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VTT

IMPORTANT ASPECTS  
ON THE DEVELOPMENT  
OF THE NORDIC  
ENERGY MARKETS



# OUTLINE

1. What drives Nordic energy markets?
2. Development of the Nordic electricity markets
  - The impacts of emissions trading in 2005
  - The impacts of market integration
3. Conclusions

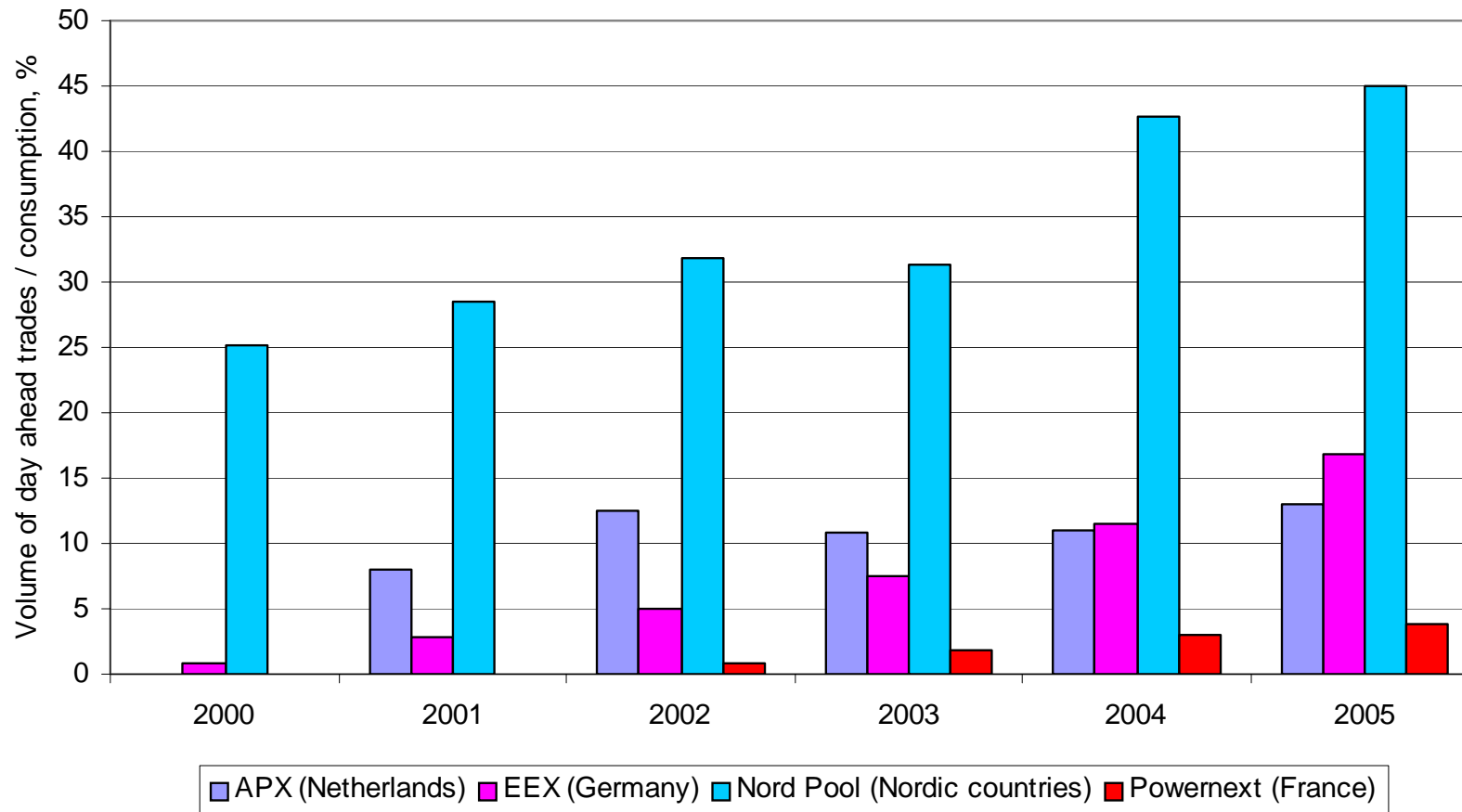
## What drives Nordic energy markets?

Before 1990 ----->Today ----->Near future?

