Business from technology

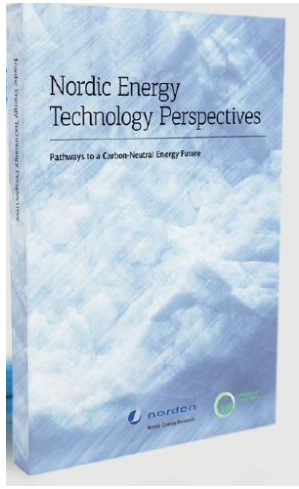
Nordic and Finnish scenarios for a low carbon society

Mobility: Technology priorities and strategic urban planning, 22 May 2013, Espoo, Finland

Tiina Koljonen

Two recent studies

1. Nordic Energy Technology Perspectives 2013 (NETP 2013)

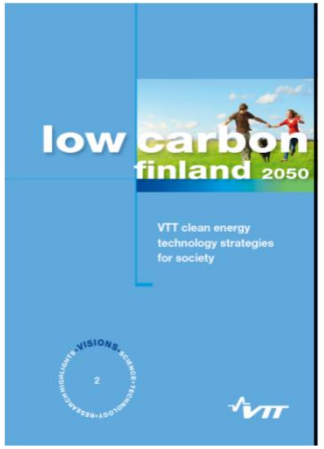


www.iea.org/etp/nordic

www.nordicenergy.org/project/nordic-energy-technology-perspectives/

2. Low Carbon Finland 2050 – VTT clean energy technology strategies for society

www.vtt.fi/lowcfin



Nordic study gathered large group of experts from different countries and organisations

Main responsible organisations:

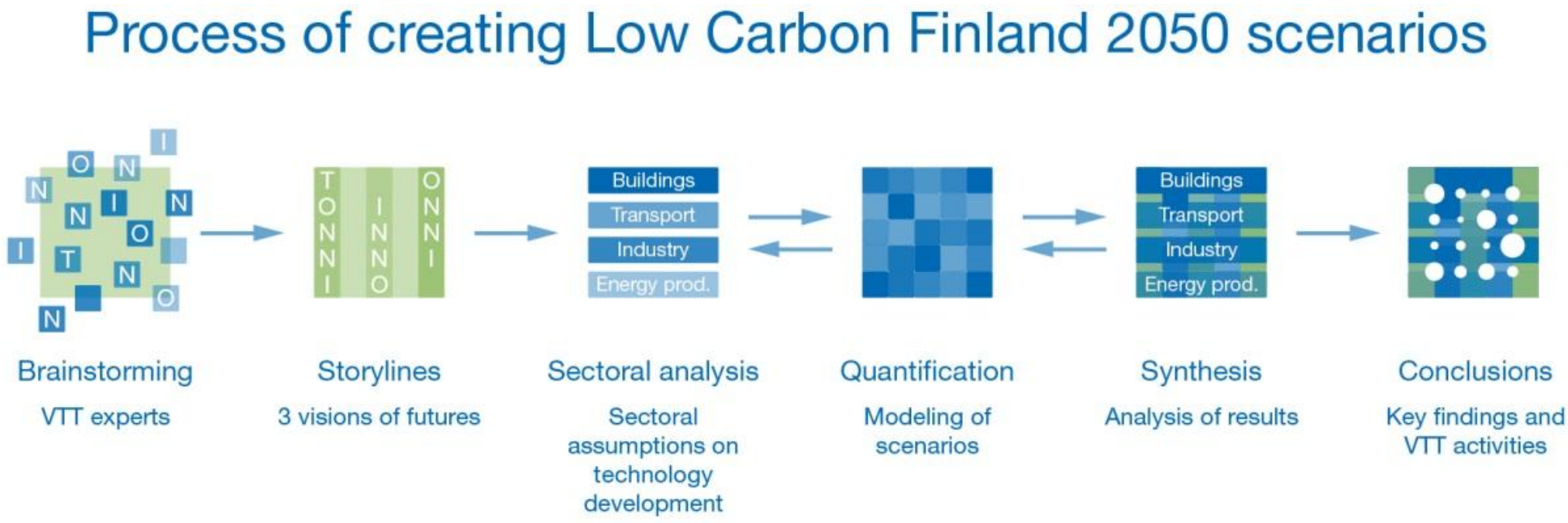
Reference group

DANISH ENERGY AGENCY
Tekes
ORKUSTOFNUN
National Energy Authority
The Research Council of Norway
Swedish Energy Agency
DANISH ENERGY ASSOCIATION
NORWEGIAN MINISTRY OF PETROLEUM AND ENERGY
Finnish Energy Industries
NORDENERGI
JRC
EUROPEAN COMMISSION

