Baltic Sea

Regional Investment Plan 2014

Main results and messages

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Regional Group Baltic Sea

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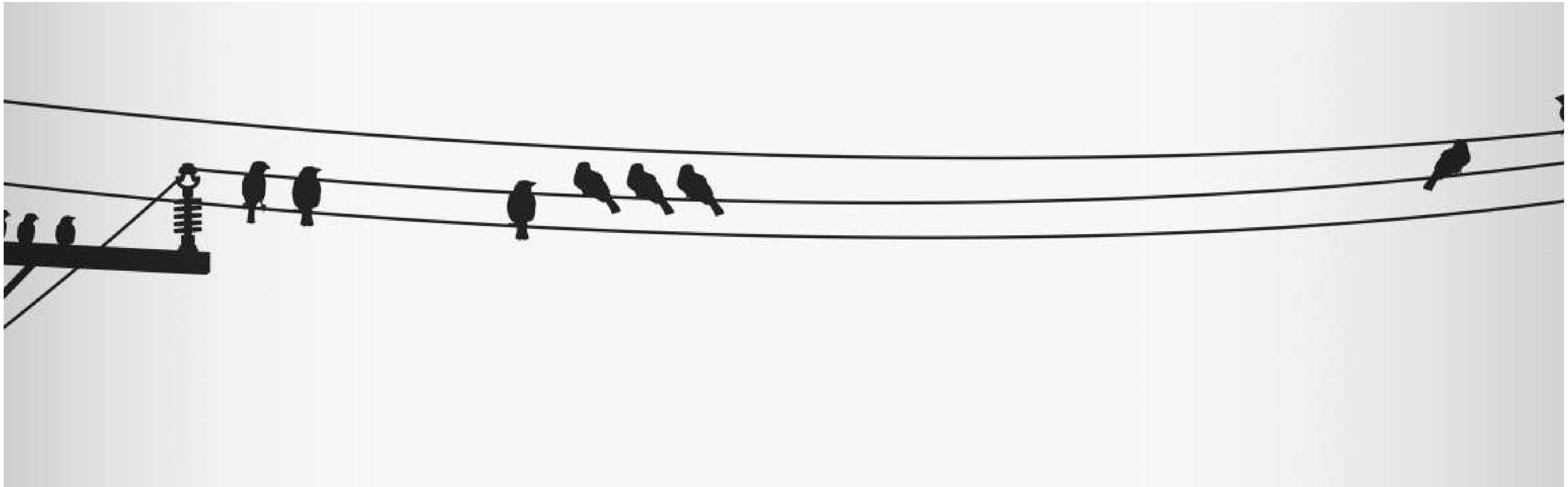

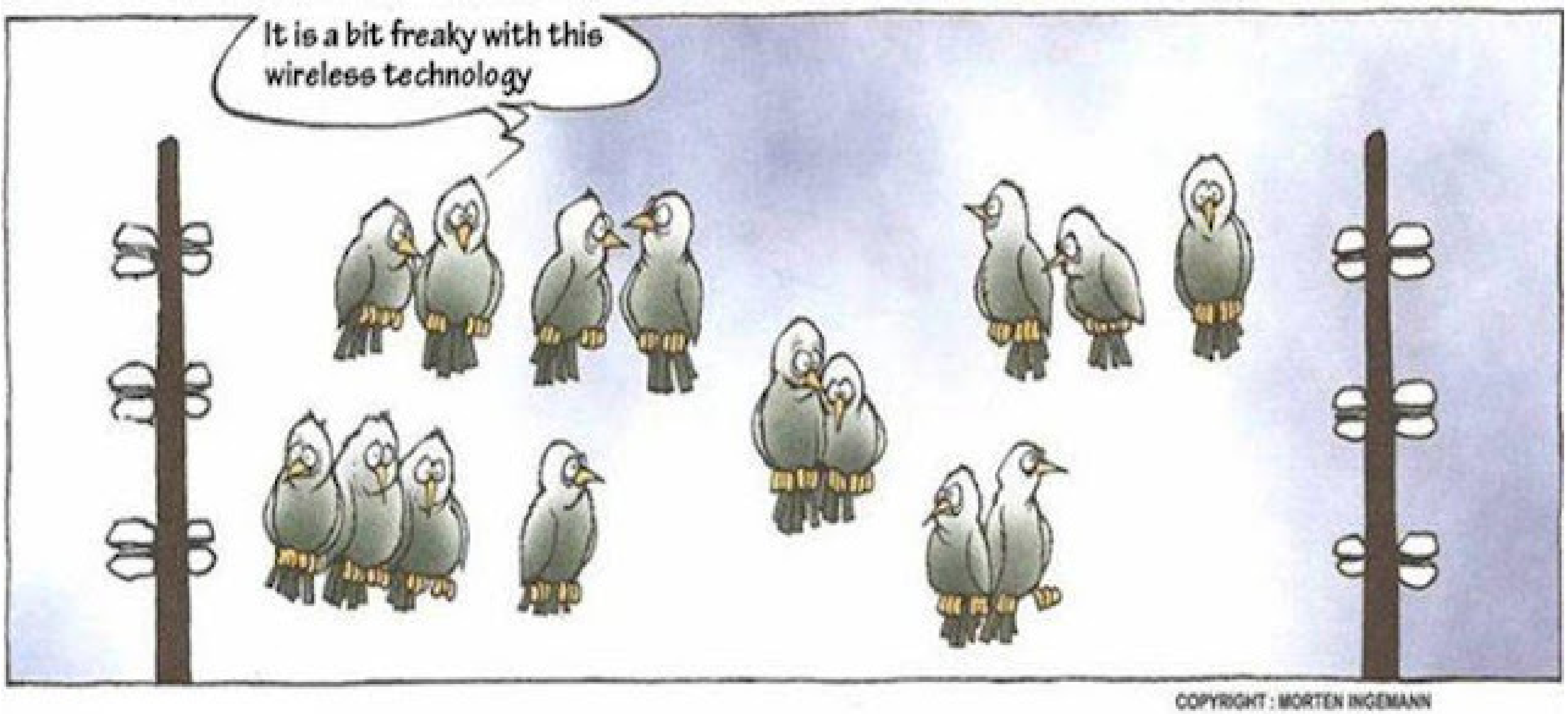
It is a bit freaky with this wireless technology
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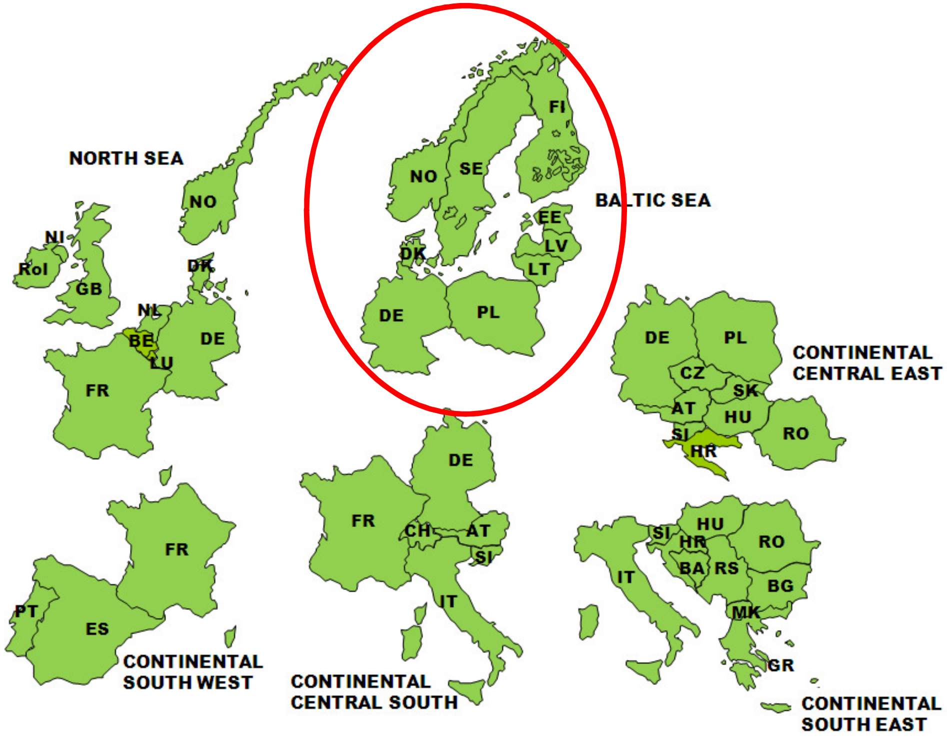
Regional Group Baltic Sea