- National policies
  - National energy demand vs. production
  - Long-term contracts (fuels, electricity, ...)
  - Strongly regulated, centrally planned systems
- EU- and national energy policies
  - National and international climate policies
  - Nordic energy demand vs. production
  - Exchange based Nordic el.trade & EUA trade
  - Risk management in financial markets
  - Electricity prices in Central Europe
- International & national energy policies
  - International climate policies
  - Nordic and European energy demands vs. production
  - Electricity trade & fuel trade & EUA, CER, AAU, ... trade
  - Electricity prices in Central and Eastern Europe



## Example: The share of electricity sold through exchanges is raising - Nord Pool is the forerunner

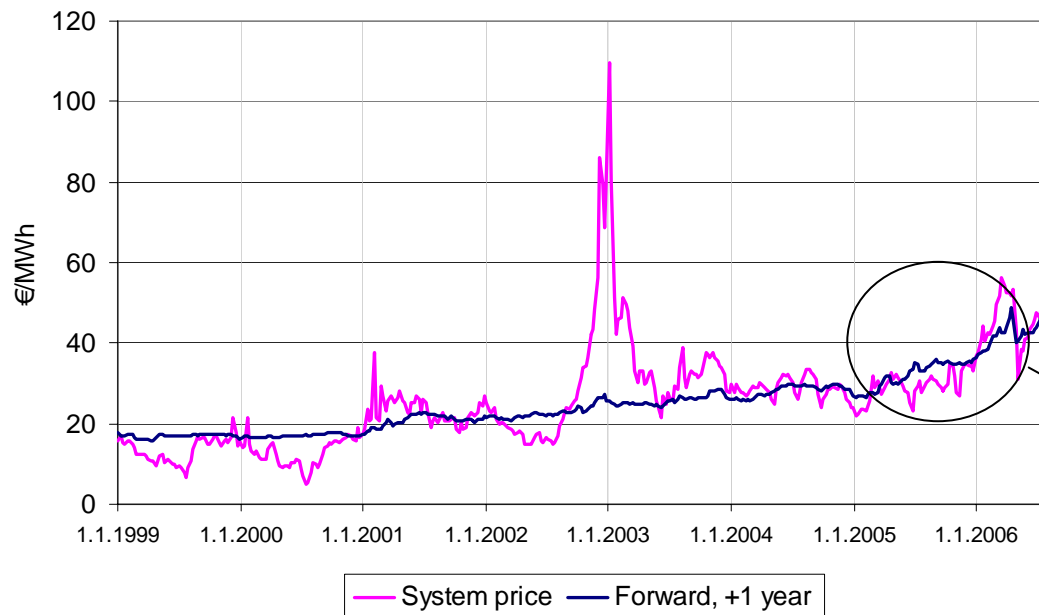


Data: EU Commission, Energy sector inquiry, draft preliminary report 2006, Nord Pool.