Working group

profu
IVL Swedish Environmental Research Institute
DTU
Ea Energy Analyses
VTT
UNIVERSITY OF ICELAND
IFE
SINTEF
CHALMERS
LULEÅ TEKNISKA UNIVERSITET
KTH ROYAL INSTITUTE OF TECHNOLOGY
Veðurstofa Íslands
Landsvirkjun

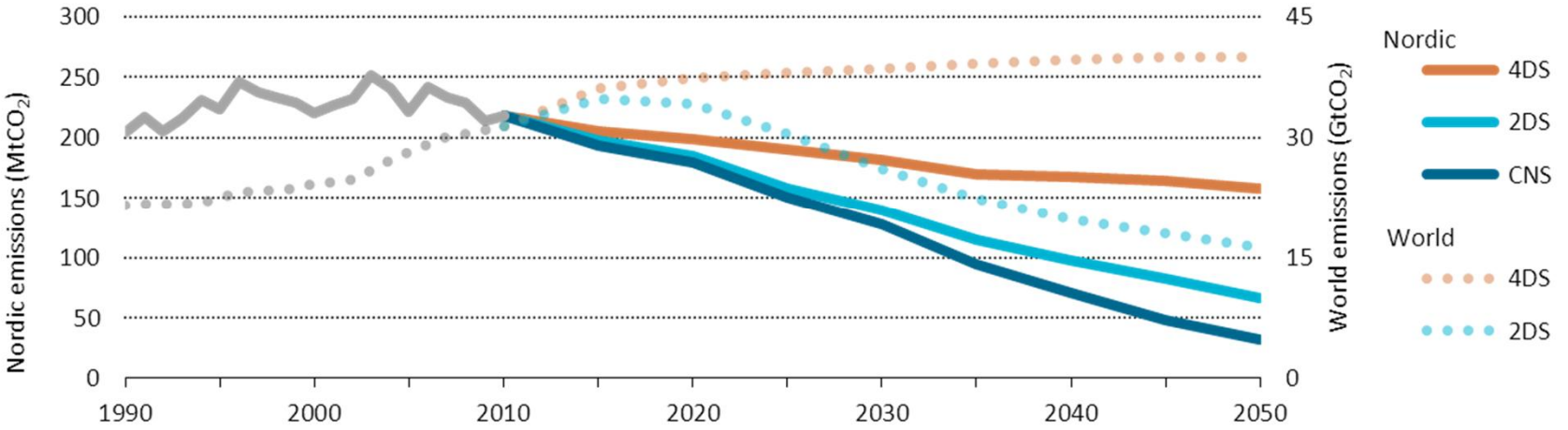
Low Carbon Finland 2050 gathered large group of VTT experts



- About fifty VTT researchers contributed in the project
- Project duration from summer 2010 to November 2012
- Finland's economic structure and welfare by 2050 analysed in collaboration with the Government Institute for Economic Research (VATT)
- Scenario illustrations by Jutta Suksi

