

Pilot 5: The Nordic Regulating Power Market

Optimizing the existing Nordic mFRR market and investigating possibilities to exchange with other regions

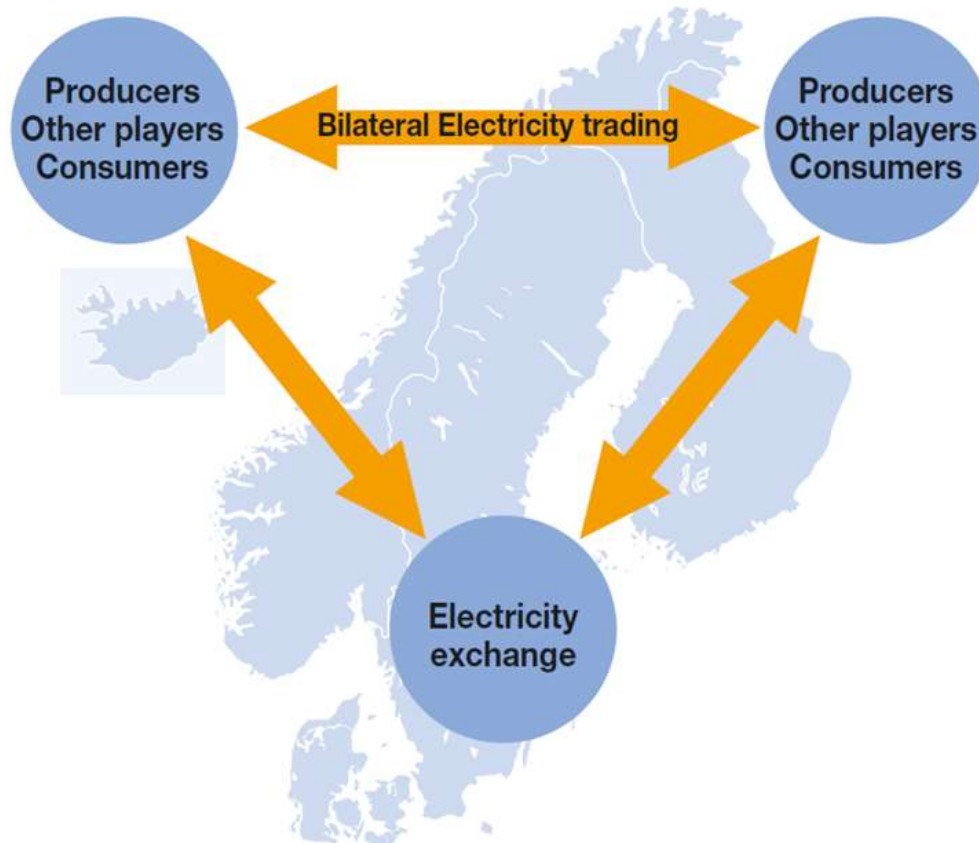
Thomas Elgaard Jensen, Energinet.dk
ENTSO-E, Bruxelles, 11 September 2014

Pilot 5: Nordic RPM

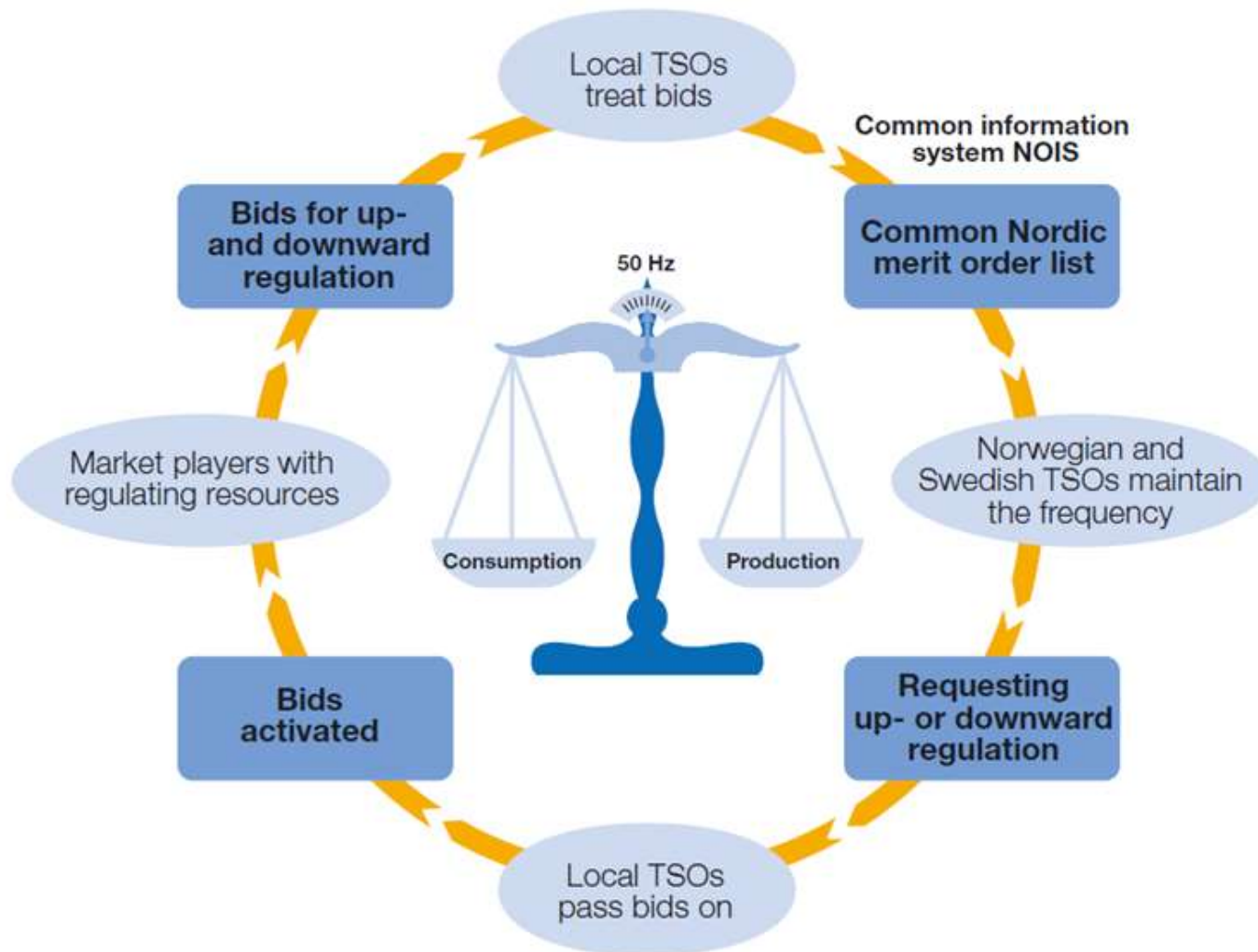
Agenda:

