Perspectives of the Baltic Energy Market

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What is Nordic Energy Technology Perspectives, and what implications can be made from the results?
Nordic Energy Technology Perspectives 2016
Buildings
Electricity and heat
Transport
The Nordic energy system and the findings of NETP 2016
The Nordic energy mix, 2014
30 years ahead on electricity decarbonisation

Global carbon intensity of electricity (gCO₂/kWh)

Historical global carbon intensity

Global 2-Degree Scenario

Nordic countries in 2013

Nordic CO₂ from energy

Electricity & heat

Transport, industry & other

70%

30%
Transforming the energy system

Nordic Total Primary Energy Supply in the CNS

2013

-1000 0 1000 2000 3000 4000 5000 6000 PJ

Biomass, waste
Hydro
Nuclear
Oil
Gas
Coal

Wind; solar; geothermal

Net export of electricity
Demand sectors most challenging

Nordic CO₂ emissions in the CNS

- Transport
- Industry, oil, gas and other transformation
- Power and heat
- Buildings (direct emissions)
Three strategic actions

1. Incentivise and plan for a more distributed, interconnected and flexible energy system

2. Tap into the positive momentum of cities in transport and buildings

3. Ramp up decarbonisation of long-distance transport and the industrial sector
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Space heating energy intensity in Nordic buildings

126 kWh/m² in 2013

0.8% annual improvement, 1990-2013

60 kWh/m² in 2015

2.2% annual improvement, 2013-2050
Electrification and public transport

Map of the Oslo area with public EV charging points
Three strategic actions

1. Incentivise and plan for a more distributed, interconnected and flexible energy system
2. Tap into the positive momentum of cities in transport and buildings
3. Ramp up decarbonisation of long-distance transport and the industrial sector
Decoupling transport activity from emissions
Long-distance transport
Visualisation of Nordic CO$_2$ emissions, 2013
CCS critical in industry

Nordic industrial emissions in 2050

Total
20 Mt CO$_2$

Captured
7 Mt CO$_2$
Three strategic actions

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2. Tap into the positive momentum of cities in transport and buildings
3. Ramp up decarbonisation of long-distance transport and the industrial sector
Implications for the Baltic energy system
Implications

1. The Nordic electric grid can provide flexibility and security of supply
2. Rapid electrification and use of biofuels drastically reduces the need for fossil fuels
3. Increasing energy efficiency in buildings and reducing CO2-emissions from industry are common challenges
1. Flexibility and security of supply

2015

- 5 GW capacity to Europe
- 28 TWh trade activity with Europe
- 14 TWh net export to Europe

2050

- 23 GW capacity to Europe
- 125 TWh trade activity with Europe
- 53 TWh net export to Europe
1. Flexibility and security of supply

- Increased transmission capacity between the Nordic electricity system and the Baltic electricity system gives access to flexible, cheap, renewable and reliable electricity.
- Prices in Central- and East Europe stay higher.
2. Rapid electrification of transport

Nordic stock of cars and light commercial vehicles in the CNS

- **2015**: 99% Combustion engine, <1% Electric (incl. plug-in hybrids)
- **2030**: 69% Combustion engine, 20% Hybrids, 11% Electric (incl. plug-in hybrids)
- **2050**: 11% Combustion engine, 24% Hybrids, 66% Electric (incl. plug-in hybrids)
2. Rapid electrification of transport

The Rise of Electric Cars

By 2022 electric vehicles will cost the same as their internal-combustion counterparts. That’s the point of liftoff for sales.

Sources: Data compiled by Bloomberg New Energy Finance, Marklines

Oil displaced by electric vehicles:
2. Rapid electrification of transport

... But still massive need for biofuels

15% import dependency for biomass in 2050, up from 8% in 2013
2. Rapid electrification of transport

... But still massive need for biofuels
2. Rapid electrification of transport

... But still massive need for biofuels

“The Russian Federation alone accounts for 20 percent of the total forest area in the world”

(Global Forest Resources Assessment 2010 Main report, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, Rome, 2010)
3. Energy efficiency in buildings and CO2-emissions from industry

“Russia can save 45 percent of its total primary energy consumption”

(Energy Efficiency in Russia: Untapped Reserves, World Bank Group)

Source: CENEF for the World Bank
3. Energy efficiency in buildings and CO2-emissions from industry

By realizing its energy efficiency potential Russia can save:

• 240 billion cubic meters of natural gas,
• 340 billion kWh of electricity,
• 89 million tons of coal, and
• 43 million tons of crude oil and equivalents in the form of refined petroleum products.
3. Energy efficiency in buildings and CO2-emissions from industry

Figure 4.2 CO₂ emissions by sector, 1990-2012

Note: Data for 2012 are provisional.

* Commercial includes emissions from commercial and public services, agriculture/forestry, and fishing.

Decarbonization of the Baltic energy system
EU targets and the Baltic countries

- Room for improved ambitions for the ESD-target (emission reductions in sectors outside ETS) and for energy efficiency targets

Source: Country Factsheet Lithuania, State of the Energy Union
EU targets and the Baltic countries

• Large differences in 2020 renewable energy targets

Source: National renewable energy action plan, Lithuania, Latvia, Estonia
Baltic Energy Market Interconnection plan

• Established 2009

“The Baltic Energy Market Interconnection Plan (BEMIP) aims to further integrate the Baltic States' energy market by building more infrastructure.”
Baltic Energy Market Interconnection plan

- Electricity market integration
- Electricity interconnections and generation
- Gas internal market and infrastructure
Baltic Energy Technology Scenarios (BENTE)

• BENTE will examine:
  - different scenarios
  - how the Baltic countries can achieve their climate- and energy targets
  - cost effectiveness

• The study will build on Nordic Energy Technology Perspectives 2016.
Thank you

Download figures, data and slides at
www.NordicETP.org