Studied areas (dark-grey)
Perimeter areas (blue)

NB! All information presented here is based on regional market simulations.

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The Baltic Sea region covers three different synchronously connected power systems, which are linked with HVDC connections.

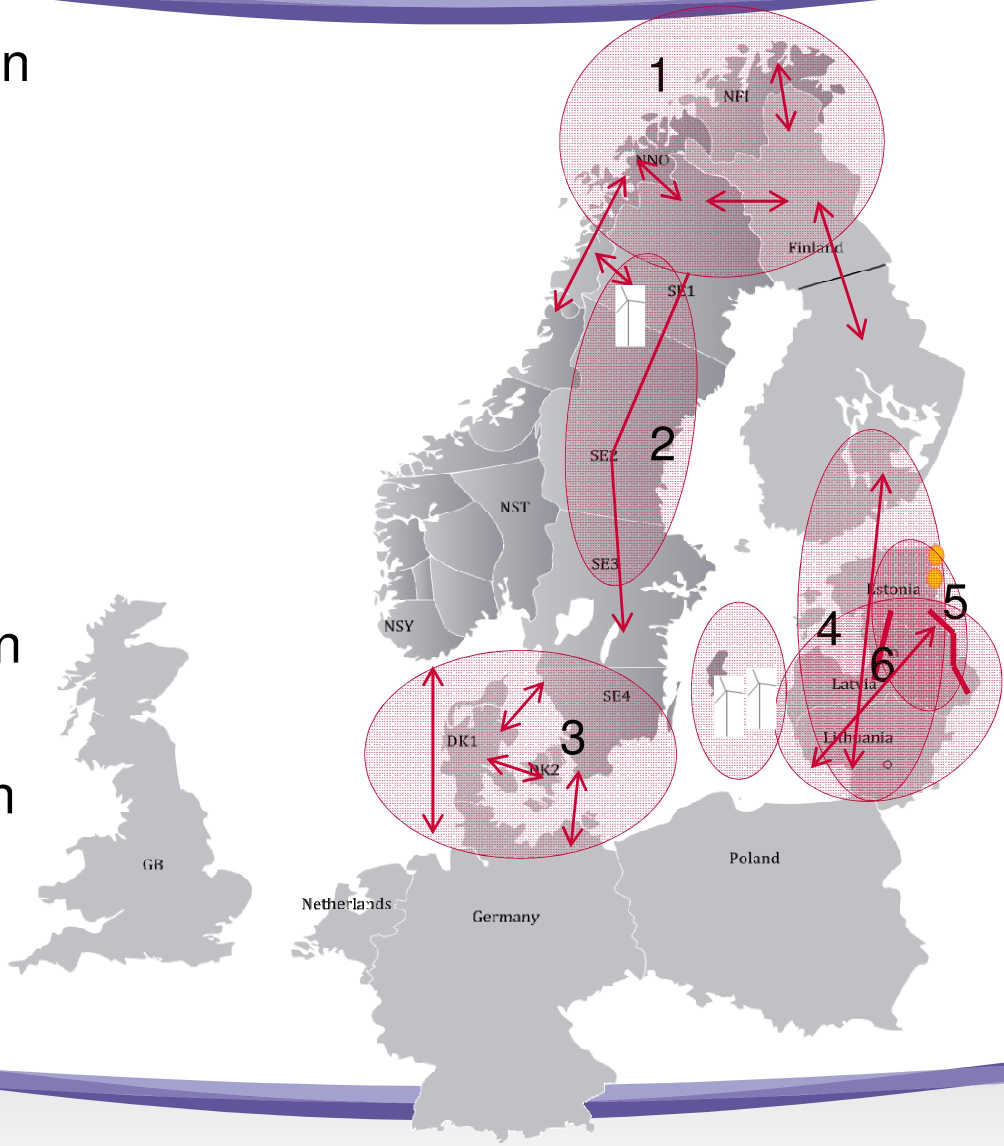
- Continental Europe,
- Nordic,
- the Baltic States and IPS/UPS of Russia,

Parts of the region are large and scarcely populated, which causes additional challenges in transmission of electricity. Dynamic phenomena restrict the transmission capacity due to long distances between production and consumption areas.

The main drivers for system development in the region are the expected increase in renewable generation initiated by policy targets and higher primary energy and CO2 prices, as well as the aim of securing a dynamic internal electricity market across Europe.

