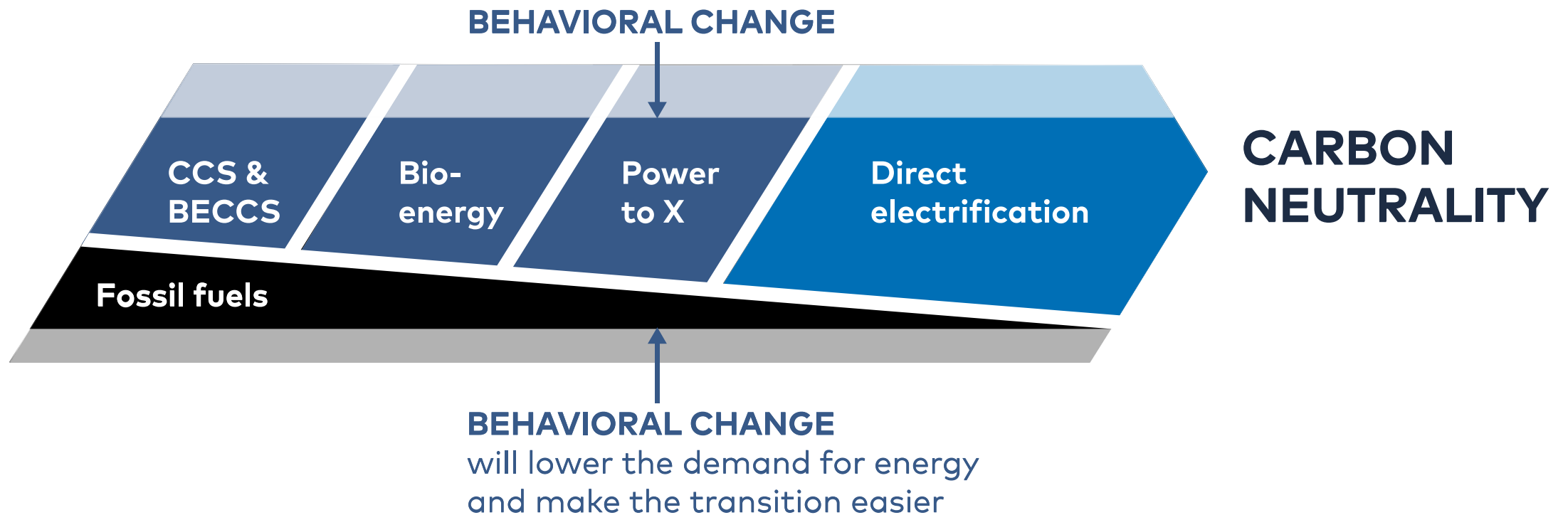


A Carbon Neutral Nordic region

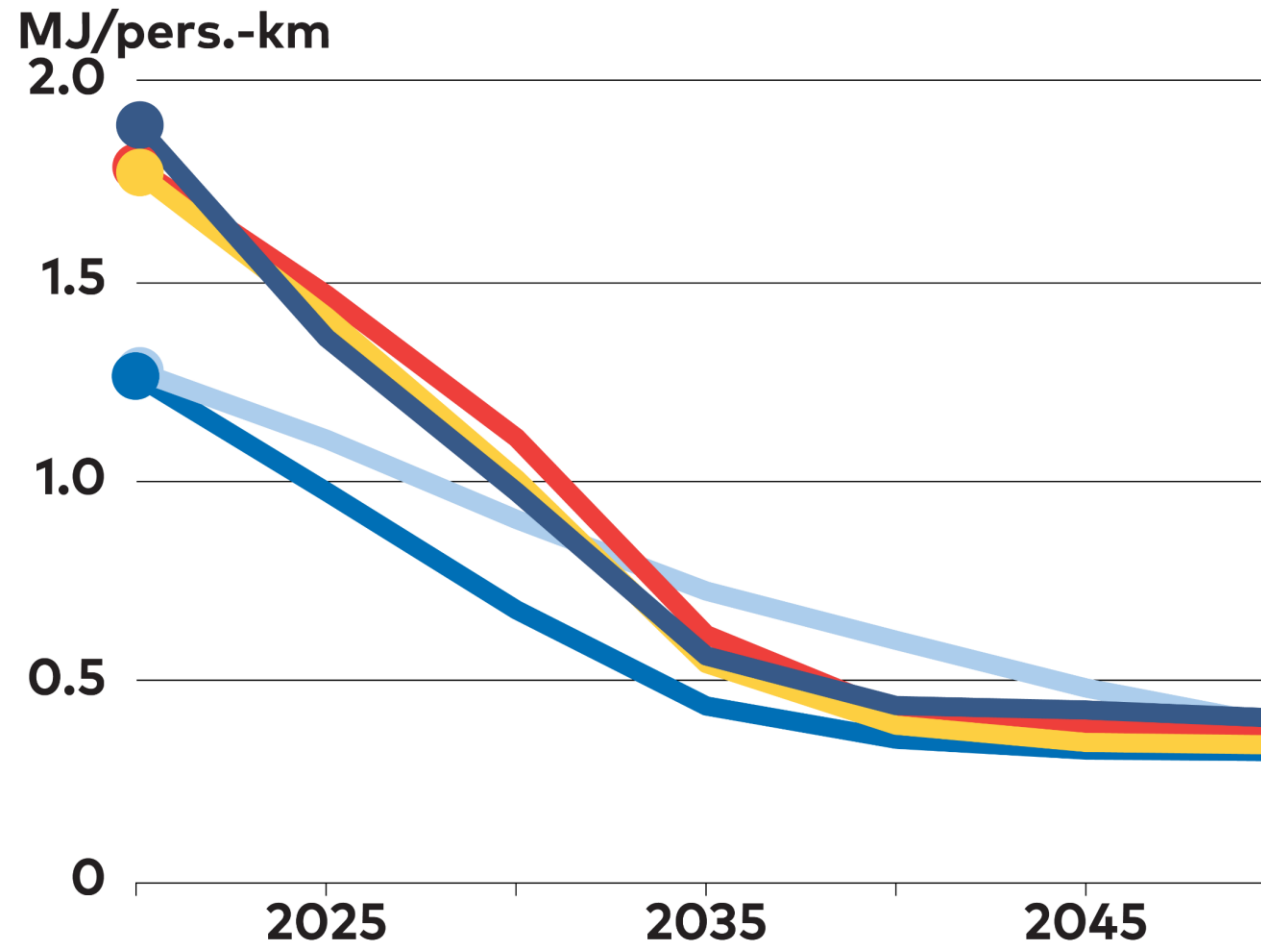
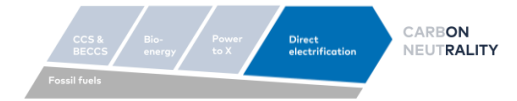
Conclusions from the Nordic Clean Energy Scenario project
Markus Wråke, CEO Energiforsk