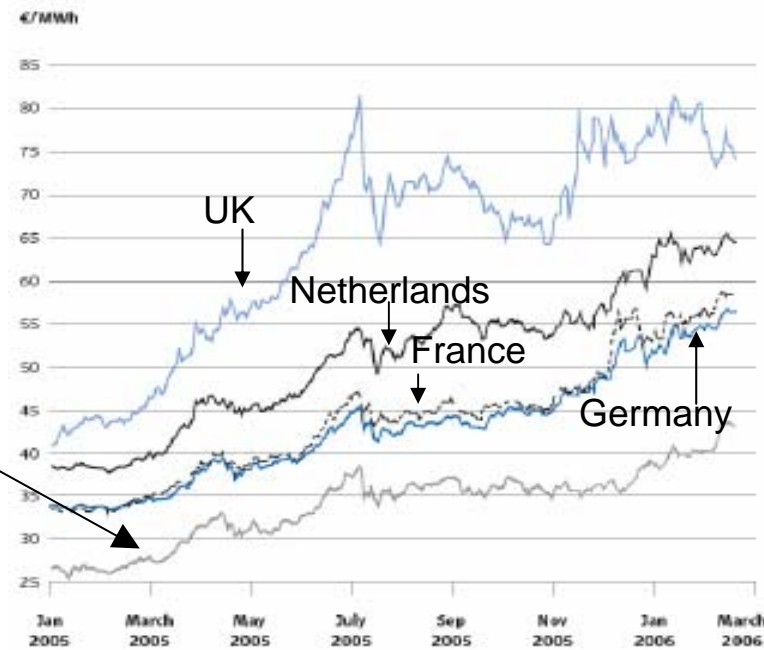


## 2. Development of Nordic energy markets

# The long lived story - Increasing electricity prices ...



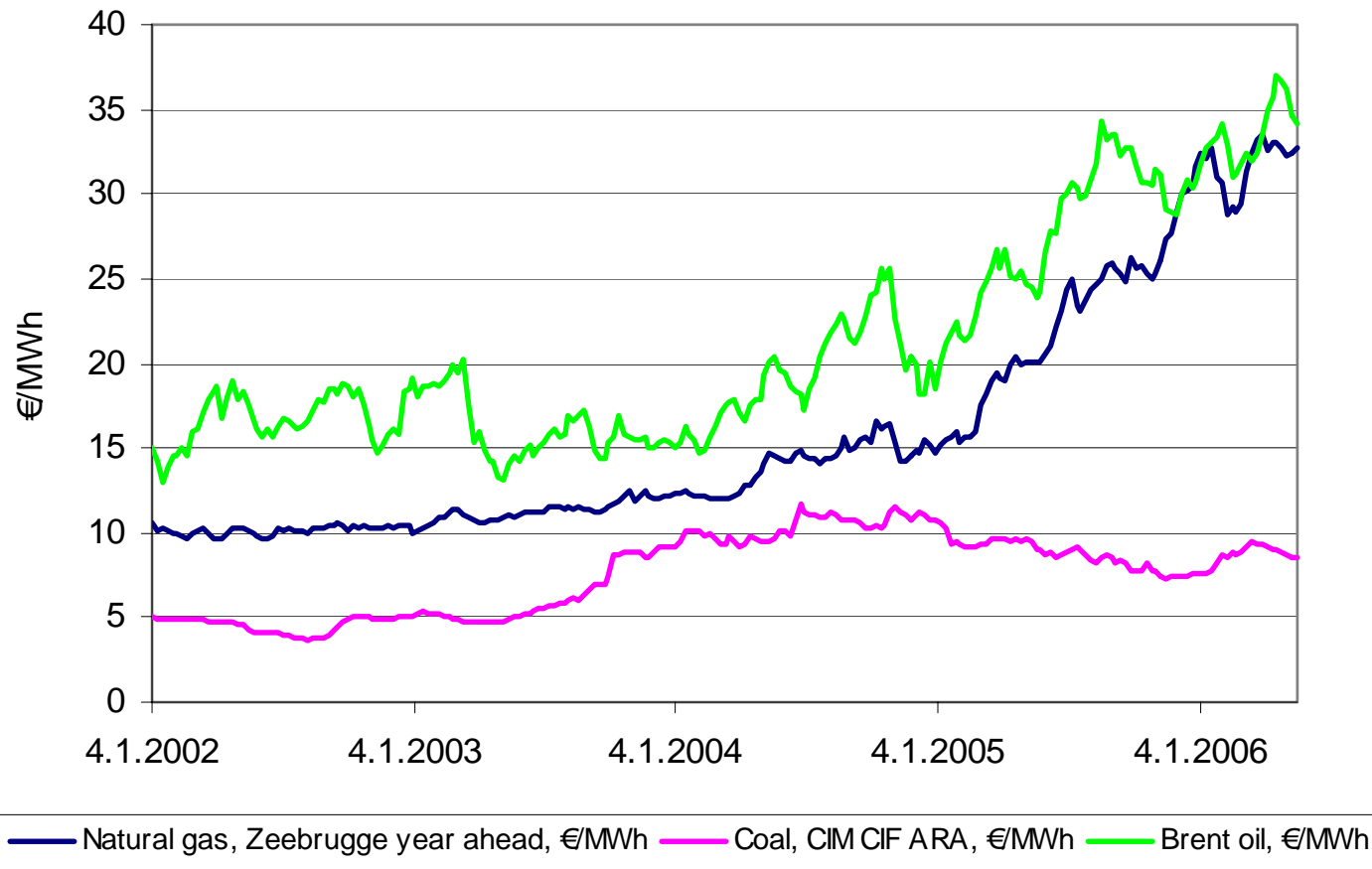
Data source: Nord Pool



Source: RWE Trading. 2007 base load forward prices

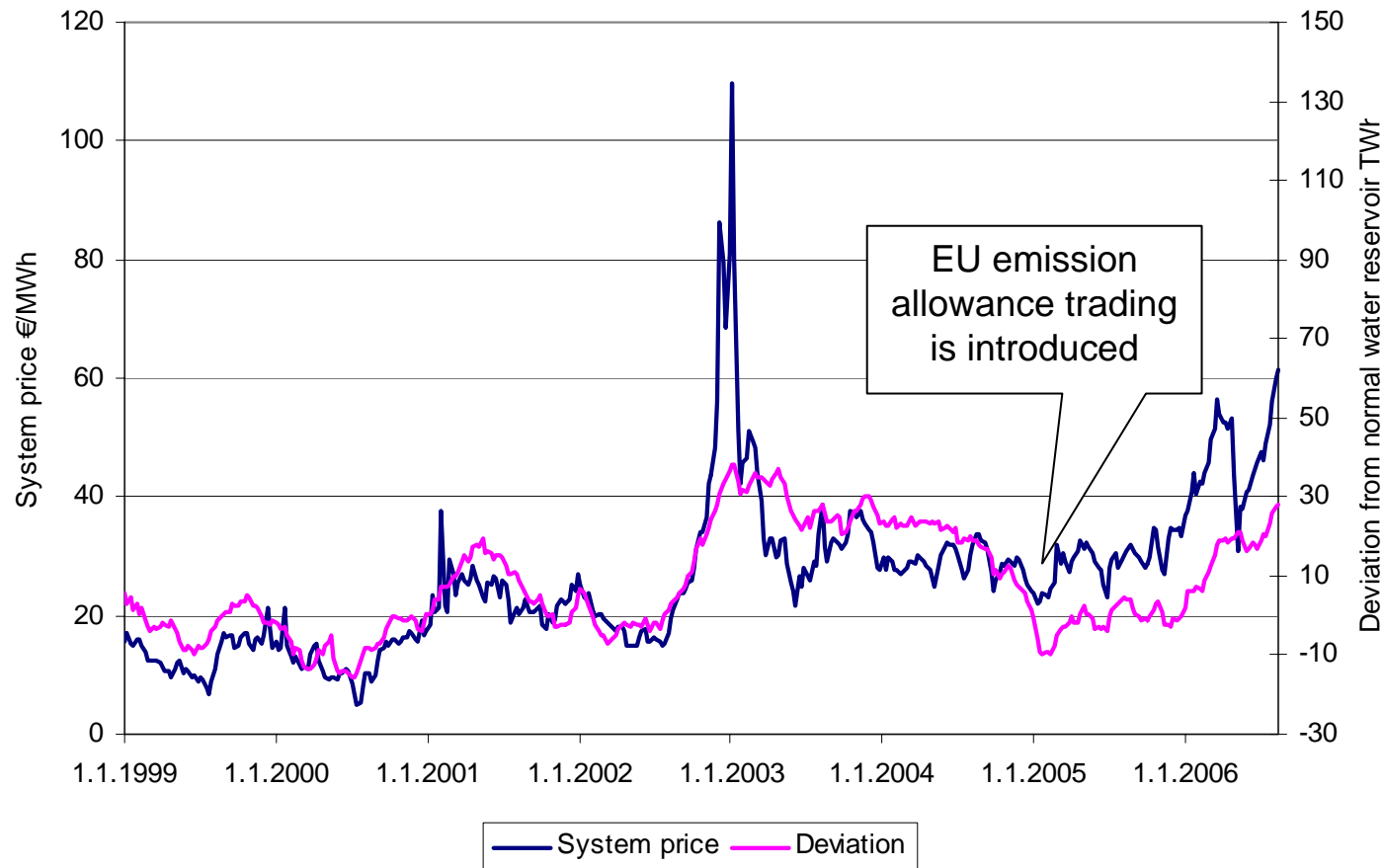


# During this century, increased fossil fuel prices are the main reason behind increased electricity prices



# Emissions trading has changed the pricing of Nordic electricity

Weather conditions are still the main driver behind Nordic system prices