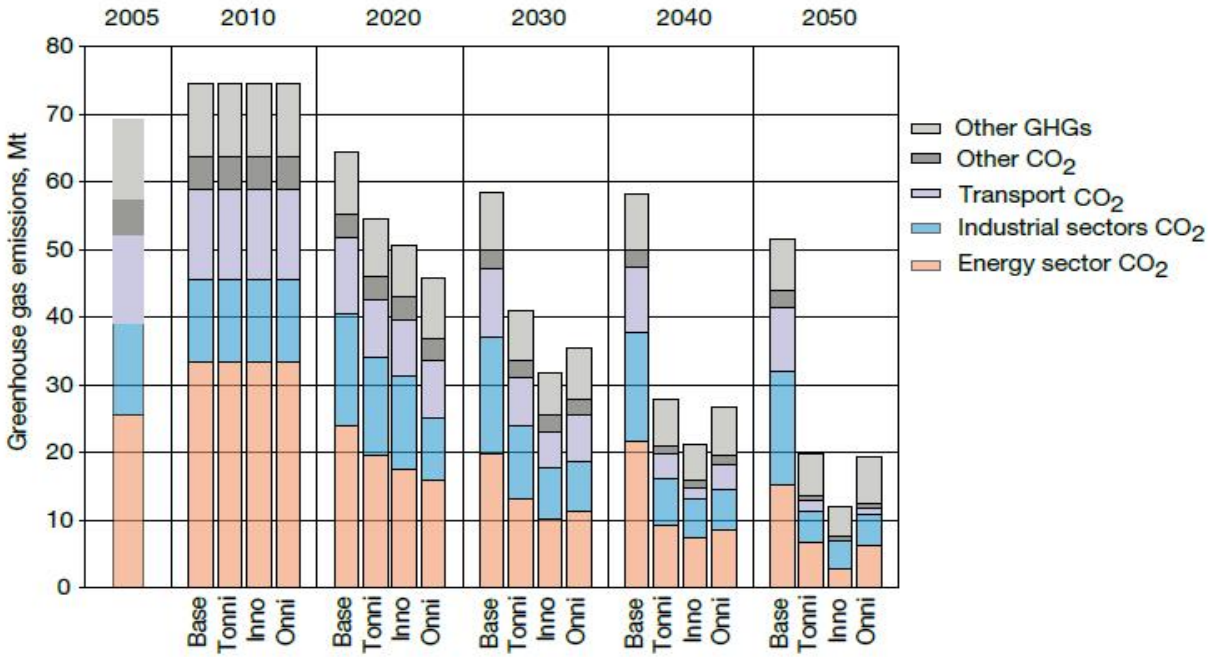
low carbon finland 2050

At least 80% greenhouse gas mitigation by 2050 as a starting point in both of the studies (compared to 1990 level)



Nordic Energy Technology Perspectives

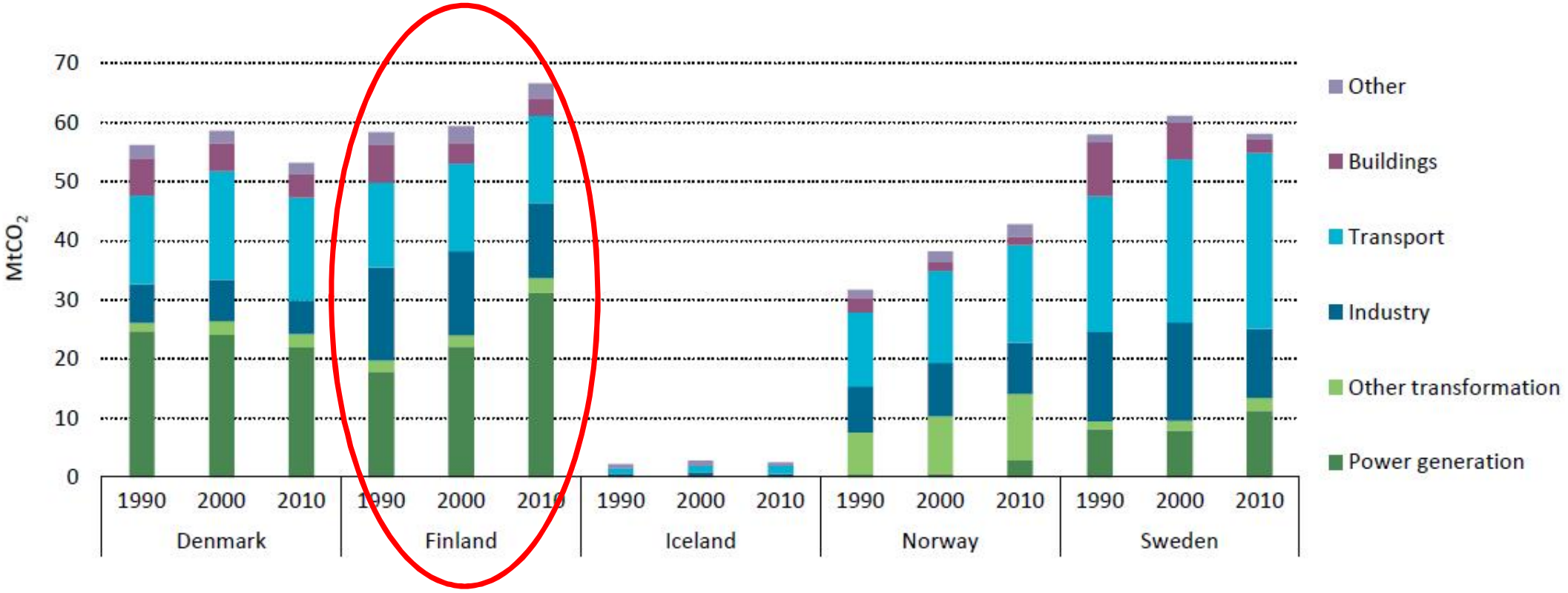
Pathways to a Carbon Neutral Energy Future