Five Solution Tracks to Carbon Neutrality

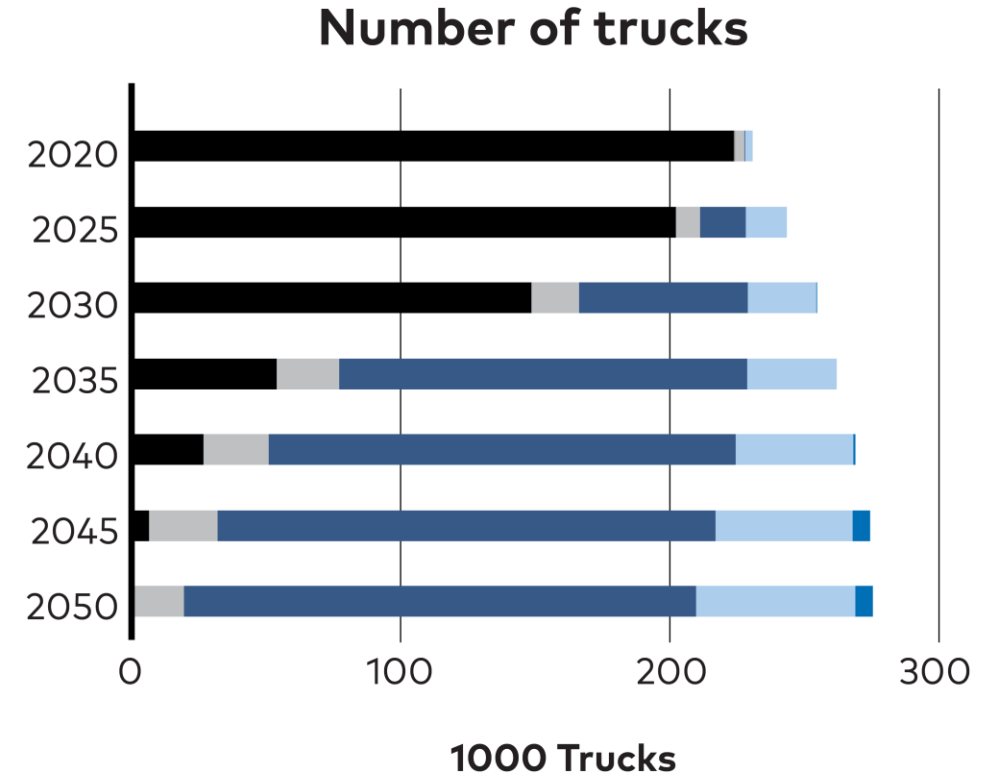
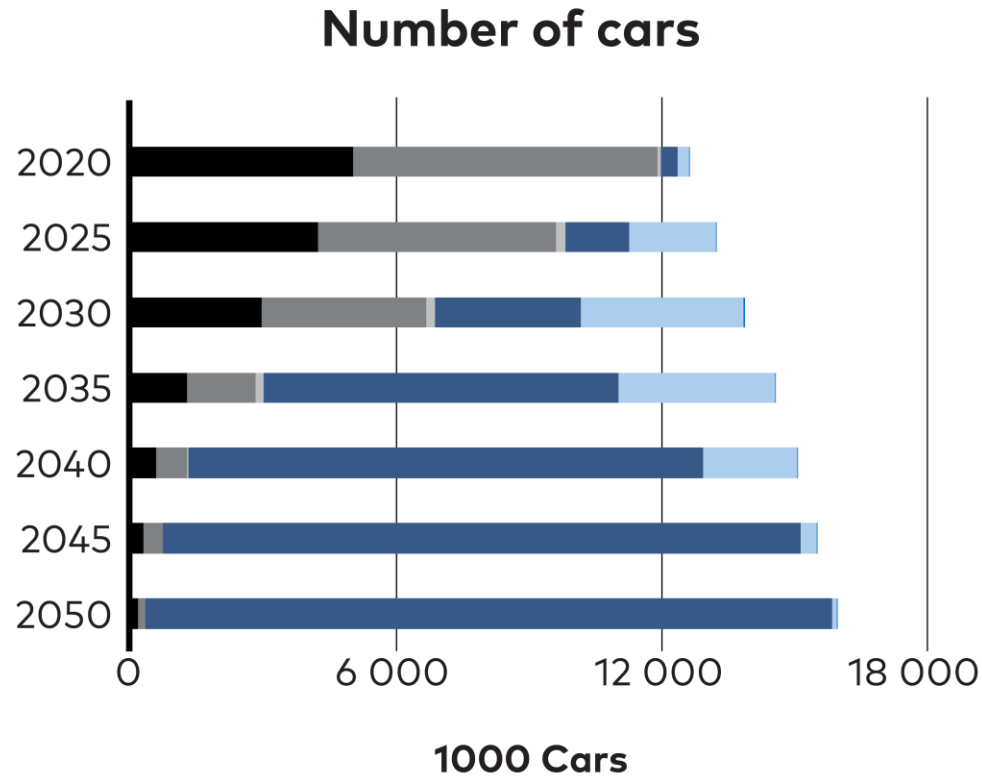


Direct Electrification Dramatically Improves Energy Efficiency



Iceland
Finland
Denmark
Sweden
Norway

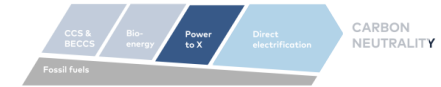
Direct Electrification is Accelerating in all Transport Modes



