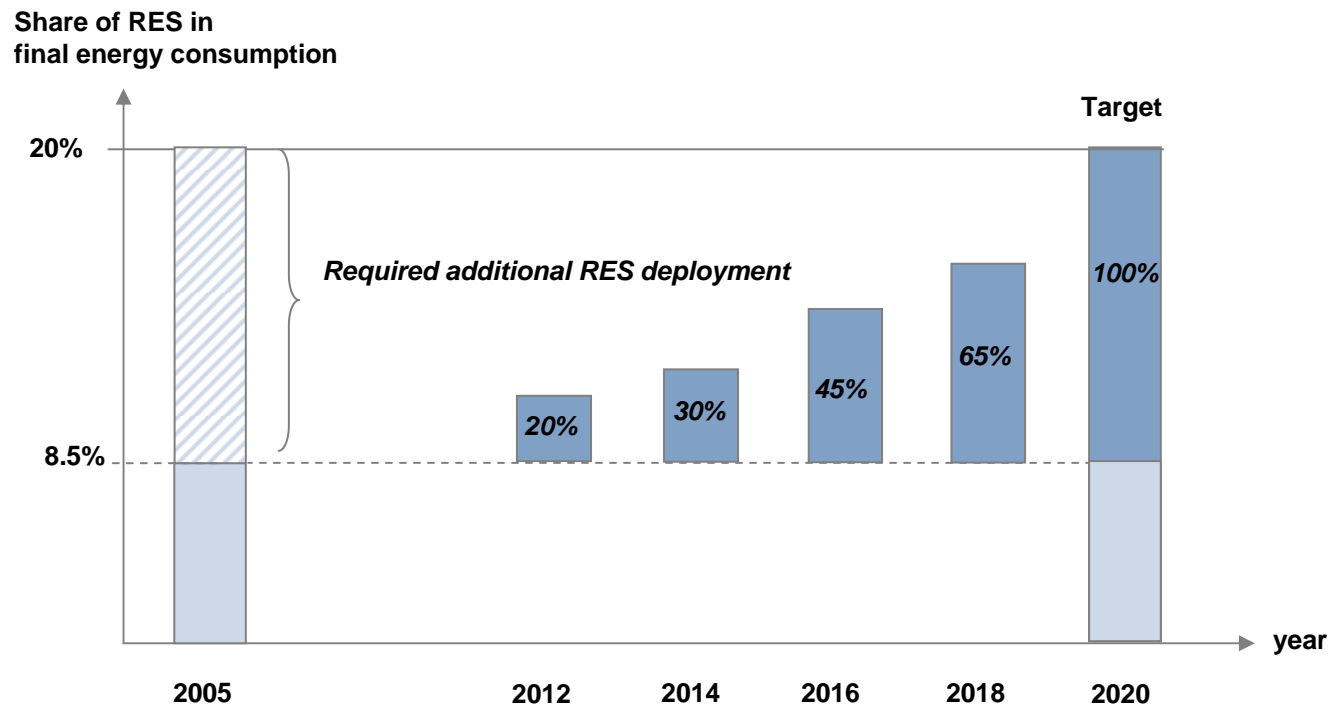


Synthesis result:
**RES deployment profoundly changes the
market balance in the Nordic power market**