low carbon finland 2050

NETP: Finland's challenges in the Nordic context

Finland's CO_2 emissisions are high compared with other Nordic countires

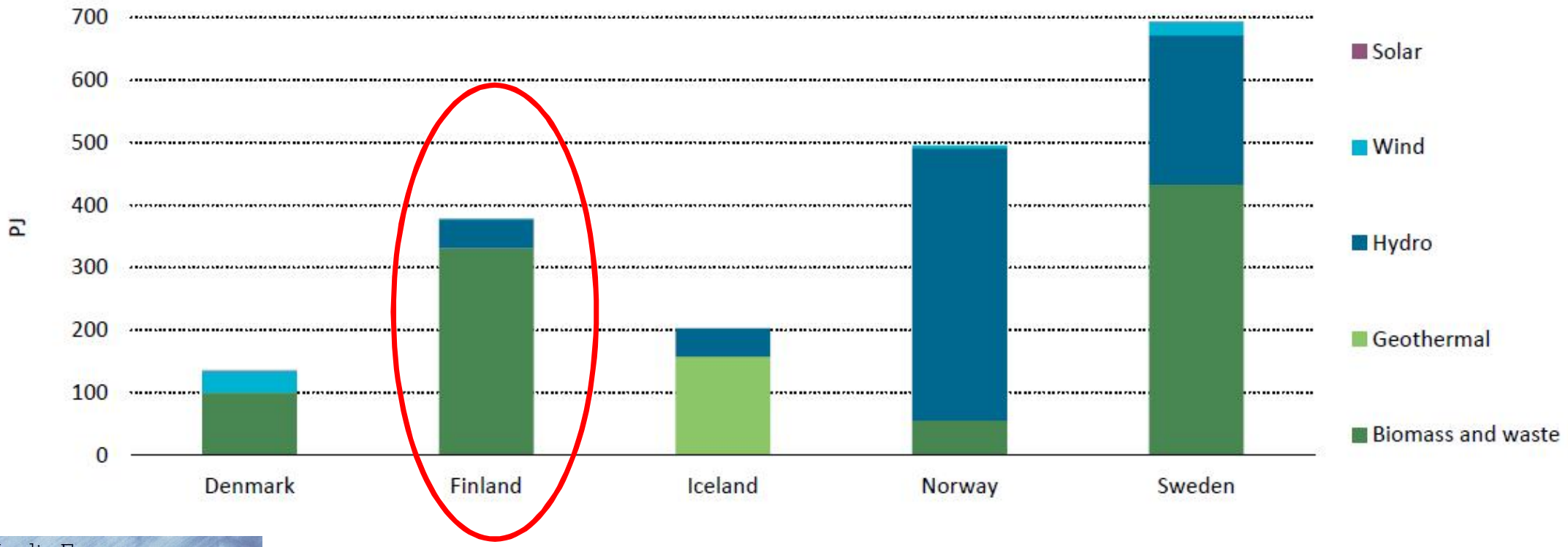


Nordic Energy Technology Perspectives

Pathways to a Carbon Neutral Energy Future

NETP: Finland's opportunities in the Nordic context

The renewable production in Finland is dominated by biomass



Nordic Energy Technology Perspectives

Pathways to a Carbon Neutral Energy Future

The scenario set-ups were different

- NETP 2013:
  - Nordic scenarios were based on the global ETP 2012 definitions, i.e. 4DS and 2DS (6DS was left out)
  - In addition, carbon neutral scenario (CNS) was created for Nordic region with two variants, i.e. with higher bio (CBNS) and higher electricity (CENS)
  - The economy, community, industrial structures were assumed to be about the same as today but some moderate growths were assumed in transport and industrial volumes, building areas, etc.
- Low Carbon Finland 2050:
  - Three alternative low carbon scenarios were created with different assumptions on economy, industrial, and community structures.