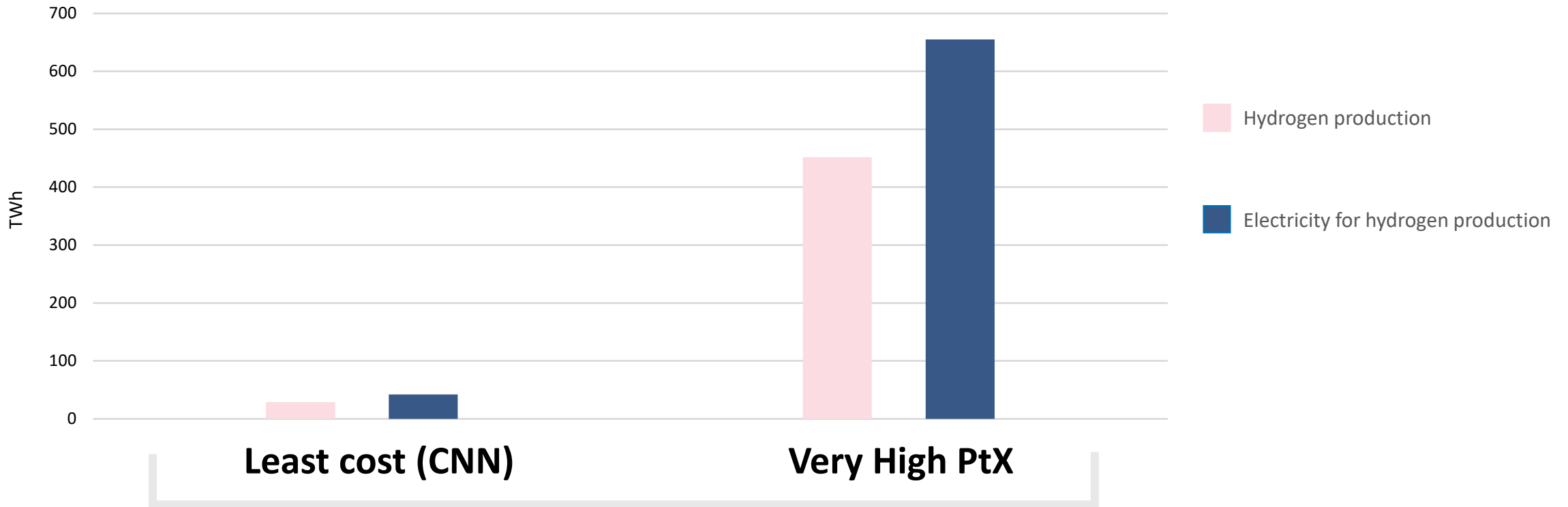
■ Diesel ■ Gasoline ■ Gas ■ Electric ■ Hybrid ■ Hydrogen