Identified areas of interest for 2020-2030 horizon

1. Arctic area – new consumption and RES
2. North-south flow through Norway/Sweden/Finland
3. Increased capacity Nordics – Continental Europe/UK
4. North-South through Baltic States
5. Power flow control on Russian border
6. Baltics synchronous operation with Continental Europe



Main scenarios

Vision 3: "Green Transition"

- Favourable economic and financial conditions
- Reinforced national energy politics
- Parallel national R&D research schemes
- High CO_2 prices and low primary energy prices (IEA – WEO 2010 450 scenario)

Vision 4: "Green Revolution"

- Favourable economic and financial conditions
- European energy policy
- European R&D research scheme
- High CO_2 prices and low primary energy prices (IEA – WEO 2010 450 scenario)

Vision 1: "Slow Progress"

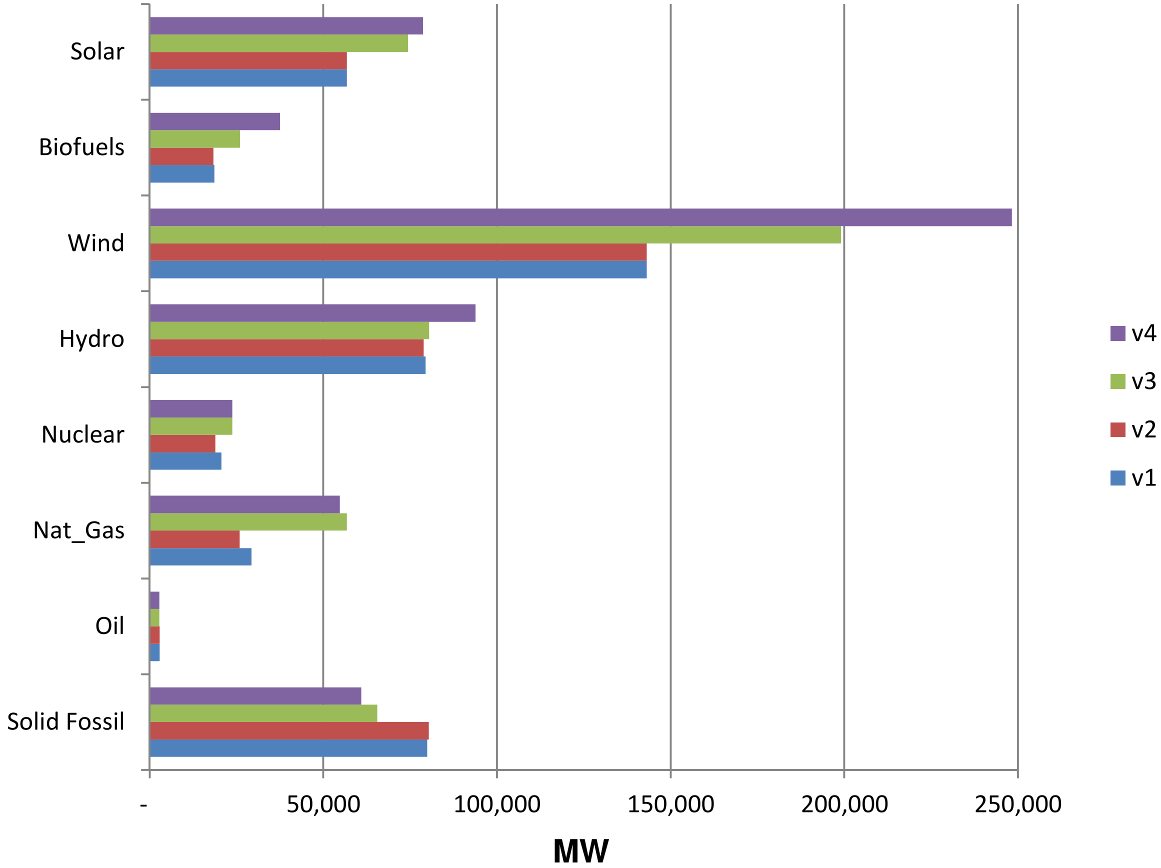
- Less favourable economic and financial conditions
- Reinforced national energy politics
- Parallel national R&D research schemes
- Low CO_2 prices and high primary energy prices (IEA – WEO 2010 current policies scenario)

Vision 2: "Money Rules"

- Less favourable economic and financial conditions
- European energy policy
- European R&D research scheme
- Low CO_2 prices and high primary energy prices (IEA – WEO 2010 current policies scenario)

Delay of Energy Roadmap 2050

Installed generation capacity in the Baltic Sea Region in Visions 1, 2, 3 and 4.