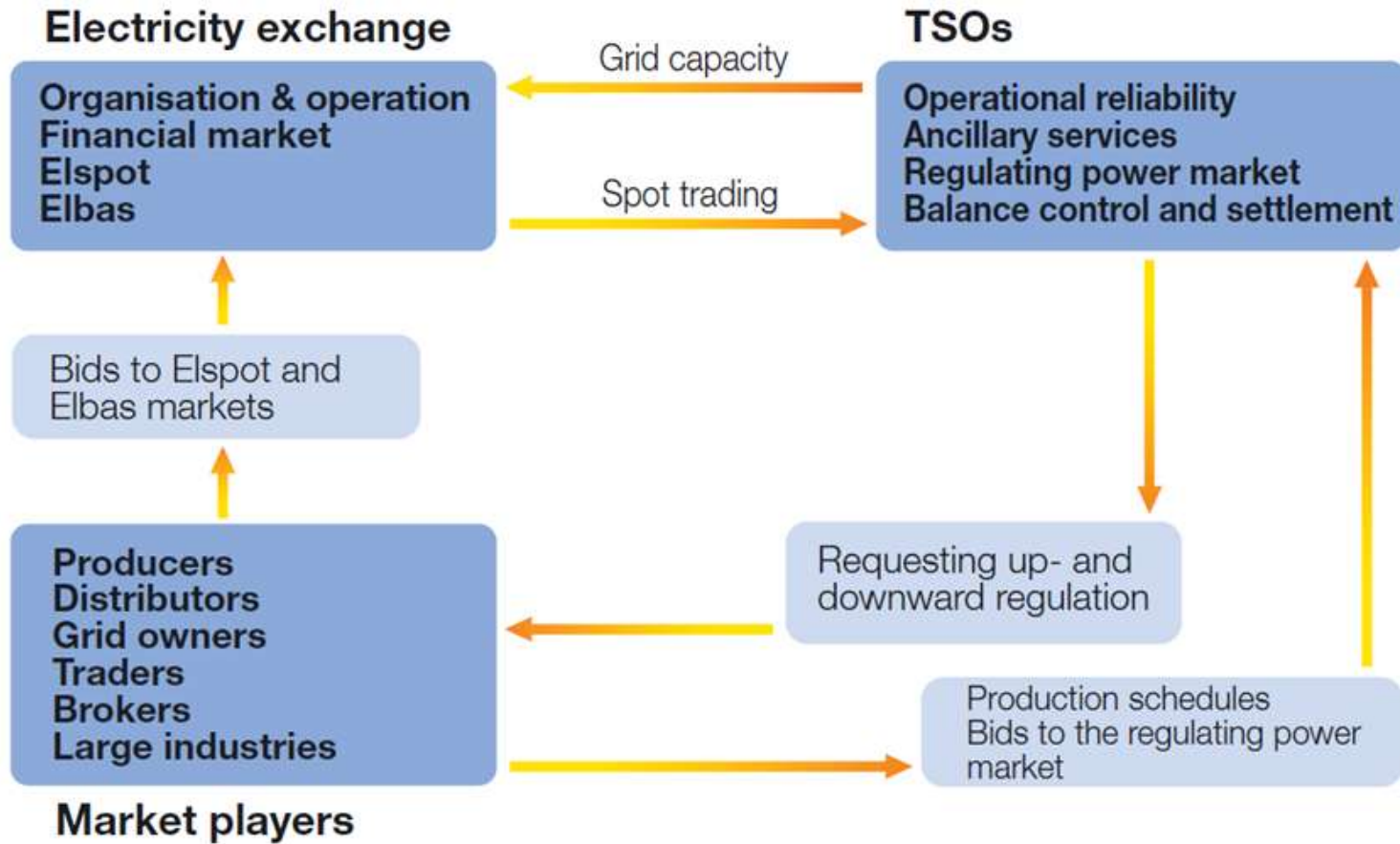
- 1) Short background of RPM
 - a) How the Nordic market works
 - b) RPM price is the imbalance price
- 2) The socioeconomic gain
- 3) Current work to improve RPM
- 4) The feasibility studies
 - a) The Baltics
 - b) Poland
 - c) Germany
- 5) The proces ahead