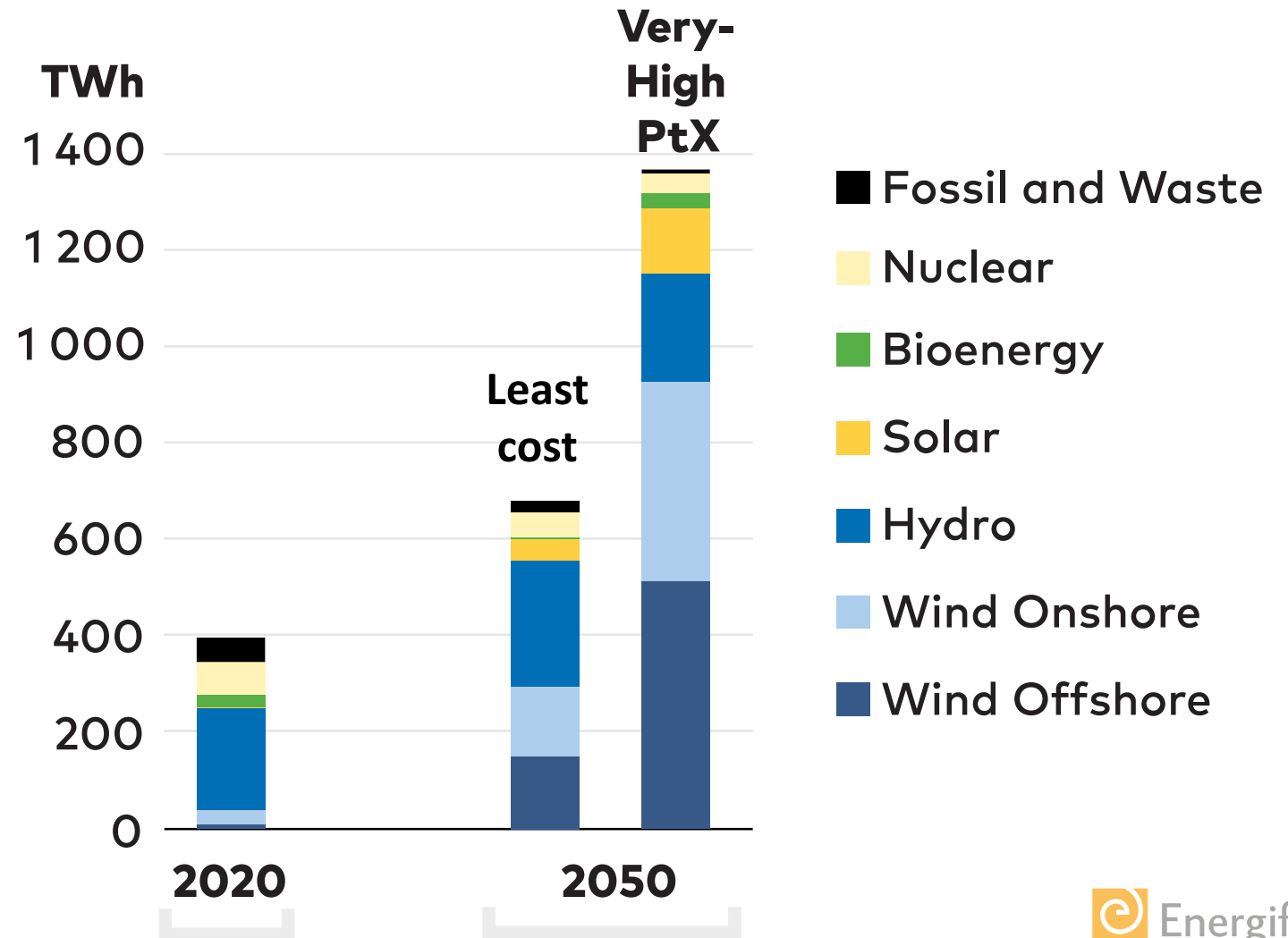
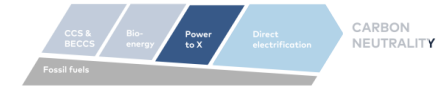
Power-toX is more than a hype, but not necessarily the cheapest option



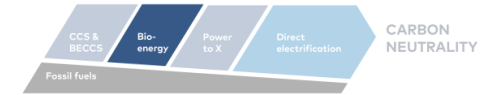
Nordic hydrogen production and associated electricity demand in 2050