Tonni-Finland 2050 (comparable with NETP 2013 2DS)

No significant changes in industrial, regional or urban forms, moderate new technology RD&D

low carbon finland 2050

Inno-Finland 2050

Fast technical RD&D, new industrial products and processes, centralized urban structure, ”smart-economy”

low carbon finland 2050

Onni*-Finland 2050

Less energy-intensive industries and more service enteprices, decentralized regional structure

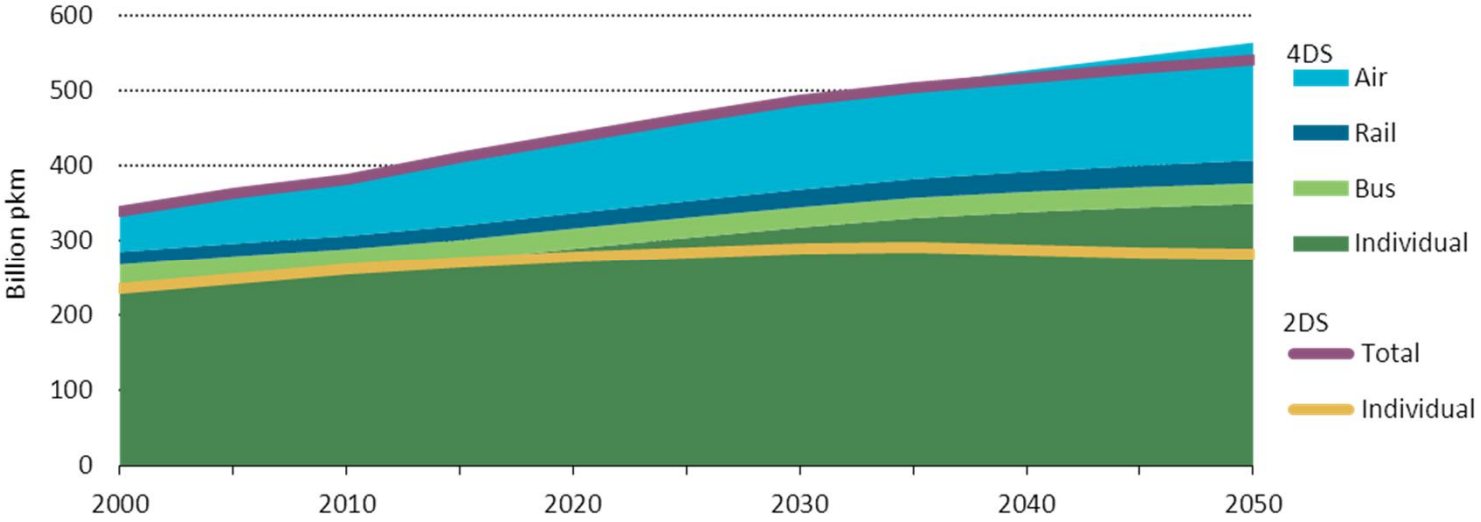
low carbon finland 2050

* Onni is a Finnish word, which means happiness

How we live and move in low carbon Finland?

- In Tonni, Inno and Onni the building stock and transport demands follow the assumed economic and community structures
- Both urban and decentralized community structures feasible due to new technical solutions. Intelligent transport systems (ITS) and use of telecommunication services (ICT) reduces the need for and volume of transport.
- Challenge: buildings we construct now will be with us for 50-100 years, transport needs will be increasing due to increasing commerce and other services