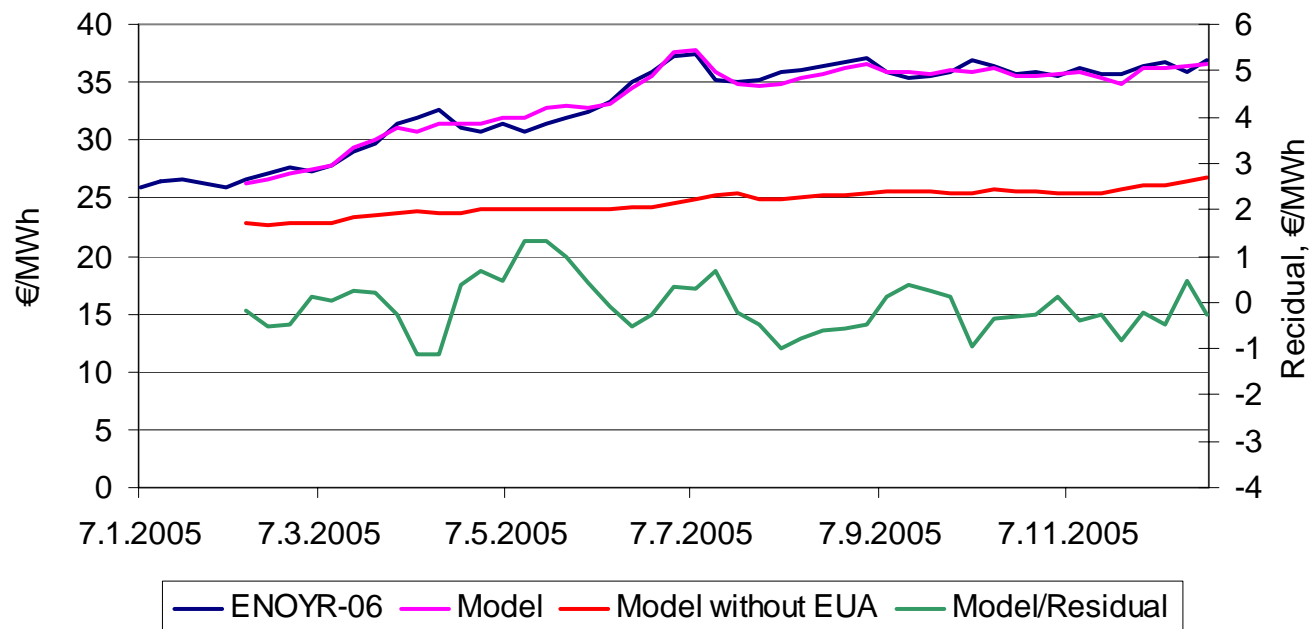
## Different parties disagree to which extent the EU ETS has increased electricity prices

- Differences in generating capacities, fuel mix, and electricity systems in the EU Member States
  - ✓ The higher the share of CO<sub>2</sub> free production, the lower the impact of the EUA price
  - ✓ Marginal production with coal or gas
- Different analysis approaches can give very different answers
  - ✓ The impacts of EUA price on electricity prices are different for spot prices and forward prices
  - ✓ Correlation and econometric analysis as well as calculations with fundamental models (i.e. electricity market models) can give very different approximations
- The windfall profits due to EU ETS are very difficult to analyse
  - ✓ The history is too short
  - ✓ There are too many variables, which should be taken into account

## Example: Regression model for the 2005 Nord Pool weekly average forward prices (year ahead)

The price increase was about  $0,46 \cdot \text{EUA}$  (0,35-0,55 with  $R^2$  87,3%)