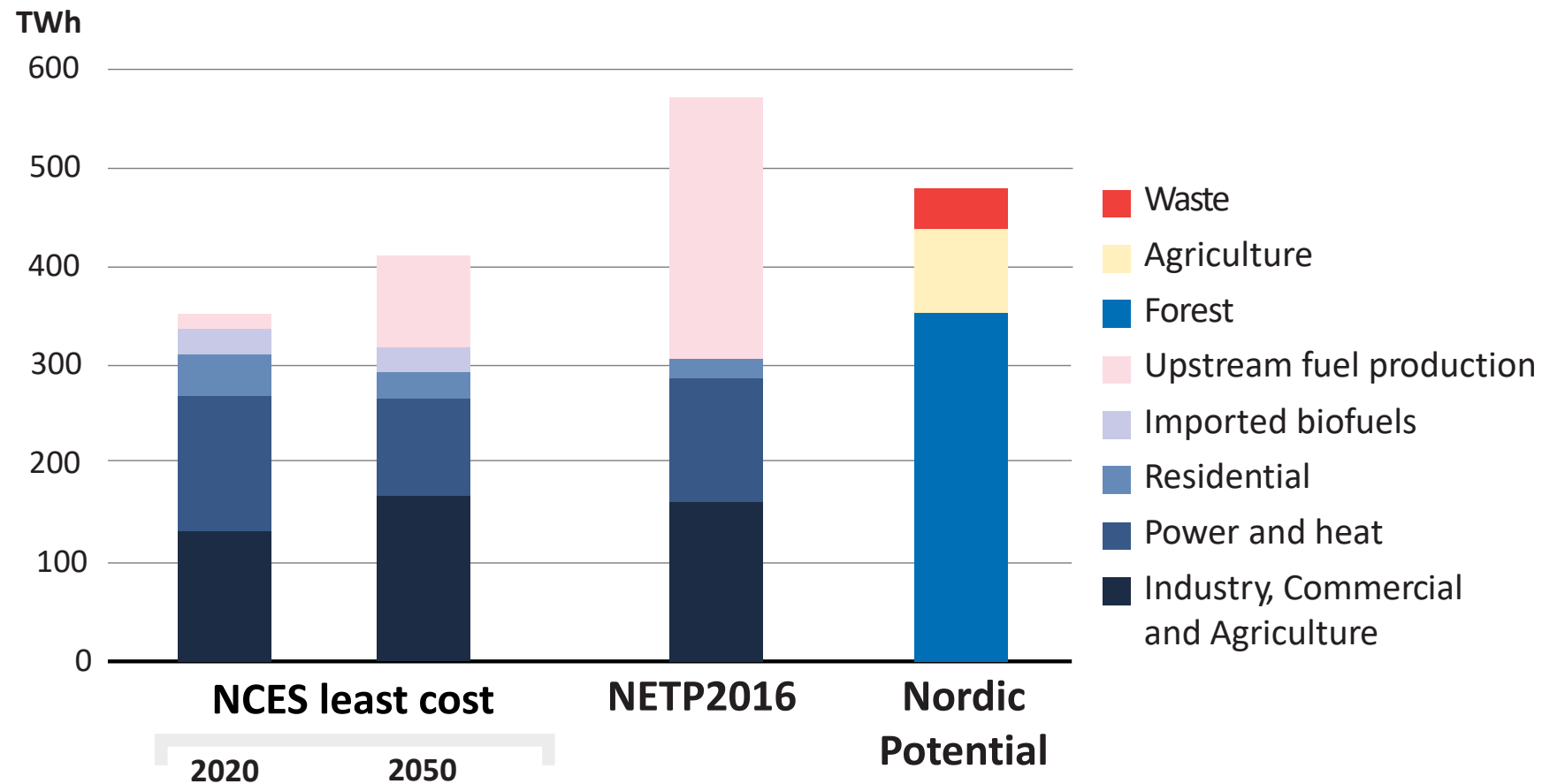
EU strategy will have significant Impact on the Nordic energy system