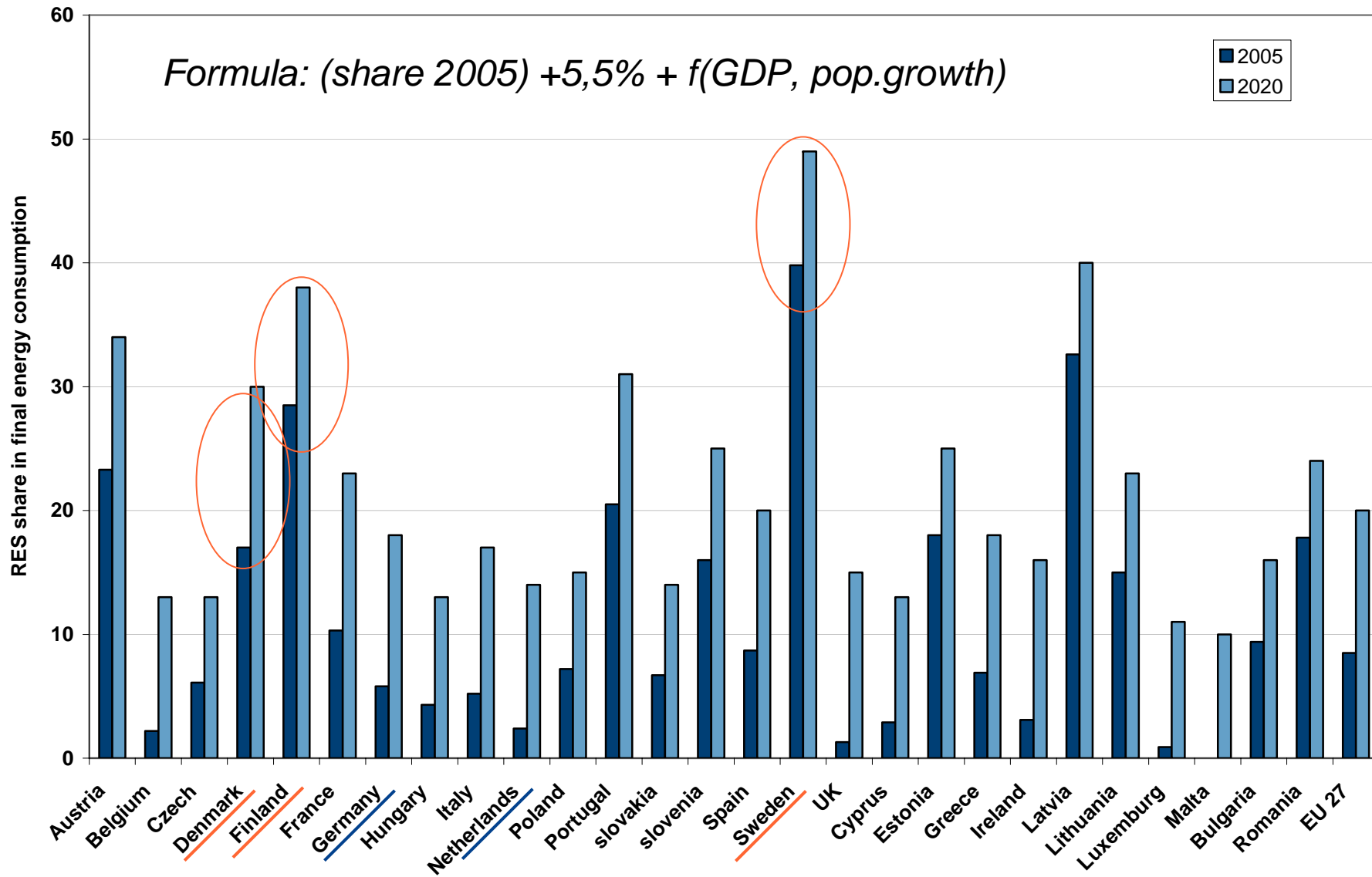
Nordic Energy Perspectives
Oslo, March 17, 2009
Berit Tennbakk and Thomas Unger

RES: Overall targets for 2020

- Overall target:
 - 20% share of Renewable Energy Sources (RES) in final energy consumption
- Effort-sharing among Member States is i.a. based on GDP growth
 - National targets between 10 and 49 % (capped)
- Directive requires renewable national plans in 2010 and reports every two years