Short background of RPM: Regulating Power Market



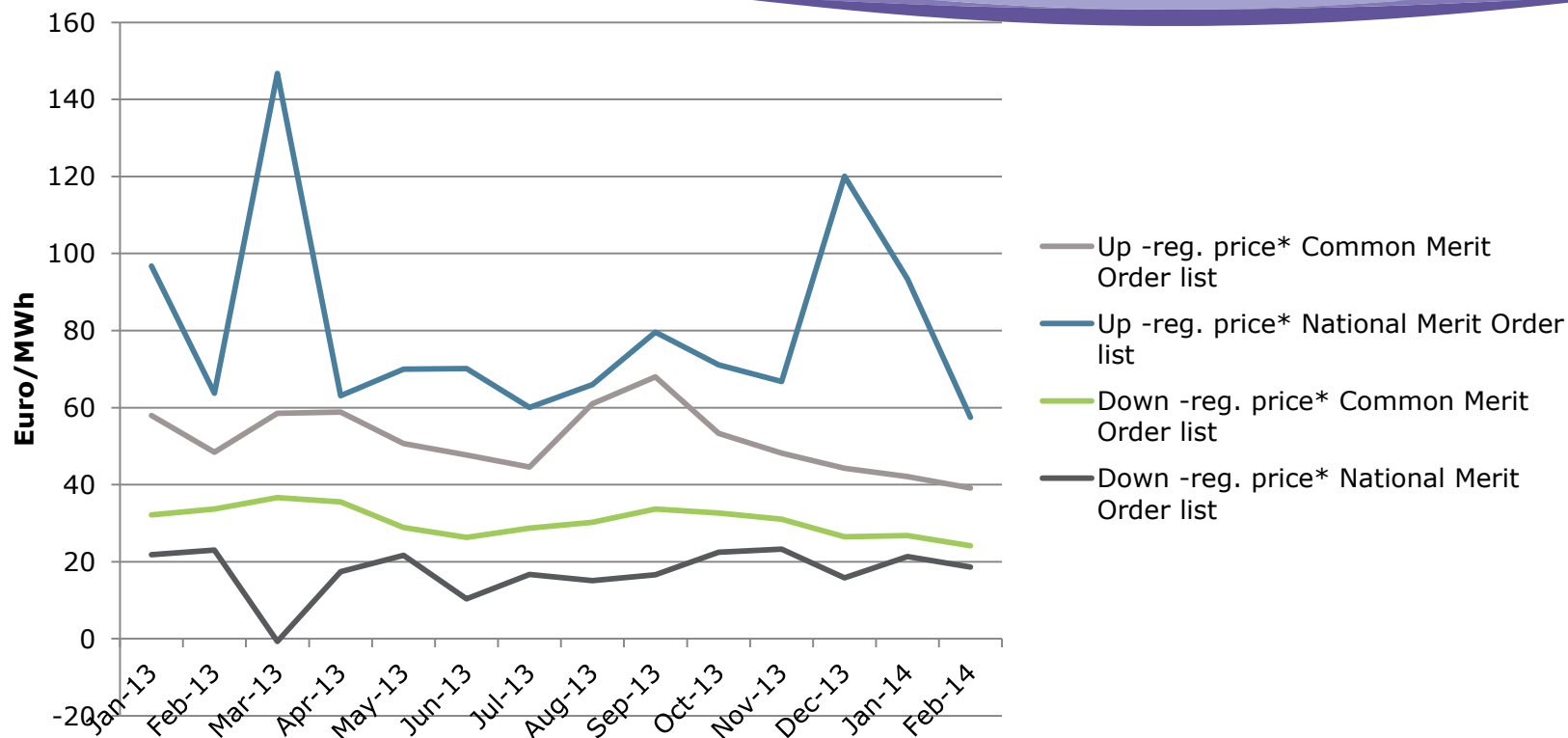
Financial market 3 years - 56 hrs	ELSPOT 36-12 hrs	ELBAS 33-1 hrs	Regulating power Hour of operation	Balancing power After the 24-hour period of operation
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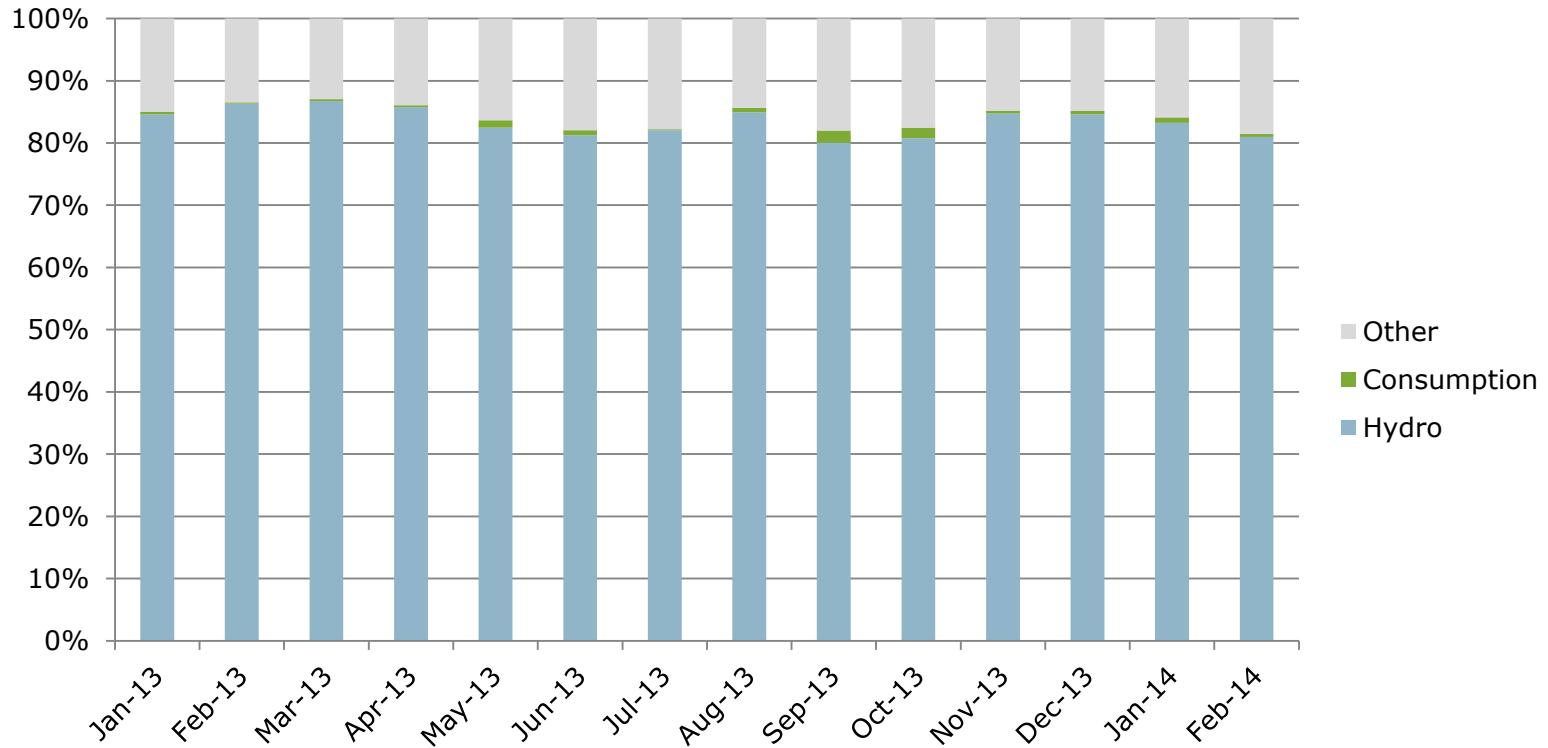
- RPM = Nordic mFRR
- Price is set as marginal price
- The price set in RPM (per price area if congestion exist) is the imbalance price (in the price area)
- The market is used for congestion and balancing (but bid used for congestion is payed as pay-as-bid and does not set the imbalance price
 - The use of the same common merit order list for congestion and balancing means higher liquidity (the BSP is only better of – is sure to get her pay-as-bid even if marginal price is lower than her bid).