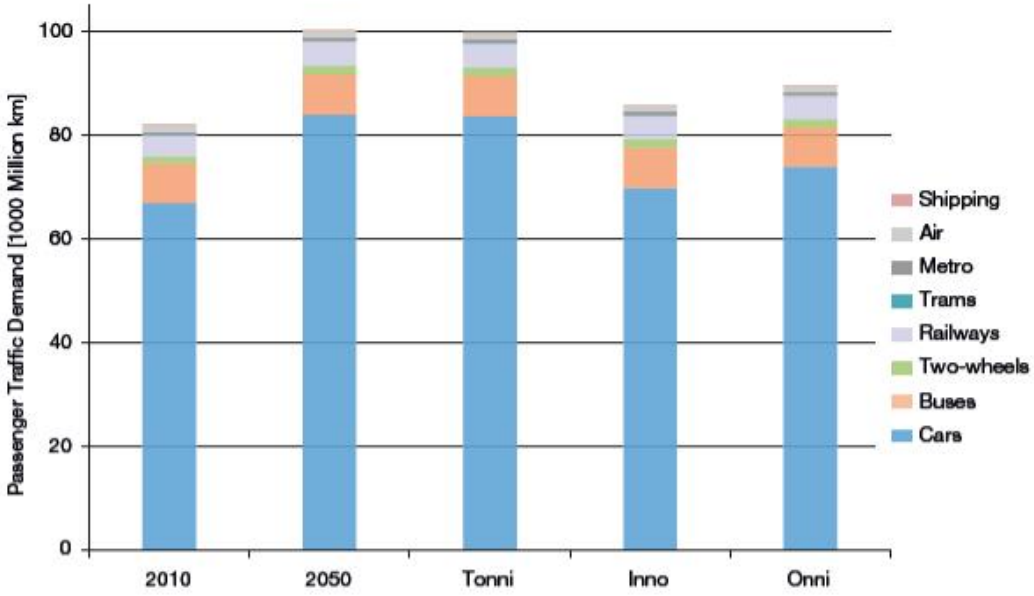
Passenger transport increases or stagnates after 2020



Nordic Energy Technology Perspectives

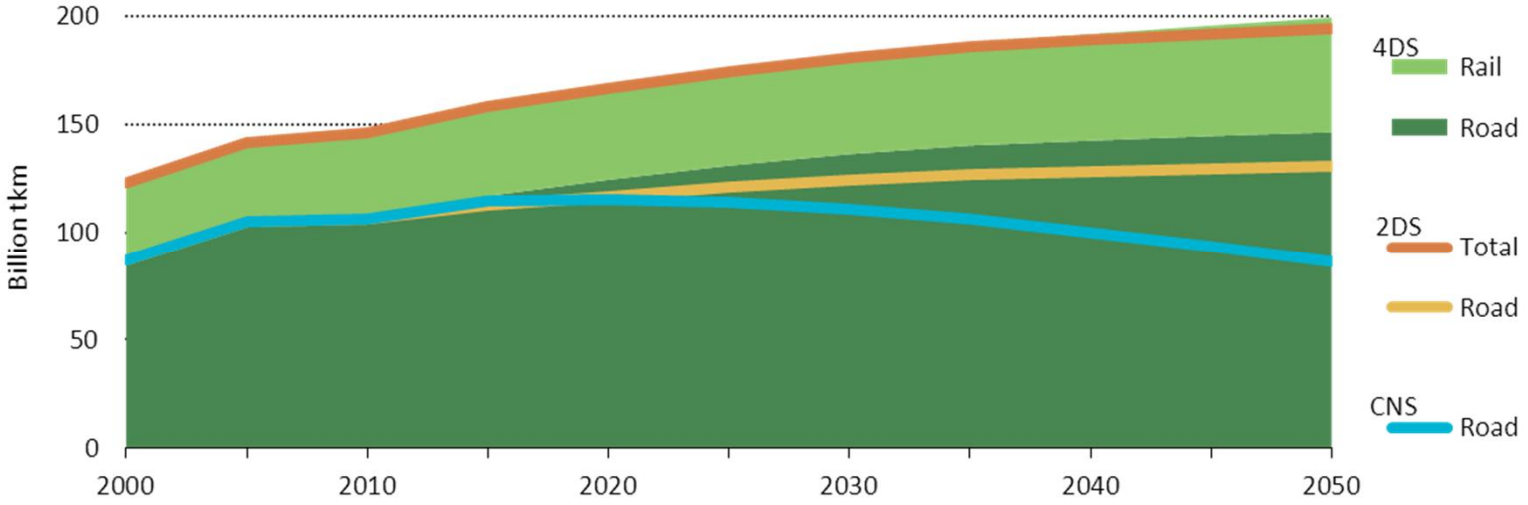
Pathways to a Carbon Neutral Energy Future