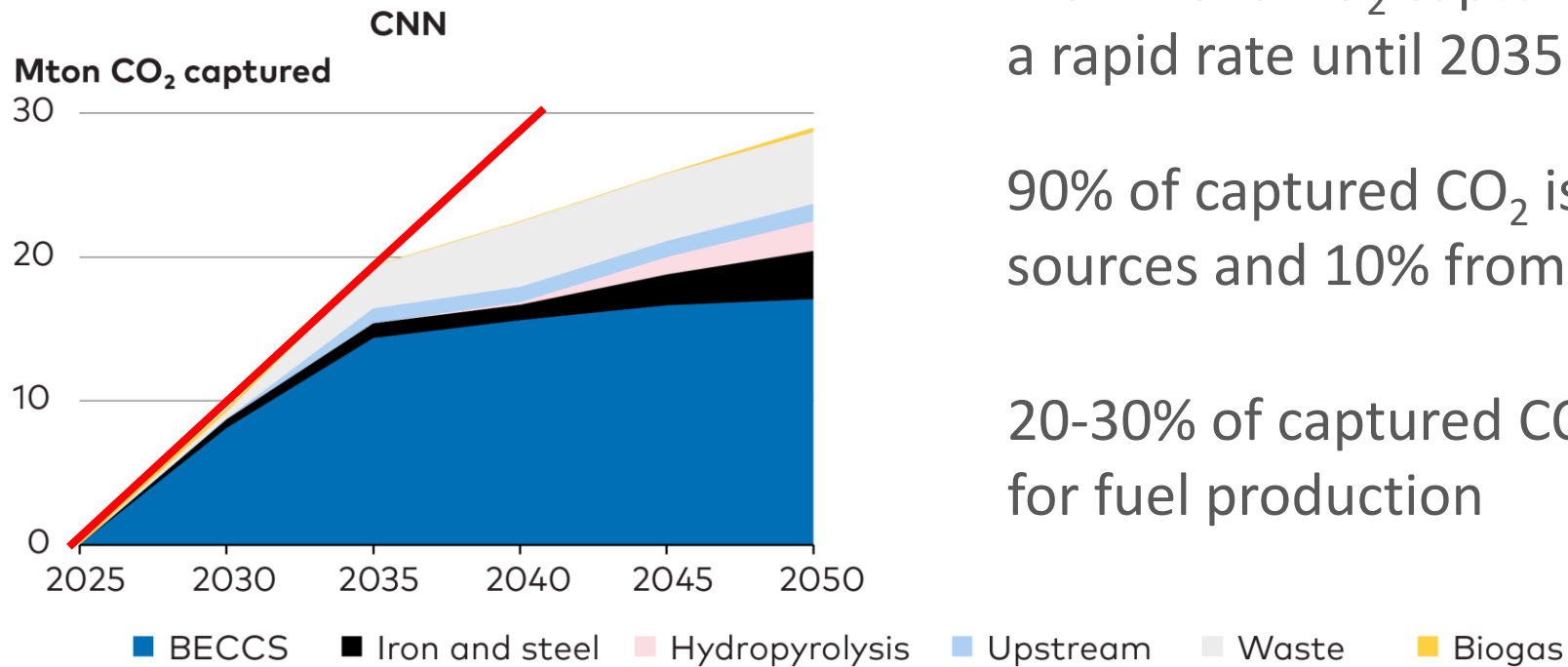
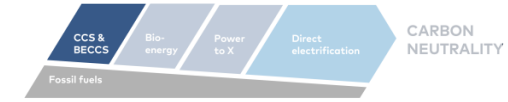
Bioenergy Use Increase