The CMO gain in current RPM



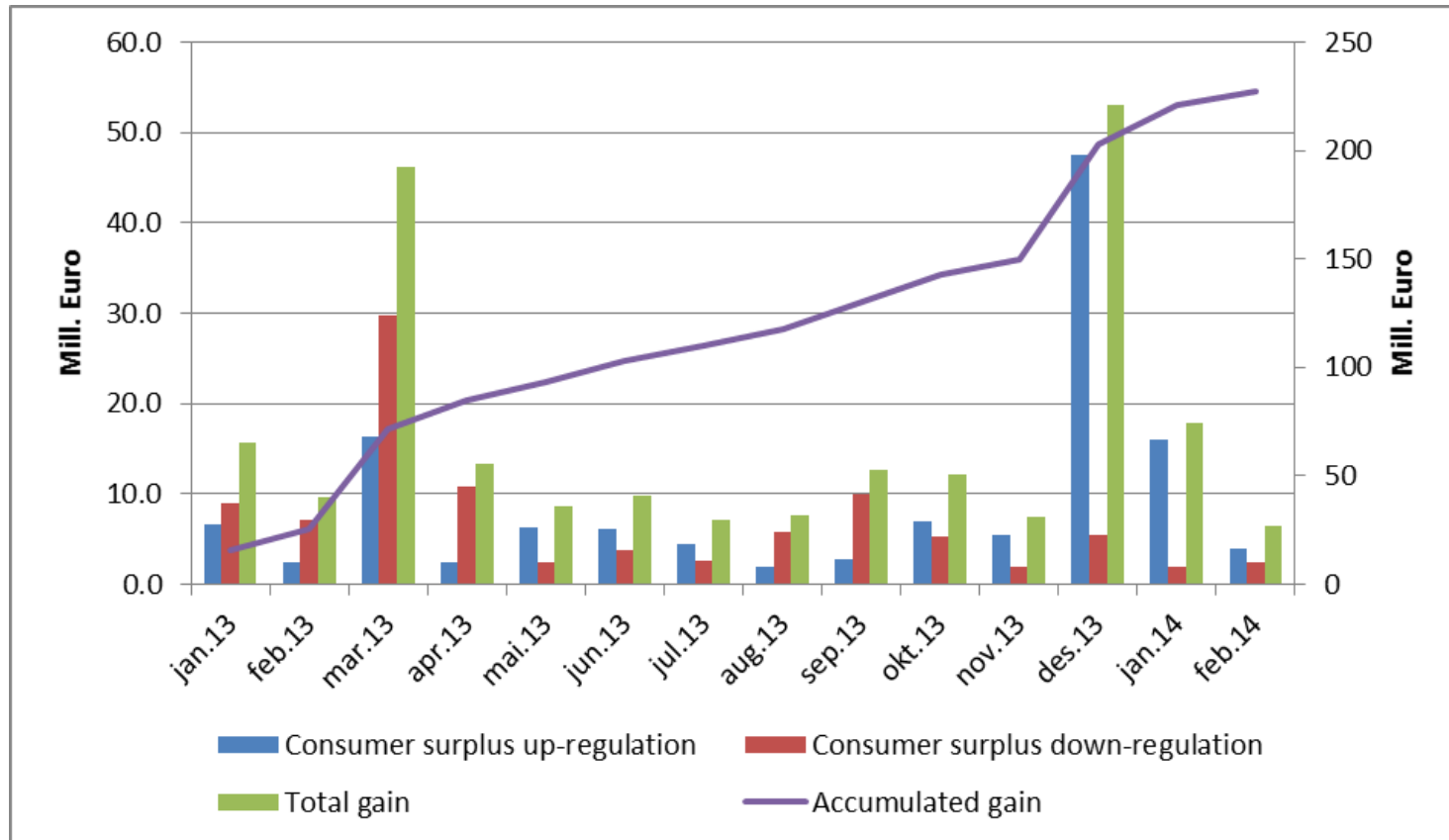
The prices would have been larger/smaller without RPM – e.g. RPM reduces the price span in the Nordics. That is how markets work.

Production type



Hydro has the largest share in RPM – over 80%. Consumption only amounts to 1% while other production types delivers the rest

Consumer surplus (in the Nordics)



The gain varies from month to month. In this period the accumulated increase in consumer surplus is EUR 229 mill.