low carbon finland 2050



Freight transport increases

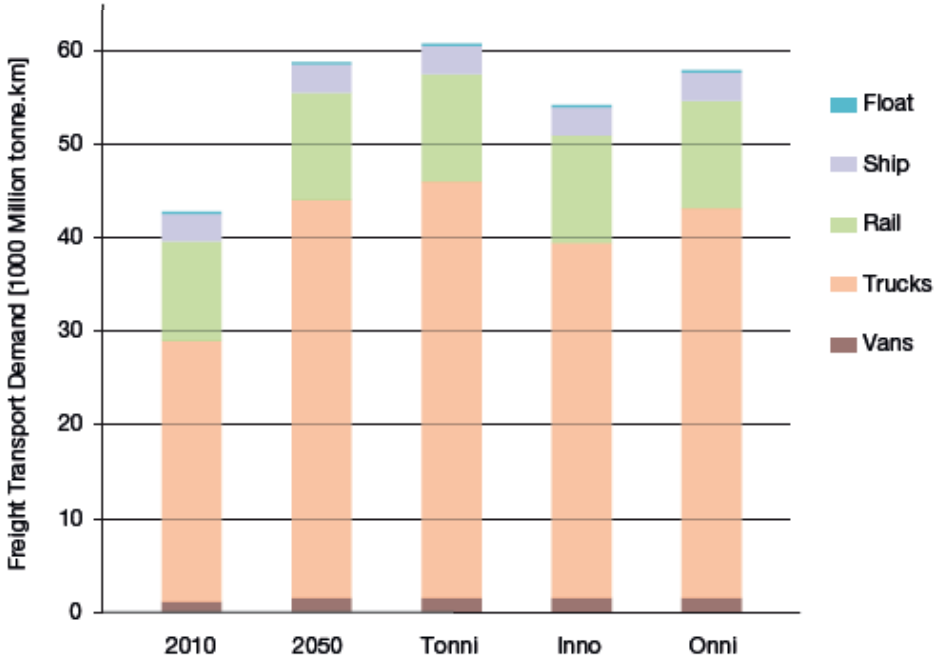
CNS also assumes strong modal shift from road to rail