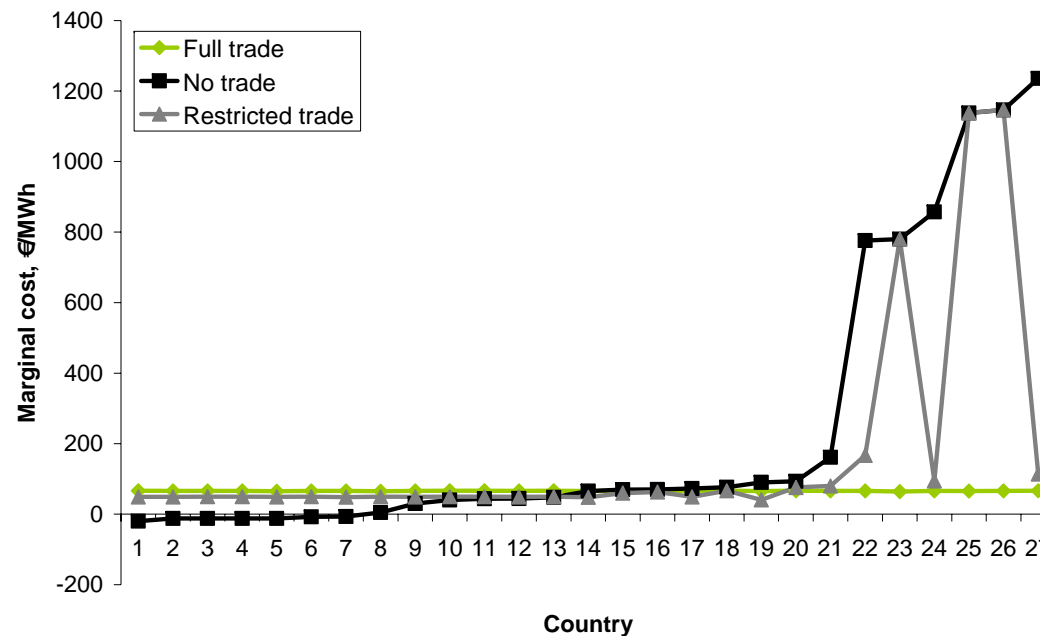


RES: National targets for share of final energy consumption 2020

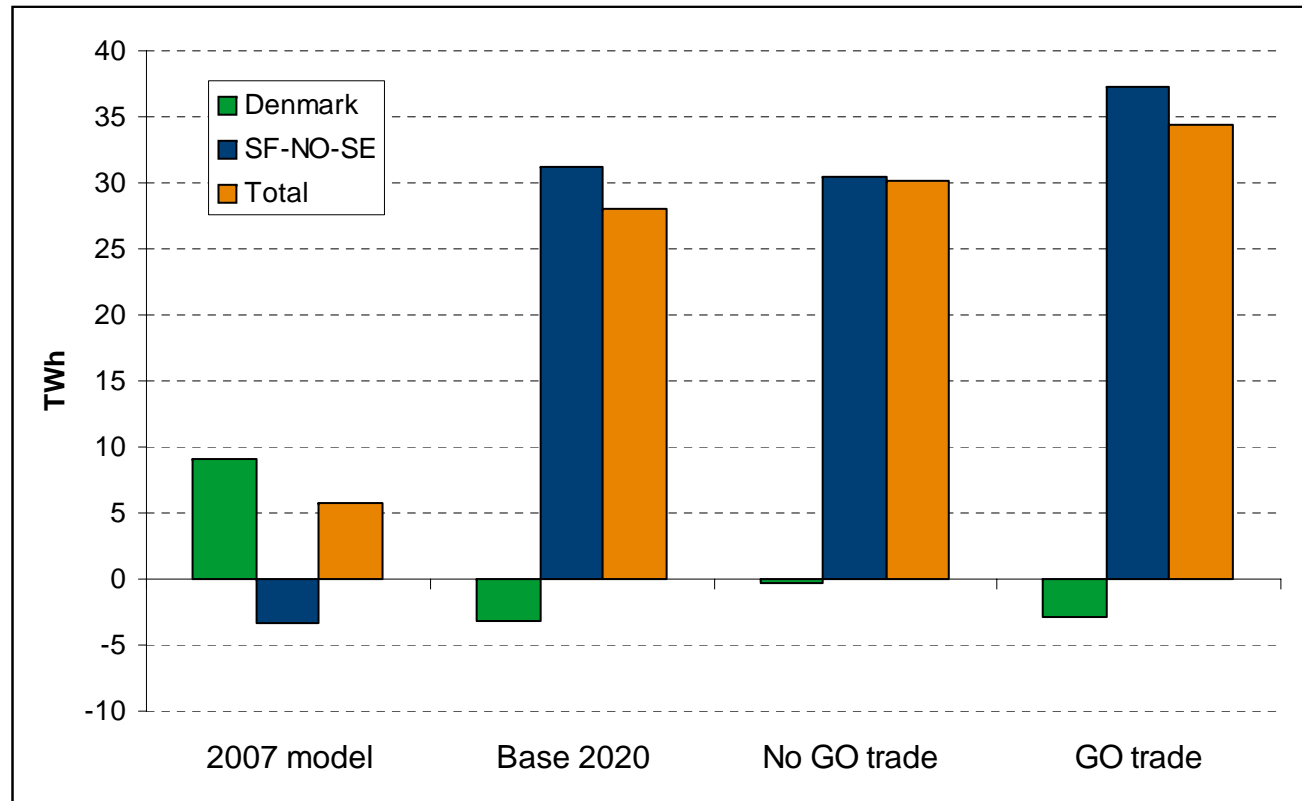


It will be very difficult – or costs will be very high – for some member states to reach their targets without trade