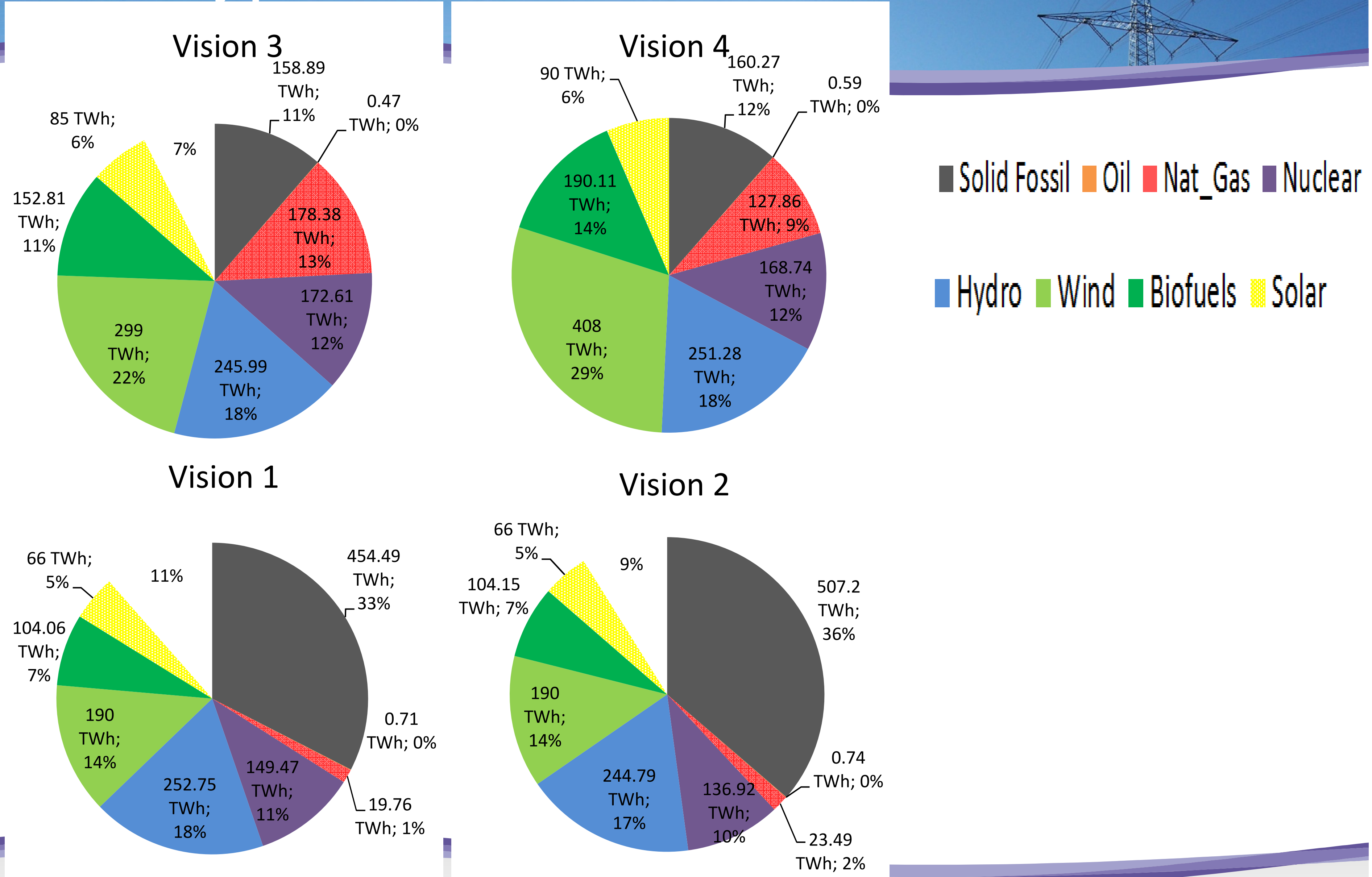


Installed capacities in total:

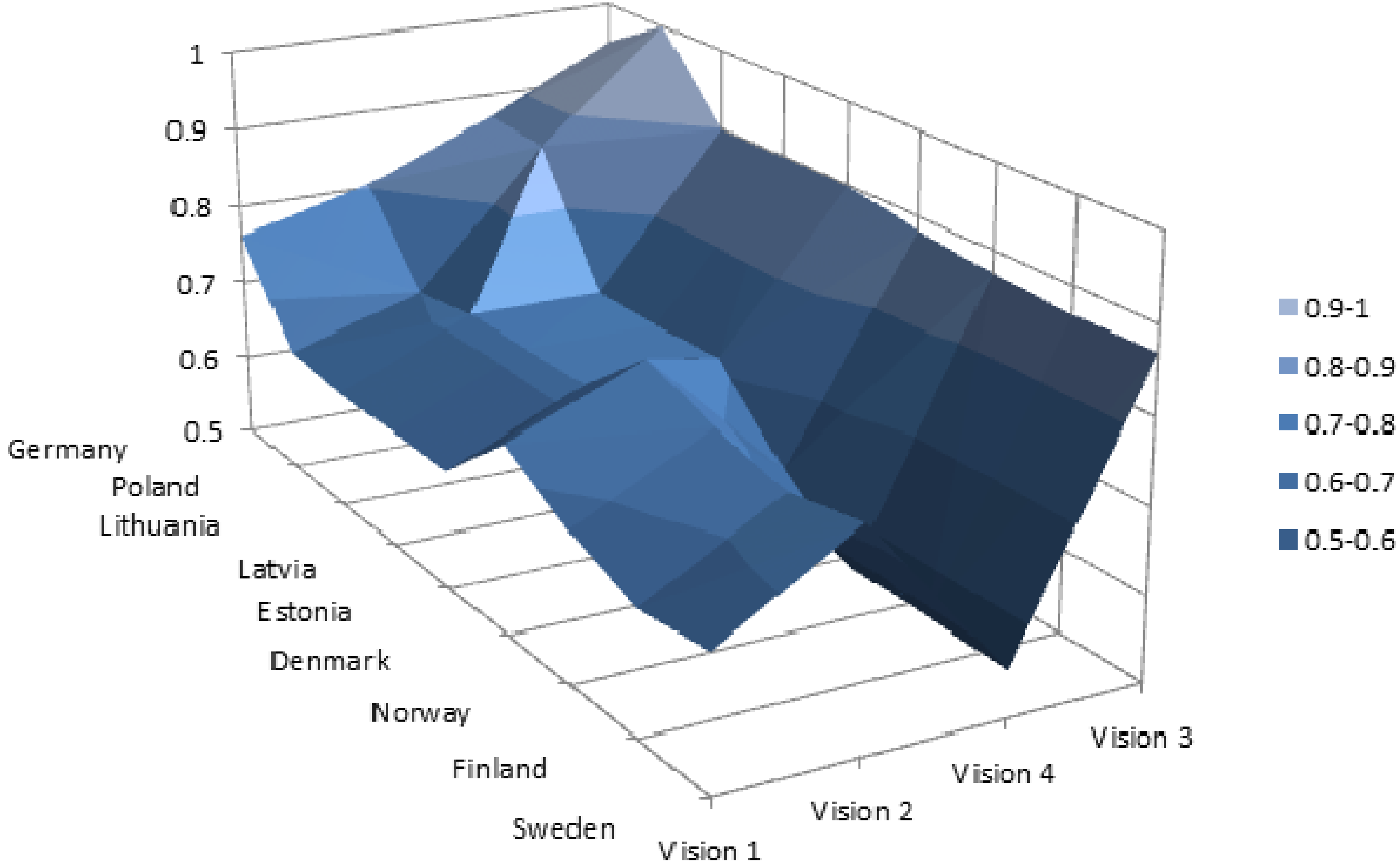
V1: 435 GW;
V2: 430 GW;
V3: 541 GW;
V4: 608 GW