Model:  $18,39 + 0,46 \cdot \text{EUADEC}_{06} + 0,16 \cdot \text{Gas forward}$

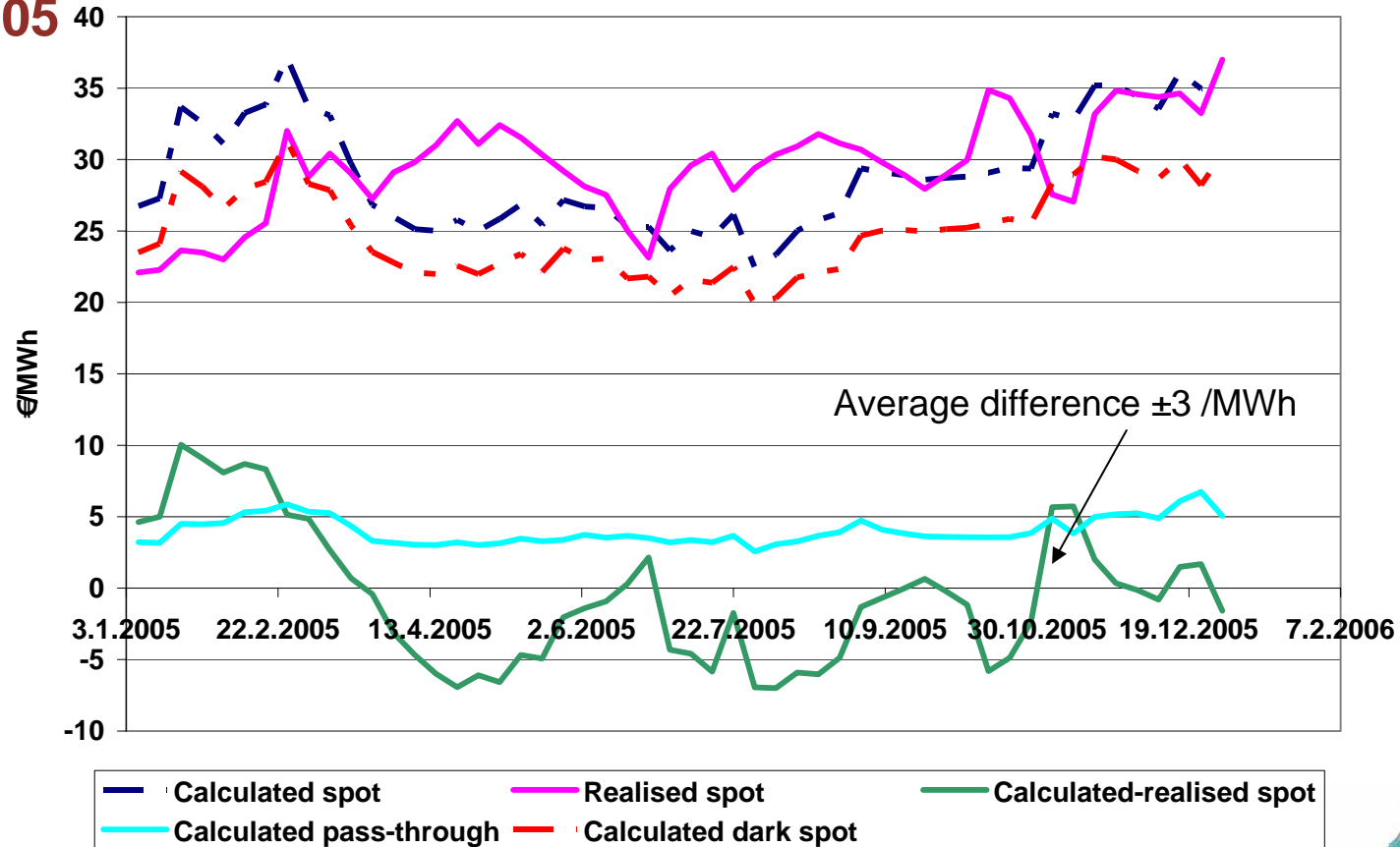


The following parameters were tested: Coal CIM CIF ARA, Zeebrugge & NBP day ahead and year ahead gas prices, marginal production costs with gas and coal (fuel + EUA), Brent oil prices, hydrobalance, system price of electricity, EUA price