...but growth in demand for liquid biofuels is significantly lower than in previous studies



Negative emissions are necessary to reach Nordic national targets



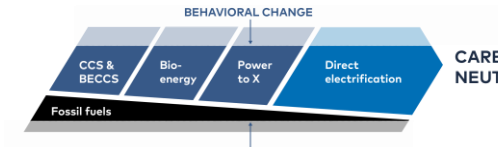
From 2025 CO₂ capture need to increase at a rapid rate until 2035

90% of captured CO₂ is from biogenic sources and 10% from fossil

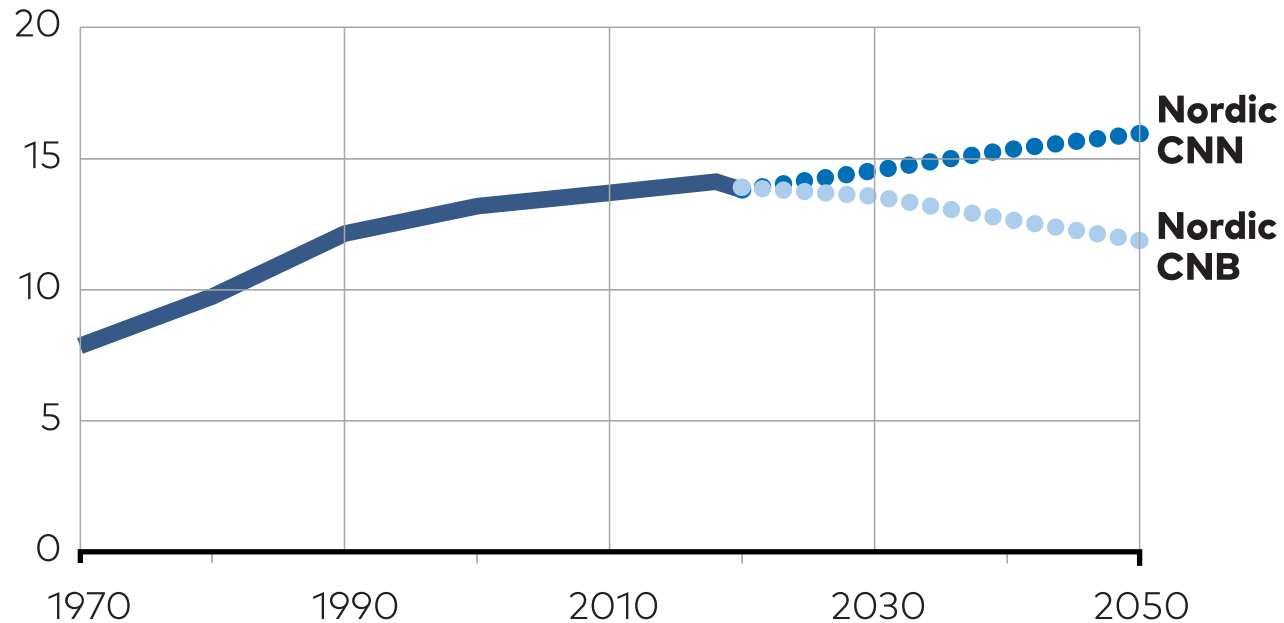
20-30% of captured CO₂ in 2050 are reused for fuel production