Results of analyses

Electricity production from different sources in V1-V4

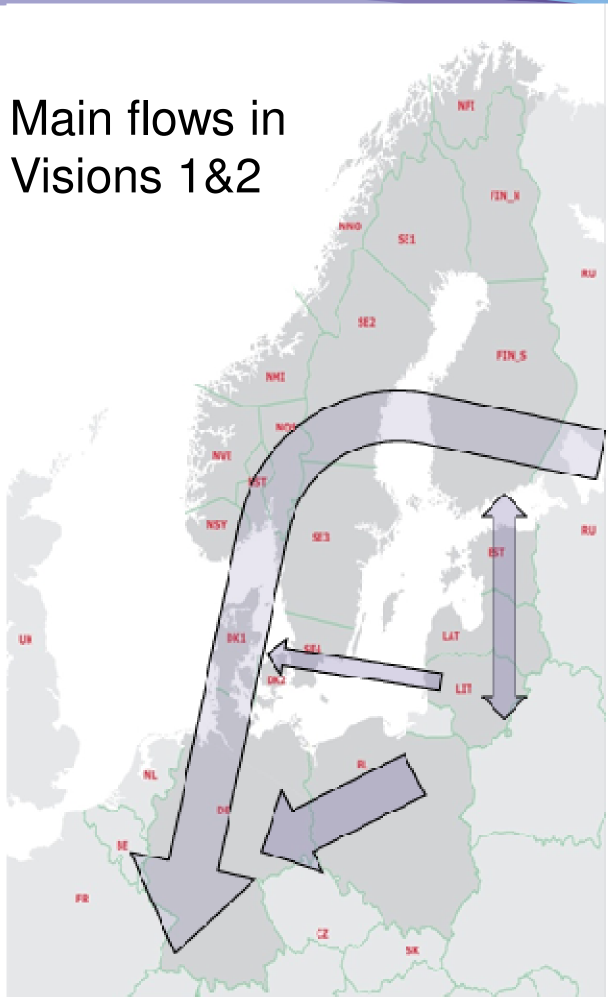


Relative price difference changes through visions in different countries

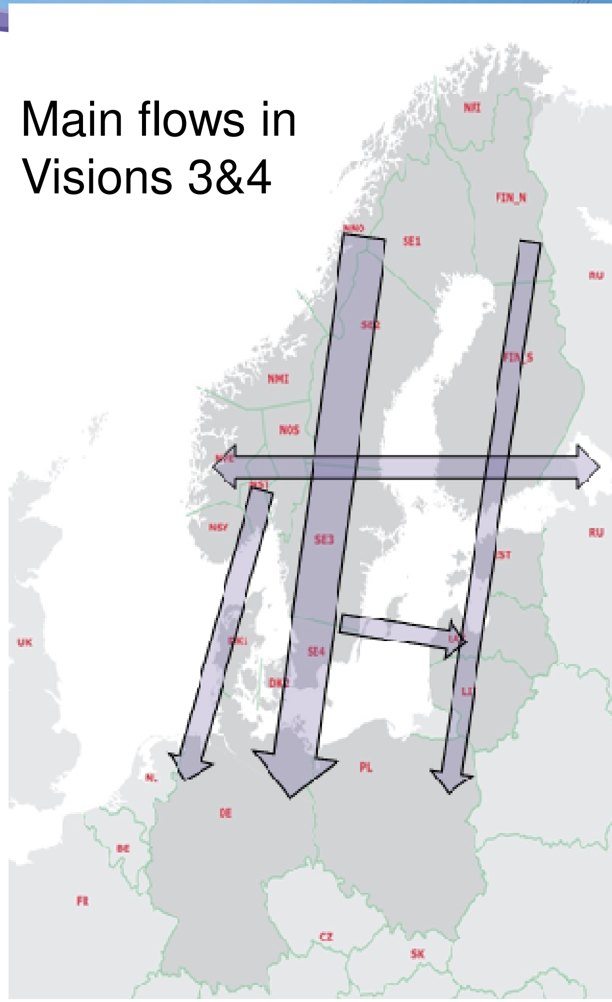


Main flows from North to South

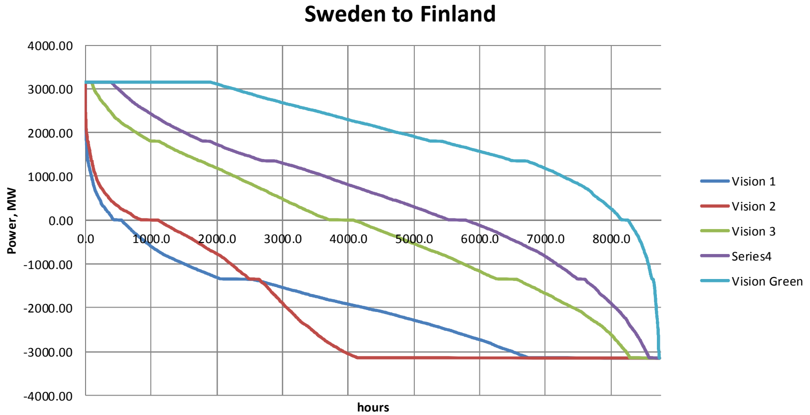
Main flows in Visions 1&2

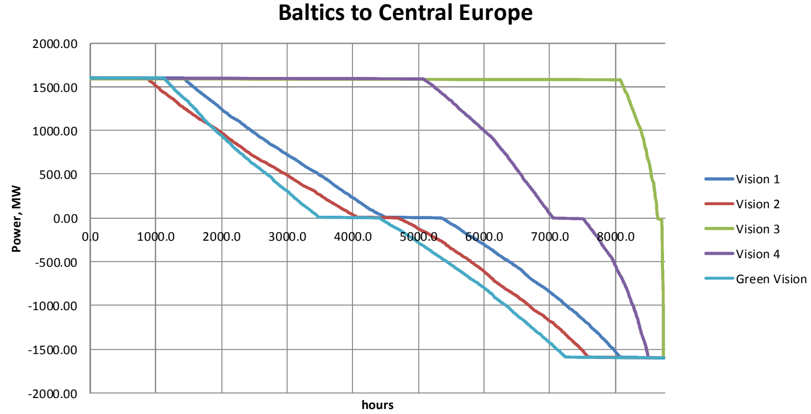


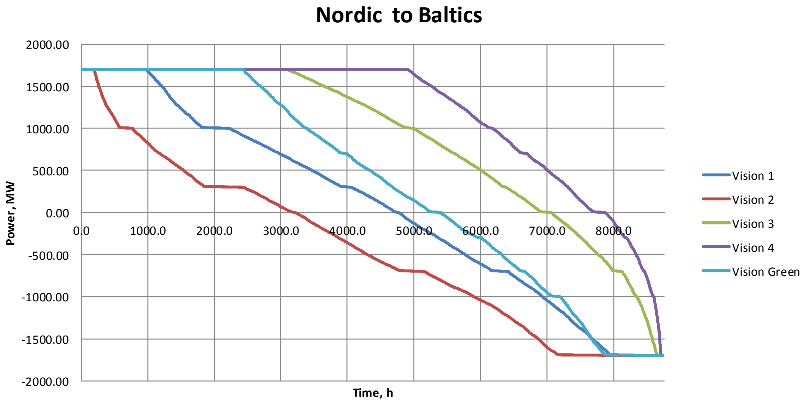
Main flows in Visions 3&4

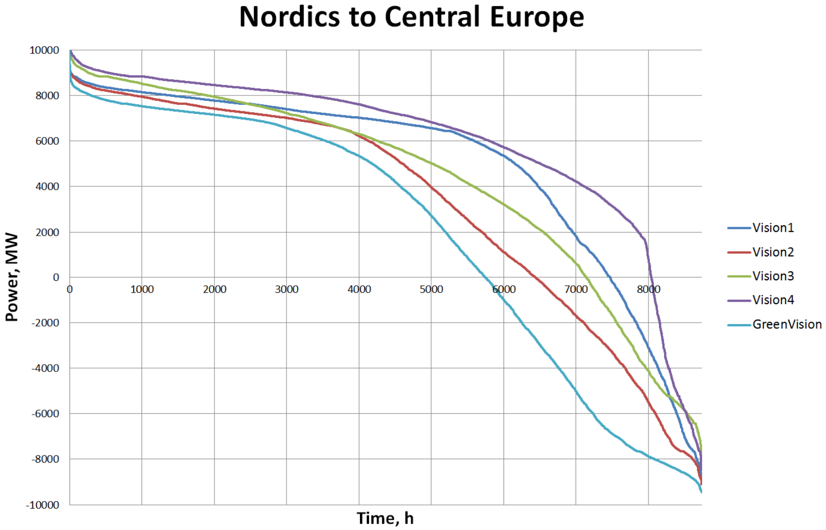


Flows variations on selected crosssections in case of different visions and sensitivity case