## Example: Calculated system prices (i.e. theoretical minimum price) with and without EU ETS for 2005

The impact of EUA price on theoretical spot price was about 5 €/MWh in 2005



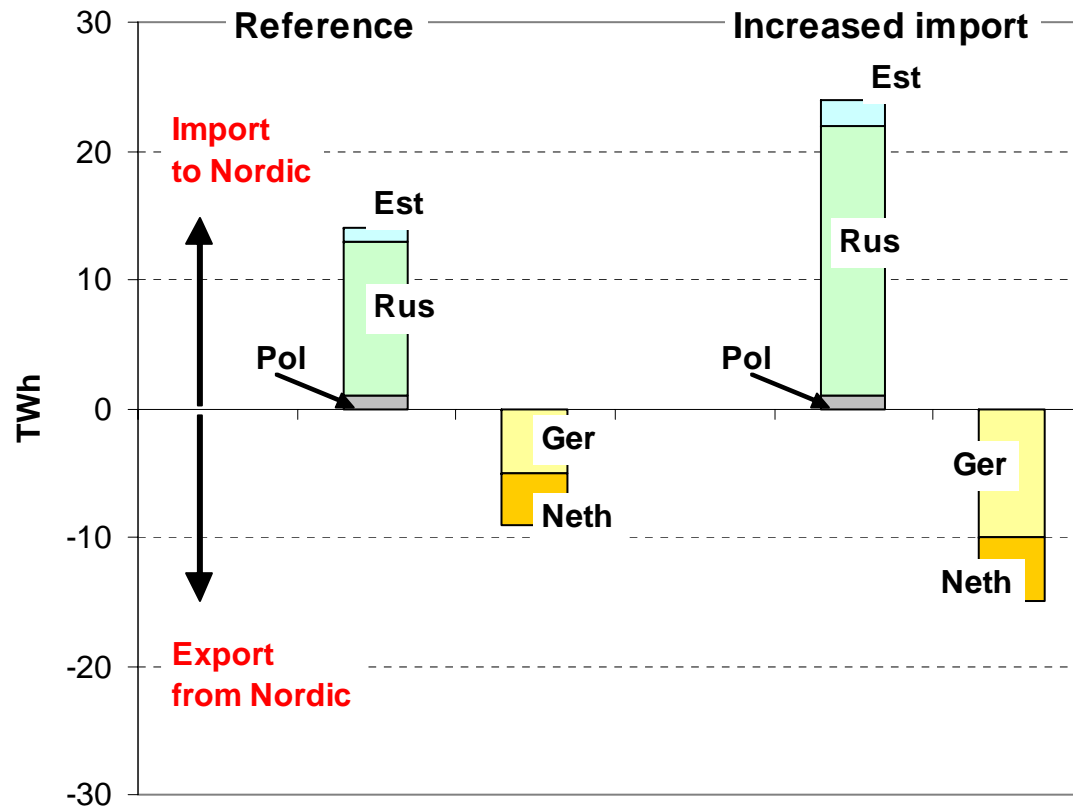
Used data: Weekly average spot fuel prices and EUA prices, water reservoir level 1.1.2005 and yearly water inflow, weekly demand curve, total yearly demand, import/export balance from/to Nordic area



## The long lived story - Increasing electricity prices ... will obviously never die ...

- Increasing demands, decreasing and centralised fossil fuel reserves
  - ✓ Also volatility will increase
- Increasing environmental constraints
  - ✓ EU's target to reduce GHG emissions by 20-30% before 2020 and by 50% before 2050.
- Increased integration to the Central Europe
- The impacts of the increased integration to Russia & Estonia are not known
  - ✓ Increased imports could also mean increased exports to Central Europe
  - ✓ Strongly increasing demands and phasing out of old generating capacities, especially in Russia
  - ✓ Increased investments to reserve capacities and the transmission system in Nordic area

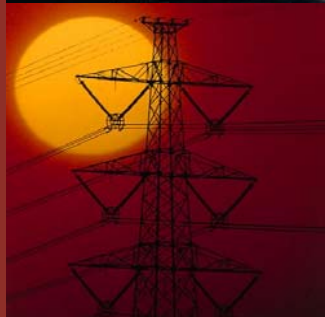
# Example: Increased import from Russia to Finland



Calculation year: 2010

# Conclusions: Challenges and Opportunities

- Liberated energy markets increase effectiveness and enhance economic growth
  - ✓ EU's internal electricity market is going to be the largest integrated electricity market in the world. Nordic market players have the longest experience.
- Increased complexity due to interaction of fuel markets, electricity markets, allowance markets, certificate markets, ...
  - ✓ New challenges for companies' risk management
  - ✓ New challenges for authorities, politicians, etc.
- High uncertainties due to short term national and international climate policies
  - ✓ Post-Kyoto policies may change the whole energy system
  - ✓ Huge markets for clean technologies in the long run



Thank you!

[www.NordicEnergyPerspectives.org](http://www.NordicEnergyPerspectives.org)