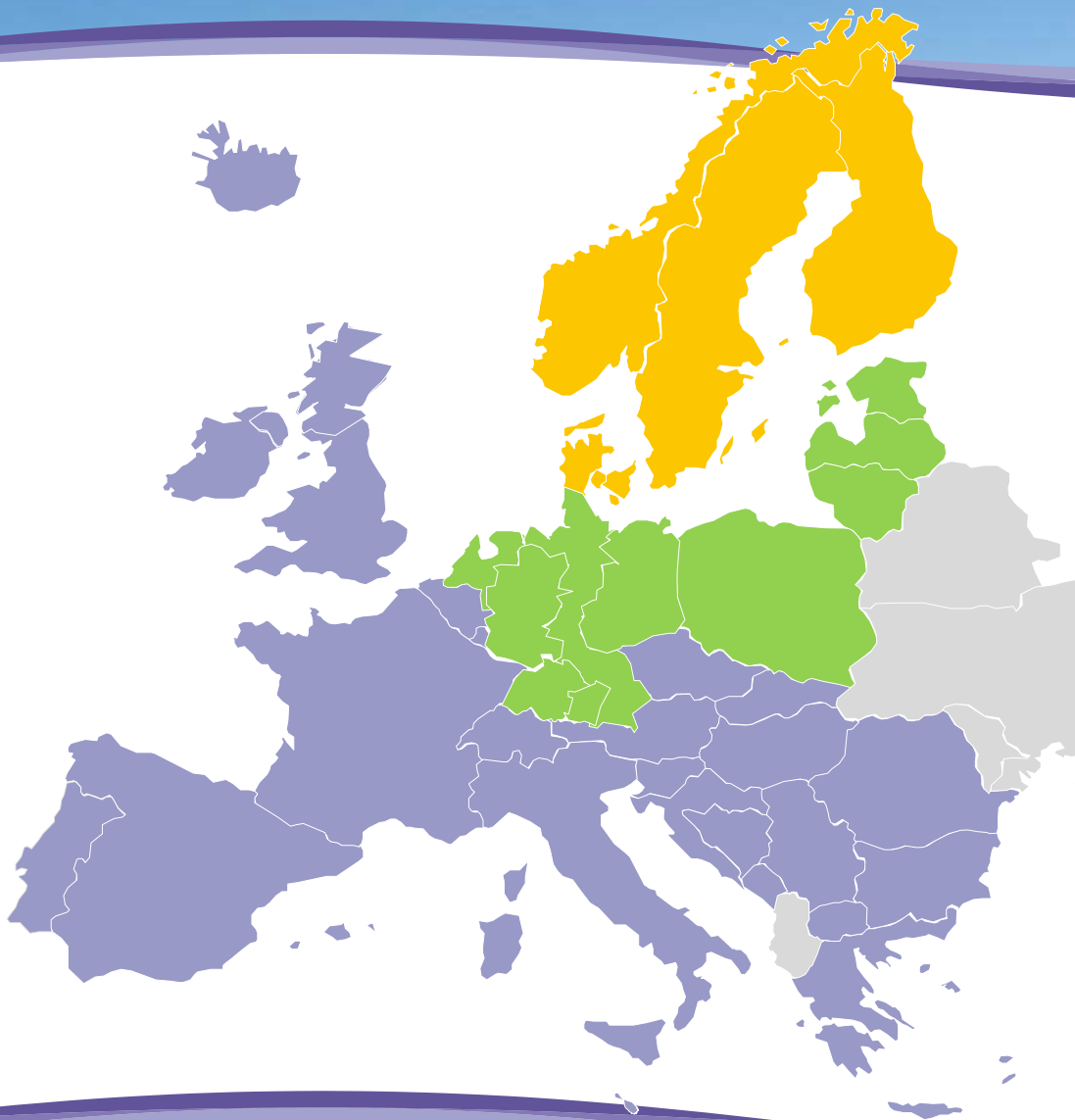
Current work to improve RPM

The Nordics has agreed to optimize the current RPM by implementing:

- 1) Electronic activation all over the Nordics (currently only in Denmark)
- 2) Lower bid size from 10 MW (to 1 MW in the future but perhaps with an intermediate step with 5 MW)
- 3) Harmonize the period a bid is price setting
- 4) Include a resting time mark in the IT system (to allow for slower responding resources as demand to participate)

All of these options should make it easier to integrate more RES and demand besides just optimize the working and attractiveness of the market (RPM)

Pilot 5: Development of the Nordic balancing market for FRR(m)



Statnett, Fingrid, Svenska Kraftnät, Energinet.dk. (Baltic TSOs, (PSE, TenneT TSO B.V., 50Hertz GmbH, Amprion, TenneT TSO GmbH, TransnetBW GmbH)

How will this project contribute to the intermediate/final target model?

1. Demonstrate and describe an existing multinational mFRR market with CMO
2. Increase efficiency and liquidity of the Nordic multinational mFRR market by capturing the full potential of the Nordic resources for regulation. This includes increased harmonization and participation demand side and RES. The results of the improvements will be reported.
3. Work and test for an extension of current Nordic balancing market towards neighbouring countries pilots

Baltic – Nordic mFRR cooperation

Feasibility Study status update



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The Nordic - Baltic mFRR Feasibility Study



Target:

Conclusions, recommendations and roadmap for mFRR cooperation between Baltics and Nordics targeting for the common merit order in future

Main points of the study:

- Description and comparison of the current Nordic, Estonian, Latvian and Lithuanian mFRR and balancing principles and possibilities to develop the mFRR exchange based on the current situation.
- Analysis of the common Baltic imbalance settlement (imbalance netting) perspectives.
- Description of the target model of the common Baltic mFRR market.
- Analysis of possibilities to develop the mFRR exchange between Baltic and Nordic systems based on separate mFRR markets.

Milestones and Progress report

March 13: WG kick – off meeting for the Feasibility Study (TOR approved)

DATE	MILESTONE	Status
2014.03.13	Project Start - Kick off	
2014.06.17	Current situation. Possibilities to develop the mFRR exchange based on current situation.	Completed
2014.06.17	Analysis of the common Baltic imbalance settlement (imbalance netting) perspectives.	Completed
2014.08.29	Description of the target model of the common Baltic mFRR market.	Draft
2014.09.19	Possibilities to harmonize the approach towards balancing energy exchange from mFRR within the Baltics and with the Nordics.	
2014.10.03	Conclusions and recommendations	
2014.10.24	Final study report draft presentation for the Nordic Pilot WG	
2014.10.31	Final study report approved	

October 31: Deadline for the study

Nordic-Polish feasibility study

Aim of the study

- To evaluate possibilities for cooperation between Nordic TSOs and Polish TSO regarding exchange of balancing energy from mFRR
- To analyse both technical and economic benefits as well as the respective obstacles
- To elaborate proposals of the general cooperation framework
 - Products/ processes schema/ settlements principles

Nordic-Polish feasibility study



Status of the study

- Descriptions of the different systems; self-dispatch/central dispatch
- Comparison of the current systems and practices; products
- Ongoing evaluation of technical cooperation possibilities
- Ongoing analyses of economical benefits from exchange of balancing energy

Nordic-Polish feasibility study



Timeplan 2014

May-July: Kick-off, descriptions and comparisons of current systems

August: Data collection

September: Analyses and initial conclusions

October- First draft report for review within Nordic pilot project group

December – Final report

Feasibility study regarding the cooperation between the German and Nordic pilot projects on electricity balancing

Study carried out by Consentec GmbH
Aachen, Germany



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Background and objective



Background

- Call for cross-border pilot projects on electricity balancing issued by ENTSO-E
- German and Nordic TSOs decided to evaluate a possible cooperation regarding nominated pilot projects by commissioning a feasibility study for analysing technical and economic benefits as well as respective obstacles