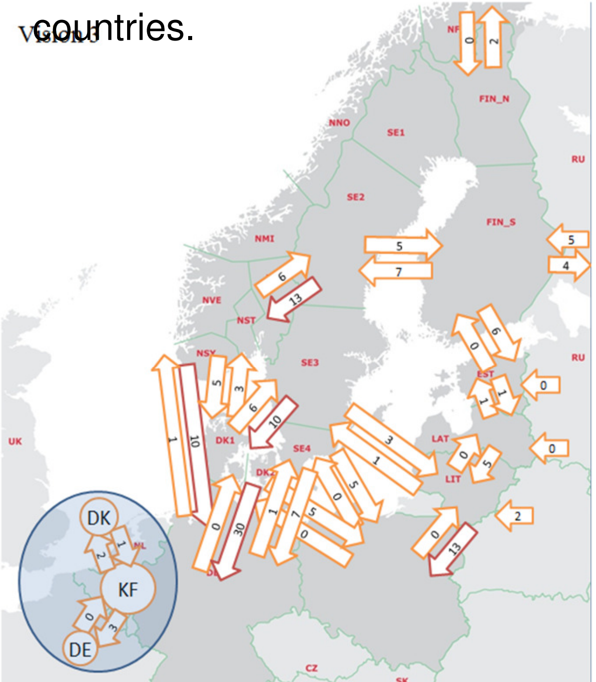


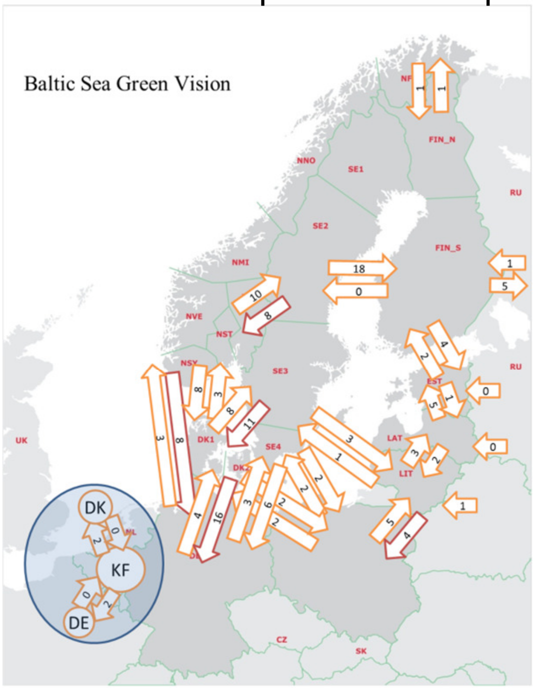
The largest bottlenecks appear on boundaries between Scandinavia and Central Europe and North – South flows from North Scandinavia to Southern Scandinavia, where interconnectors are loaded in range of 80-90%. Also interconnections from the Baltics to Scandinavia are heavily utilised, up to about 70% on average throughout the year.

Sensitivities

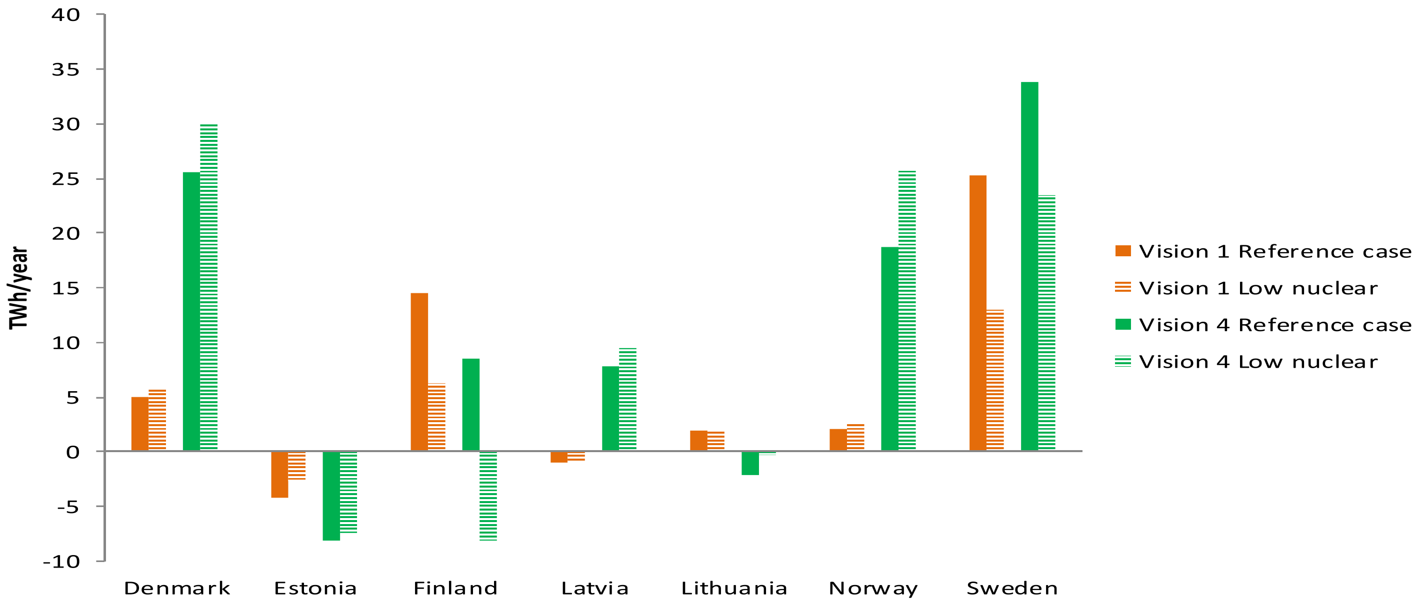
Sensitivity – „Baltic Sea Green Vision“

- Sensitivity is based on Vision 3. Main difference – Deficit in generation capacity (less fossil generation capacity)
- Largest differences in the flows were between Finland and Sweden, where relatively balanced exchange in Vision 3 was changed to fairly continuous import from Sweden to Finland in BS Green Vision.
    - Total Nordic surplus decreased from 60 TWh in Vision 3 to 30 TWh BS Green Vision.
- BS Green Vision results support the main conclusions drawn from V1-V4; the importance of interconnections between Nordics and Central Europe and the importance of integration of Baltic countries.