- The analysis indicate that six member states will face extremely high marginal cost in order to reach their national targets
 - In reality it means that they are unlikely to be meet their targets
- At the same time cheap renewable potential may not be utilized
- For three of the countries with high marginal cost a restricted trade of 20% is sufficient to bring costs marginal cost down to the overall European level



Changes in trade flows: Surplus capacity in SF-SE-NO

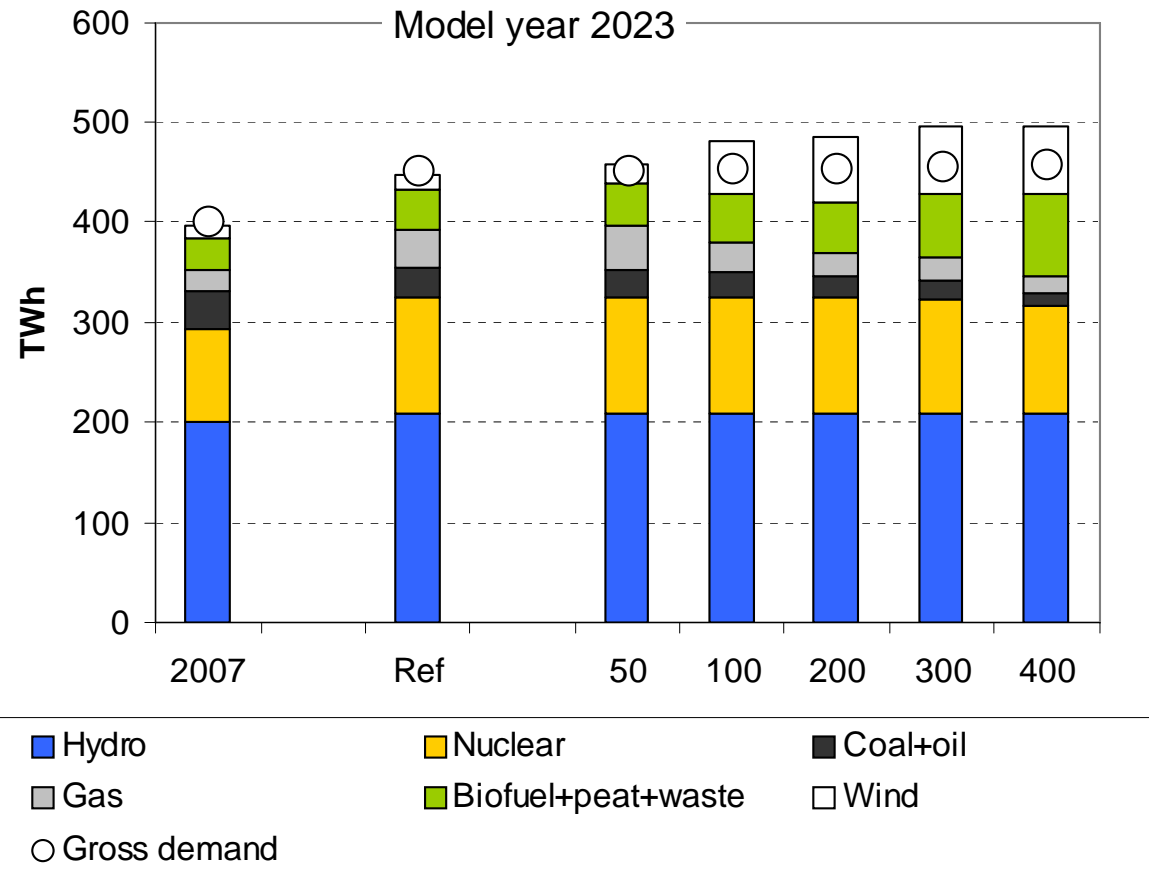


*Trade scenario:
Certificate price
6,6 Eurocent/kWh*

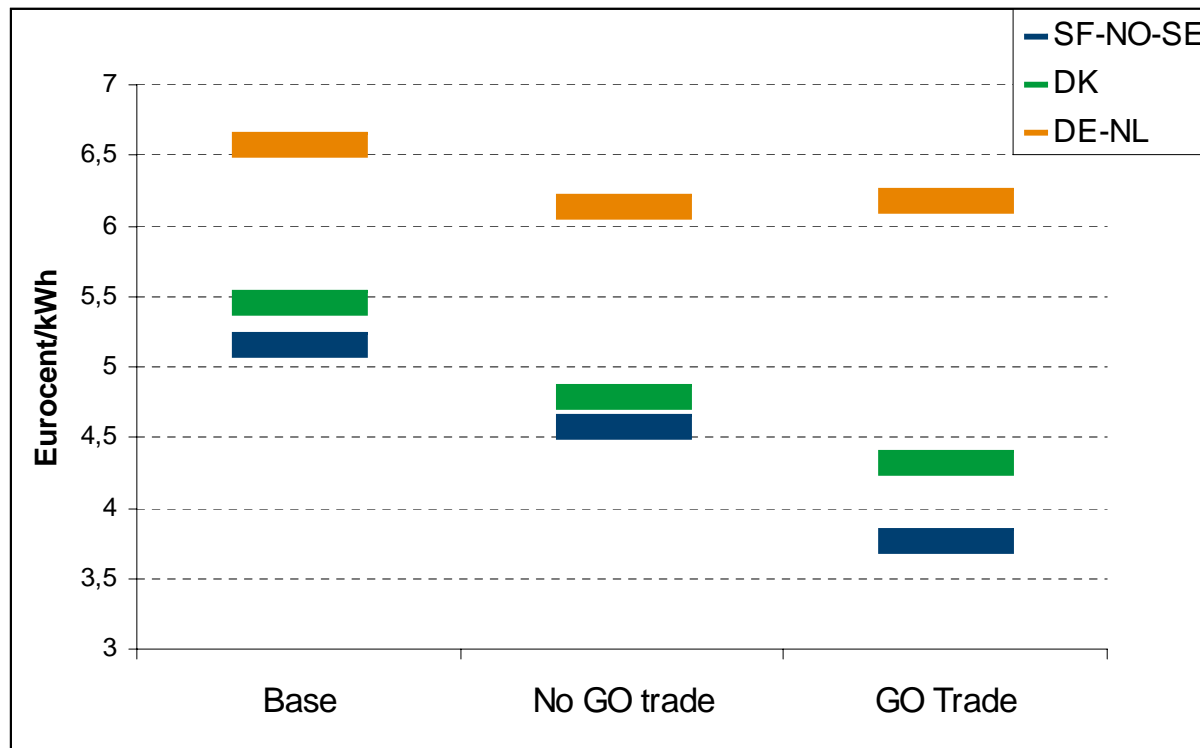
Exports from the Nordics to NL, DE, POL increases significantly in all scenarios
Denmark net importer of electricity

Nordic exports of electricity *and* certificates in Trade scenario
Denmark significant transit area (17 TWh)

Increased TGC price increases Nordic net exports



RES-E expansion increases price differences and congestion rents



Market effects of RES policies:

- Electricity prices in the Nordics well below Continental prices
- Crowding out of thermal production – lower load factors and less investments
- Higher demand as prices decline: Good news for Nordic industry?

Grid impacts:

- Interconnector investments more profitable
- Challenging situation for grid and system: Increased transit, increased intermittency, reduced flexibility



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The Eurelectric study: Overview

Aim of study

- To demonstrate the effects of flexibility in terms of reduced compliance costs for the 2020 renewables and CO2 targets, the interaction between the targets, and their impact on the European power market

Scenarios

- All scenarios assume fulfilment of targets
 - In reality the renewable target may be difficult to reach
 - With a purely domestic solution some countries are unlikely to be able to reach the national targets
- Renewables
 - Varying degree of harmonisation of support and possibilities for trade
- CO2
 - Reduction target: 20% or 30%
 - Possibilities for import
 - Auctioning

Modelling tool

- Euren - model develops economic supply curves for incremental investments to meet the new targets
- Econ Carbon – EU ETS carbon and power market model