Goal of feasibility study

- Provision of a thorough analysis of possible implementation of cross-border balancing market between Germany and NORDIC
 - Focus on mFRR products and type of exchange as well as estimating economic benefits and costs
 - Assessment of potential obstacles preventing exchange of balancing products and transparency
- Assessment of possible implementation of imbalance netting between Germany and NORDIC (completely covered by TSOs themselves)

Consentec's tasks

- Qualitative and quantitative assessment regarding status quo and options for market harmonisation (benefits and prerequisites)
- Project Management

Project status

- Qualitative assessment almost finished covering following aspects:
 - Legal framework
 - Technical framework for load-frequency control and requirements for provision of reserve
 - Design of reserve markets and product definition (status quo)
 - Activation and settlement of control energy
 - Interaction with (future) network codes
 - Potential models for further market harmonization

Project status

- Quantitative analyses well advanced with ongoing discussion of results
 - Technical implementation of cross-border mFRR activation and imbalance netting
 - Comprehensive assessment regarding interaction of control block imbalance, requested and actual power flows on HVDC interconnections taking into account outages of power plants and/or HVDC interconnections as well as influences on system frequency
 - Economic benefit of a closer market harmonisation
 - Simulation of resulting costs for mFRR activation for separate and common markets for different assumptions regarding bid prices and amount of demanded control energy
 - Limitations in available capacity due to congestions are not taken into account in the analyses and results represents an economic potential
- Project will be documented in a written report (final version to be expected end of September 2014)

