NORDIC CLEAN ENERGY SCENARIOS

Solutions for Carbon Neutrality

Slido code: NCES2021



Five solution tracks emerge in the NCES scenarios

Five Solution Tracks to Carbon Neutrality



BEHAVIORAL CHANGE

will lower the demand for energy and make the transition easier

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Direct Electrification is Central to all Decarbonisation Strategies



CARBON NEUTRALITY

Direct Electrification Dramatically Improves Energy Efficiency

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Direct Electrification is Accelerating in all Transport Modes

Stock of cars and trucks (incl. vans) CNN and NPH scenario





Number of trucks

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

Electricity demand grows in all sectors, but the span is wide

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Power-to-X and Hydrogen is not just Hype



...but is not necessarily the cheapest option

Nordic hydrogen production and associated electricity demand in 2050



Significant Impact on Nordic Electricity Production

EU hydrogen demand offers export revenues but put pressure on the electricity system



Fossil and Waste

- Nuclear
- Bioenergy
- Solar
- Hydro 🖉
- Wind Onshore
- Wind Offshore

Bioenergy Remains Important, but with a Shifting Role



Three Bioenergy Takeaways

Development in transport electrification could lower the pressure on bioenergy resources

Biomass and biofuels play an important interim role in most sectors

Maintaining sustainability despite increased demand will continue to be an important topic



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Bioenergy Use Increase

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



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Carbon Capture and Storage, along with Negative Emissions, are Essential to Reach Nordic Climate Neutrality Targets



All scenarios reach national targets but amount of CO₂ captured in 2050 depends on cost and acceptance



Negative emissions are necessary to reach Nordic national

targets

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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 CO_2 in 2050 are reused for fuel production

Remaining Emissions in the CNN Scenario

About 33 Mton of energy-related CO₂ emissions remain in hard-toabate sectors by 2050.





Behavioral change and social acceptance will directly impact the Nordic energy transition



The CNB Probes Different Ways to Disrupt Historical Trends

- Passenger transport demand stabilises
- Consumption is reduced
- Increase of car sharing





Behavioural Change Could Dramatically Reduce the Transition Cost



Public acceptance of onshore wind, solar PV and transmission lines will impact transition feasibility

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113 GW

100 GW

Thank you.

The results show that it is possible, but we must prioritise

The pace of transformation must increase

A transition that is socially acceptable

A transition that is low in cost

Long-term business strategy

Supporting the European transition

Four target areas for Nordic collaboration



Nordic cooperation on integrated offshore wind and grid development





Common Nordic power infrastructure planning





Common vision for the role of PtX production in the Nordics



Common Nordic CCS strategy



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Successful coordination in these areas lead to more efficient solutions at a lower cost

Project Partners

Energiforsk



Norwegian University of Life Sciences

















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Description Nordic Energy Research



Scenarios report at

WWW.NORDICENERGY.ORG



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Choose Countries	
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Scenario Difference This function will calculate the difference in value between the blue and violet model results.	

Explore all data and results through NCES

open access tools

AVALABLE AT

WWW.NORDICENERGY.ORG

- Open access models
- Nordic energy statistics database
- Complete technology catalogue
- Web tool for scenario results and sensitivity analyses

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Thank you!