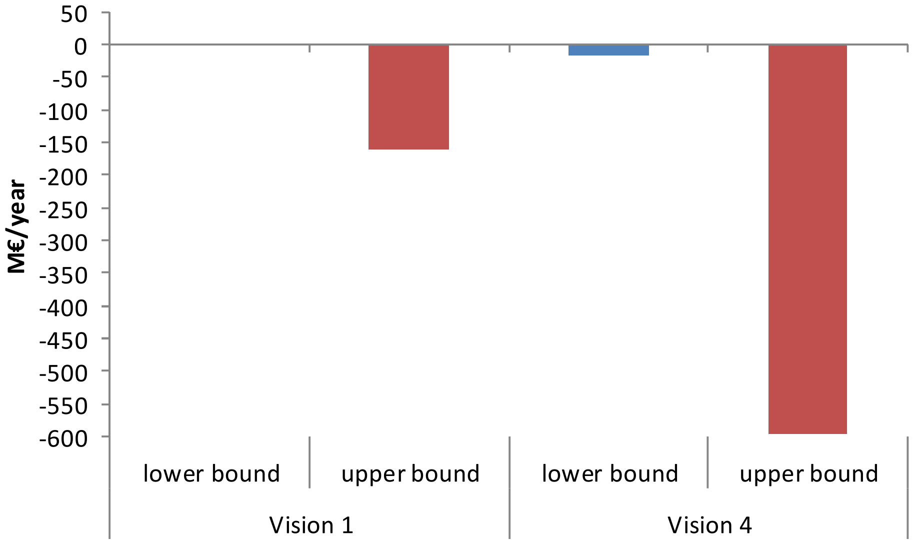


Sensitivity – „low nuclear“



- Reduced nuclear capacity in Sweden (-1,8 GW), Finland (-1,6 GW in Vision 1; -3,6 GW in Vision 4) and Poland (-1,5 GW)
- Largest differences can be observed both for Finland and Sweden - Finland moved from being a clear net exporter in to net importer
- Danish and Norwegian surplus was higher compared to reference cases of Visions 1 and 4 due to comparably higher hydropower and RES generation.

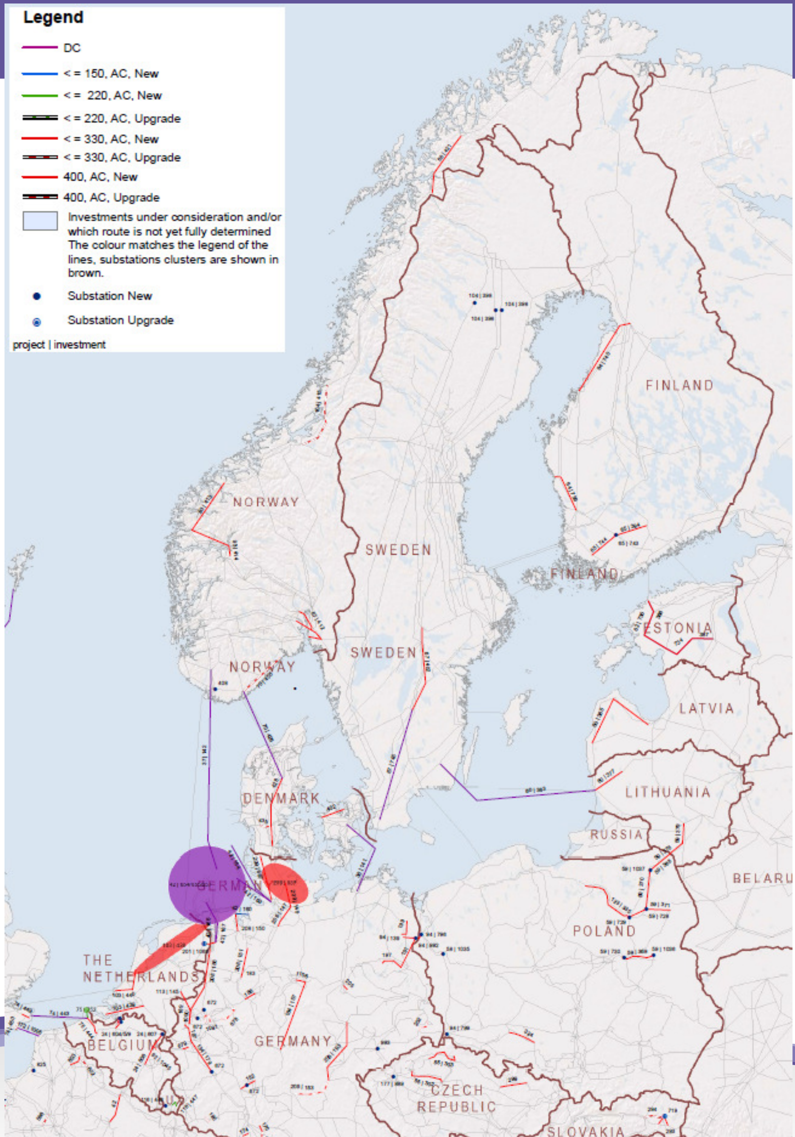
Sensitivity – „delays of projects“



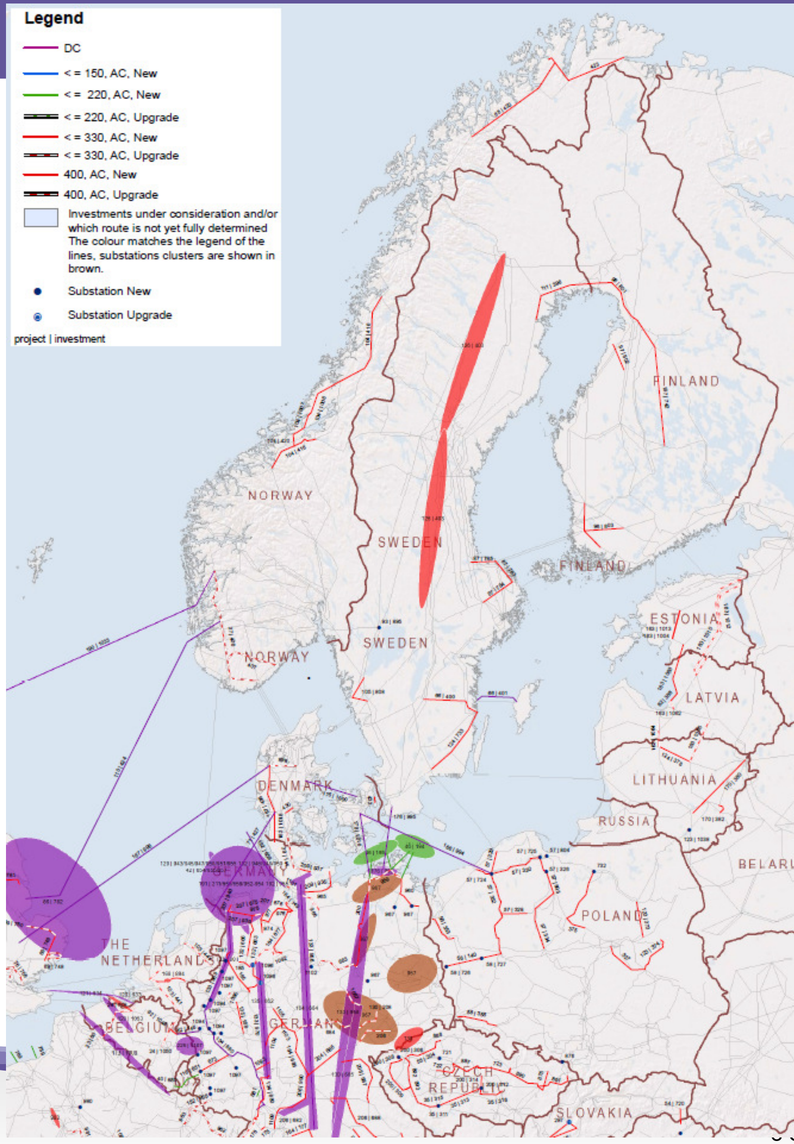
- It can be concluded that total loss caused by delays can reach 150-600 M€ annually if about 30% of the investments are delayed.
- Other benefits (CO2 reductions, SoS, etc.) are reduced with delays of the commissioning of projects, but these are not assessed.