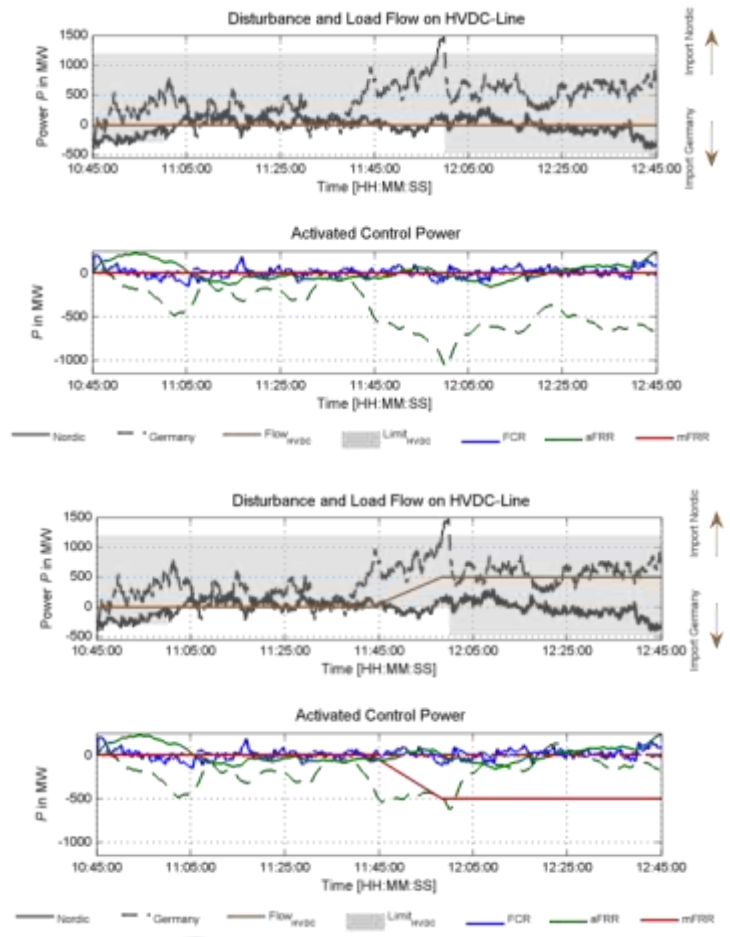
Exemplary results 1/2



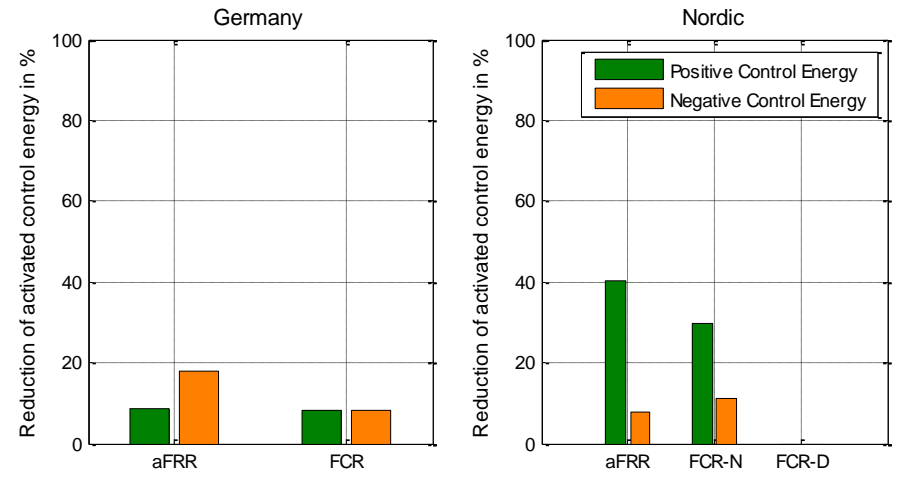
Impact of cross-border mFRR activation

without mFRR activation

with mFRR activation



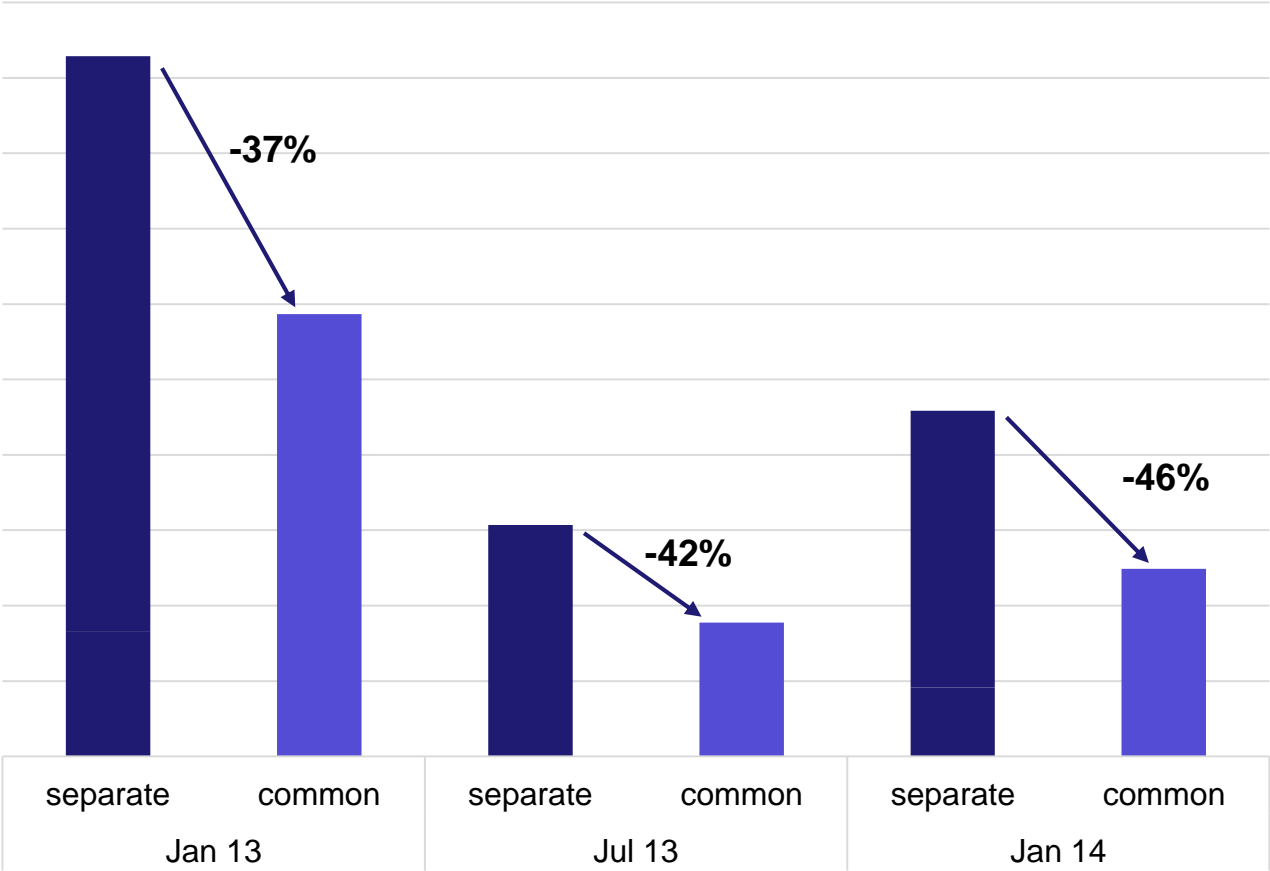
Impact of imbalance netting



Exemplary results 2/2



Change of costs for mFFR activation with separate or common market



Overview of the current status: Pilot 5, Nordic RPM

Recent achievements

On-going studies on how to:

- Exchange mFRR energy between possible future CoBAs (German pilot and Baltic feasibility studies)
- Perform imbalance netting between synchronous areas and CoBAs (HVDC) (within German pilot feasibility study)
- Exchange mFRR energy between a self-dispatch system and a central dispatch system (Polish feasibility study)

Risks or legal/regulatory issue

Export of balancing energy from Standard Products for FRR from the Netherlands will adversely affect market functioning, cost recovery of balancing costs via imbalance settlement, and local incentives to BRPs. The TSO in the Netherlands can and does export Balancing Energy from Special Products for FRR to other TSO's.

Project co-operation and merging

- **Feasibility study with Pilot 1 on-going**
- **Feasibility studies with Poland and the Baltics on-going**
- **Initiated dialogue on the possibility for feasibility study with the Netherlands**

The process ahead

- The feasibility studies are on-going and will be completed before December
- The studies will form the basis from which the Nordics will decide before Christmas how to go on in the Nordic pilot. E.g:
 - How should the future RPM look like to realize most of the potential efficiency gains from integrating markets identified in the studies?
 - What would be a feasible stepwise process towards the goal considering security of operations, congestion management and the need for consolidating Nordic co-operation and agreements?