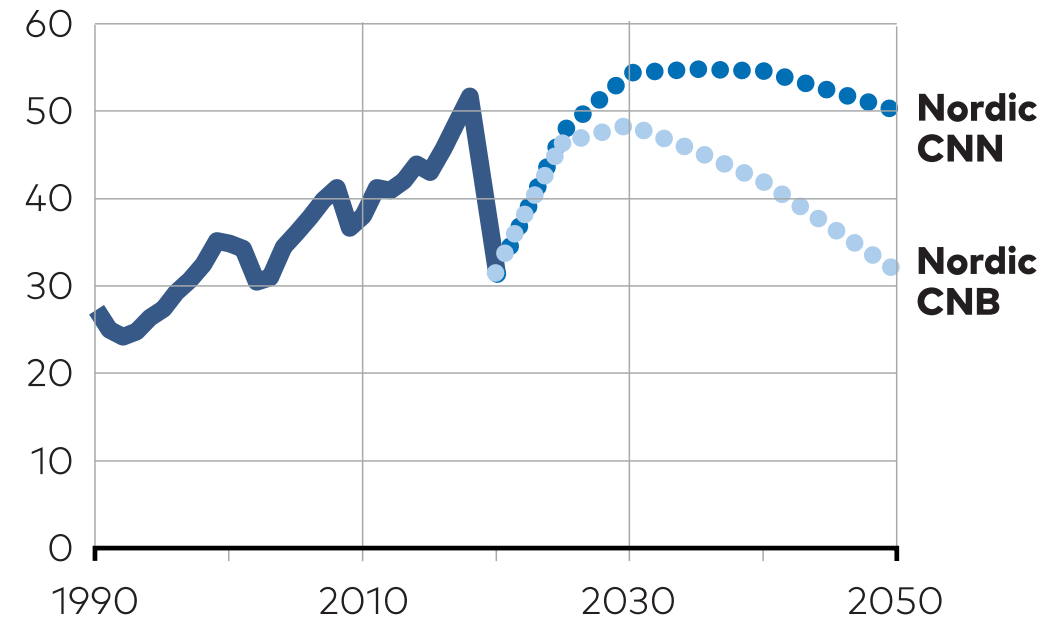
Behavioural Change Could Dramatically Reduce the Transition Cost



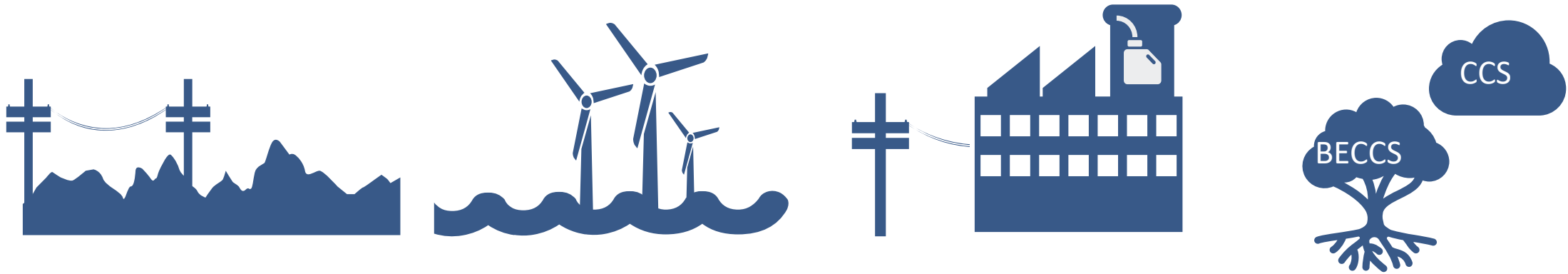
Per capita transport demand (1000 pkm/year)



Aviation fuel, total (TWh)



Four Target Areas for Nordic Collaboration



Thank you!

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