Project package – mid term & long term

Midterm Projects

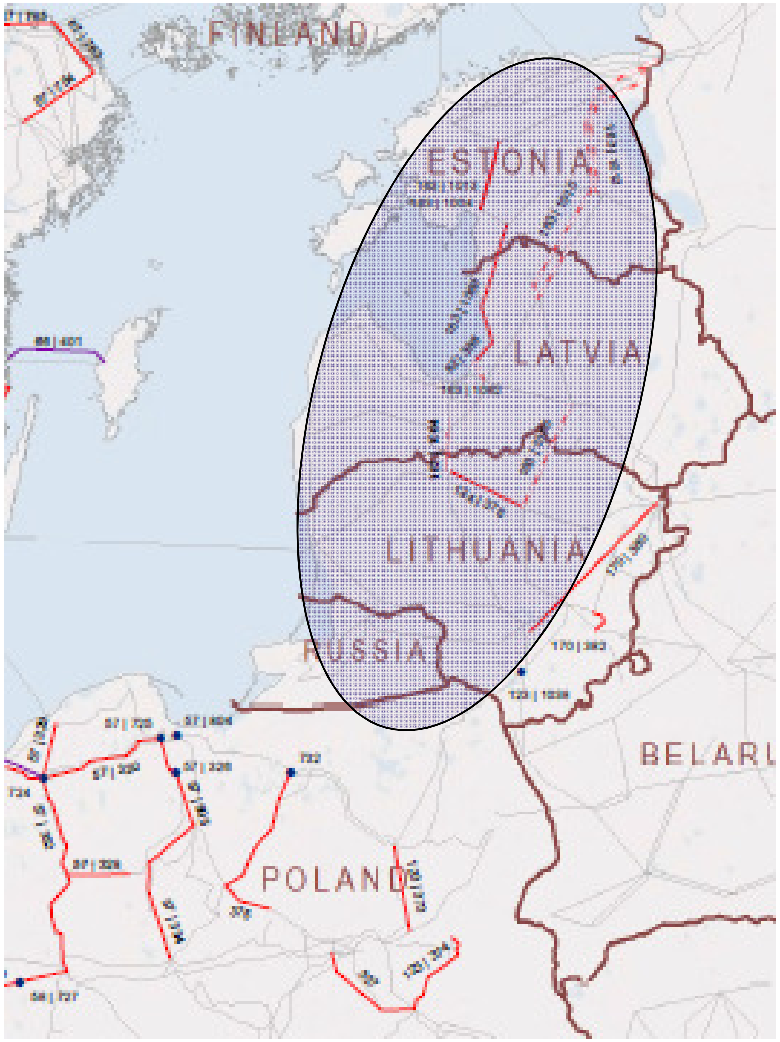


Long term projects



Project package – Baltics synchronization with Continental Europe

- Baltic Power System synchronisation with the Continental Europe network is a unique project as a main driver for not increase of the Grid transfer capacity but to disconnect from the synchronous operation with the IPS/UPS system and connect with the Continental European networks synchronously.
- Two different landing points and two differently routed interconnections are required to achieve physical separation of the two redundant interconnections in order to establish a reliable synchronous connection
- The first Lithuania – Poland connection (LitPol Link) is already decided and is under construction.
- The second connection is still under investigation. The projects consists mainly of the 330-400 kV cross-border lines and internal lines in order to reinforce internal grids to handle the situation.



Main conclusions 1/2

- **Looking further towards 2030, the TYNDP 2014 confirms the conclusions of the TYNDP 2012.**
- **The generation portfolio will most likely experience a major shift by 2030, with the replacement of existing capacity by different ones,**
- **One of the main drivers in the Baltic Sea region is an expected Nordic surplus, largely due to the hydro generation in Norway and Sweden, but also due to increases in nuclear capacity, additional wind power and biomass generation. In visions with large shares of renewables (Vision 3 and 4),**
- **An important driver is the integration of energy peninsulas into the common European Electricity market. The results of the analysis show that further grid-interconnection of the Baltic States with the Continental and Nordic system is needed.**
- **Analysis of the TYNDP 2014 in Baltic Sea region shows that project portfolio has a positive impact in targets:**
  - contributing to increased social welfare and supporting European climate and renewables targets.
  - Analysis results of Vision 4 shows substantially higher benefits than other Visions due to large price differences.
  - further integration of renewables call for even higher investments in order to allow development of optimal supply-demand system.

Main conclusions 2/2

- **A major challenge is that the grid development may not be completed in time for the EU-wide targets in 2030.**
  - Permit granting procedures are lengthy, and may cause commissioning delays.
  - If energy and climate objectives have to be achieved, it is of the outmost importance to smooth the authorisation processes.
  - It is also important to understand that delays in commissioning cause additional costs to the European society with Baltic Sea regional analyses emphasising this.
  - Loss caused by delays can reach 150-600 M€ annually if ca 30% of investments are delayed.
- **For the studied Visions some investments in the portfolio were found to give low socioeconomic benefit, however they are important for other needs.**
- **In total the Regional Investment Plan assesses an investment portfolio of about 55-75 billion Euros for the countries within the Baltic Sea Region. Germany is having the largest investment portfolio.**
- **It is also important to understand that despite the four Visions and several sensitivities analysed regionally, there are still some uncertainties in future developments such as location of new generation; future interaction with third countries; new demand types; future of industrial demand; evolution of nuclear capacity and competitiveness of generation investments.**

Thank you!

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