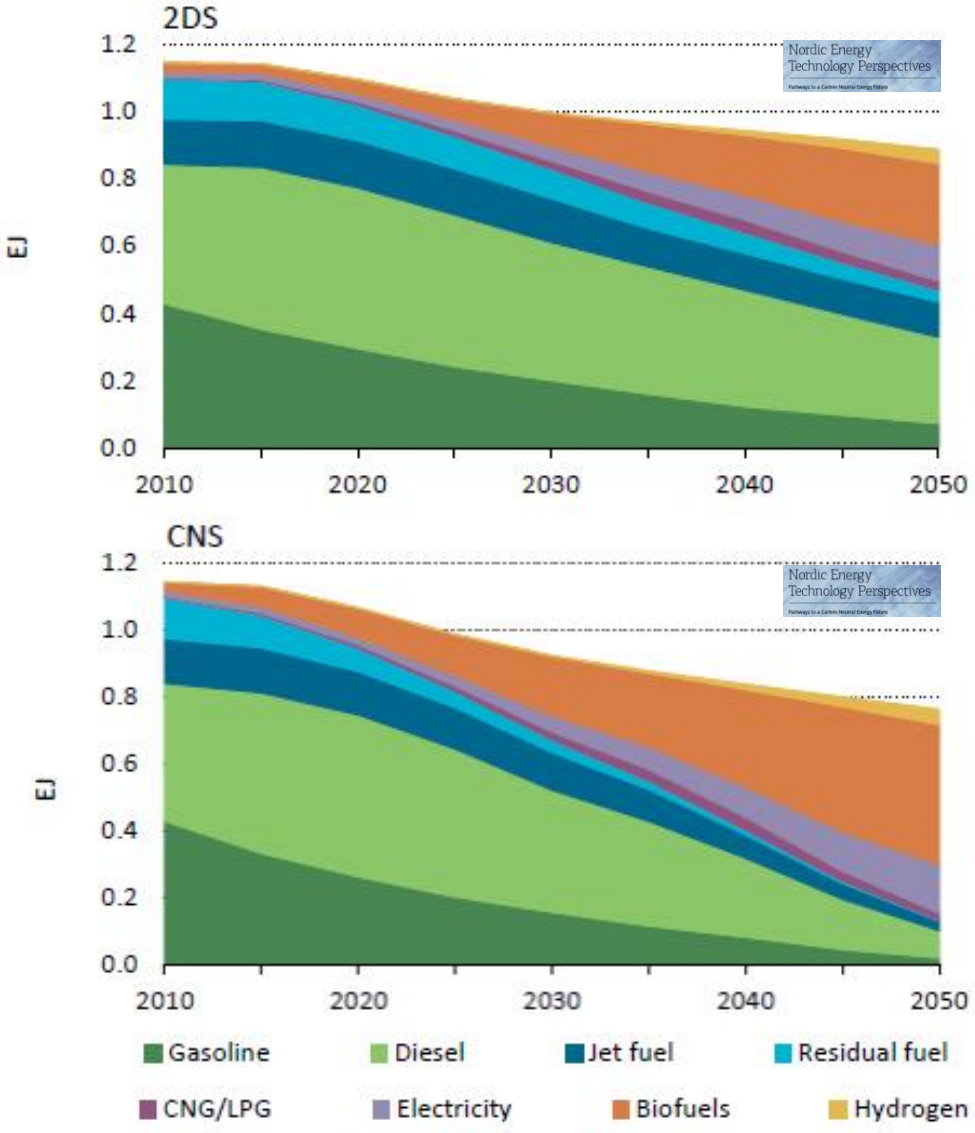
Nordic Energy Technology Perspectives

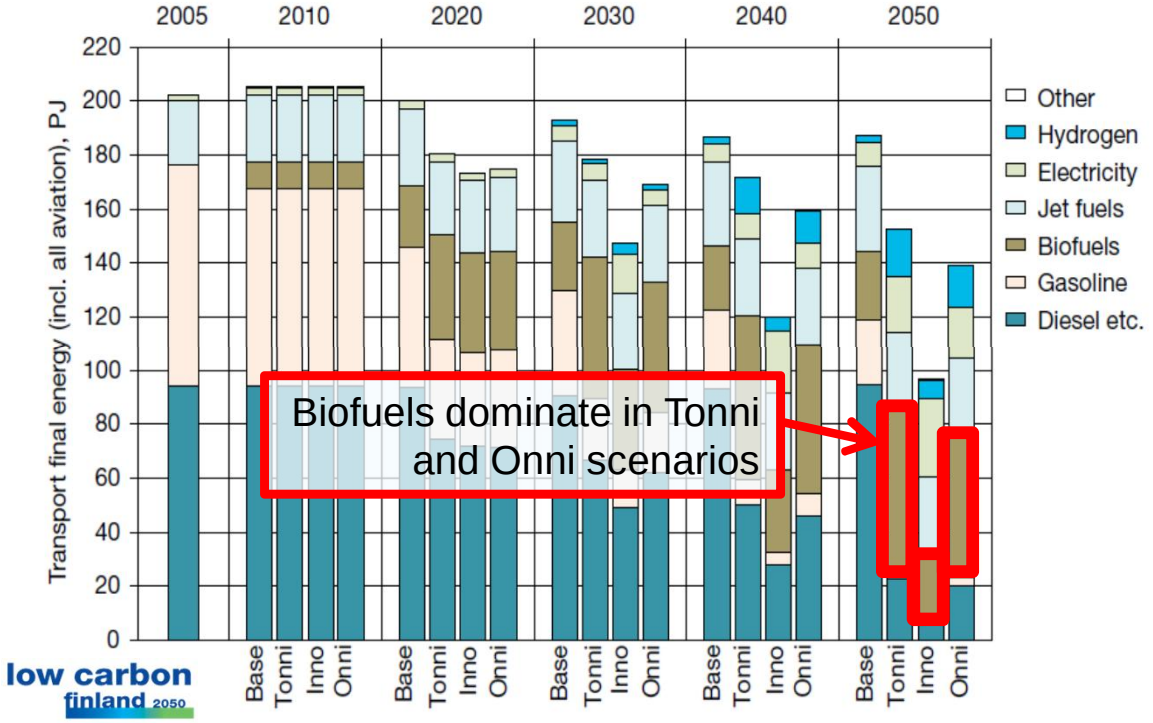
Pathways to a Carbon Neutral Energy Future

low carbon finland 2050



The future entails an increased variety of energy sources for the transport sector and increased energy efficiency





Key findings

- The transport sector remains dependent on high-energy-dense liquid fuels but **biofuels** will play a significant role in the future transport sector.

- All Nordic countries have ambitious long-term targets to reduce ghg emissions from transport but current policies are insufficient to meet the low carbon target. However, policies are very different in each Nordic country.

- Transport and industry sectors seem to be the most difficult sectors to decarbonize
  - New technologies are needed
  - Behavioural changes are needed
  - International climate agreement is needed

VTT creates business from technology