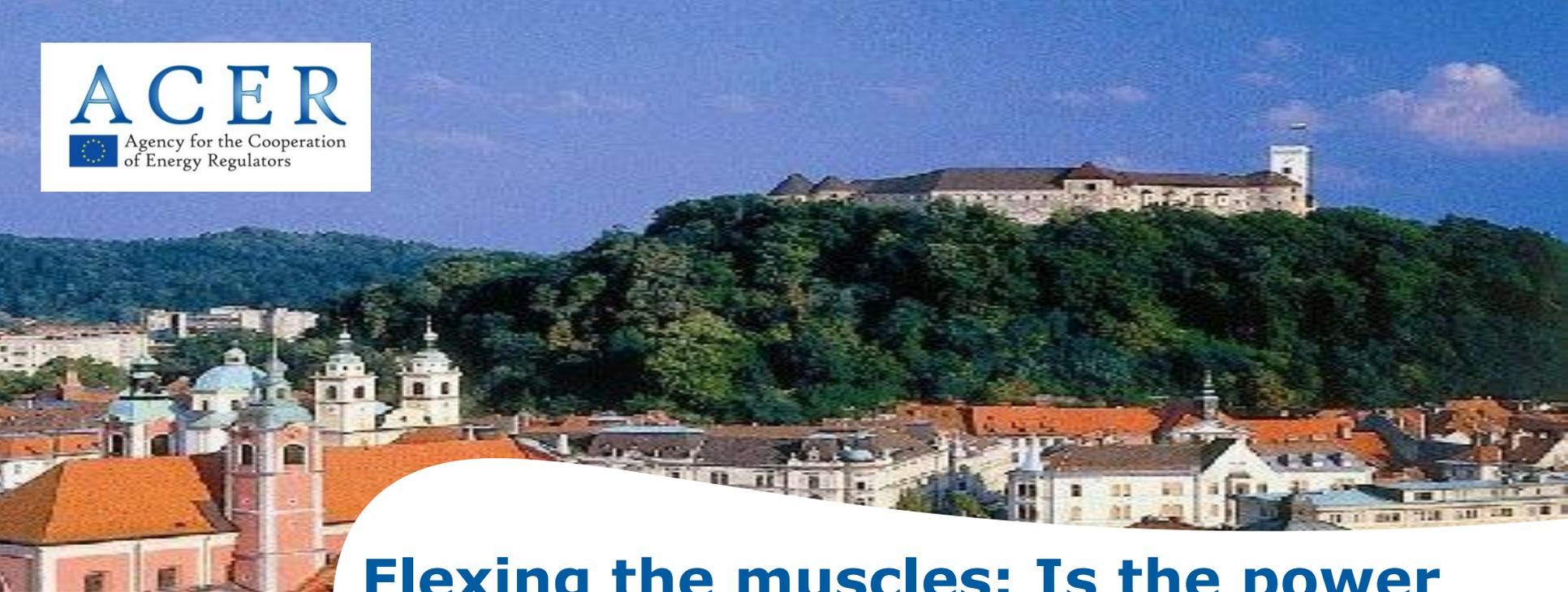


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# **Flexing the muscles: Is the power market robust for new technologies?**

**Alberto Pototschnig**

*Director*

**Energy Security with Renewables**

**A joint conference by the German Institute for Economic Research, the Florence School of Regulation, and the Institute for Research in Technology Madrid in cooperation with the IEA**

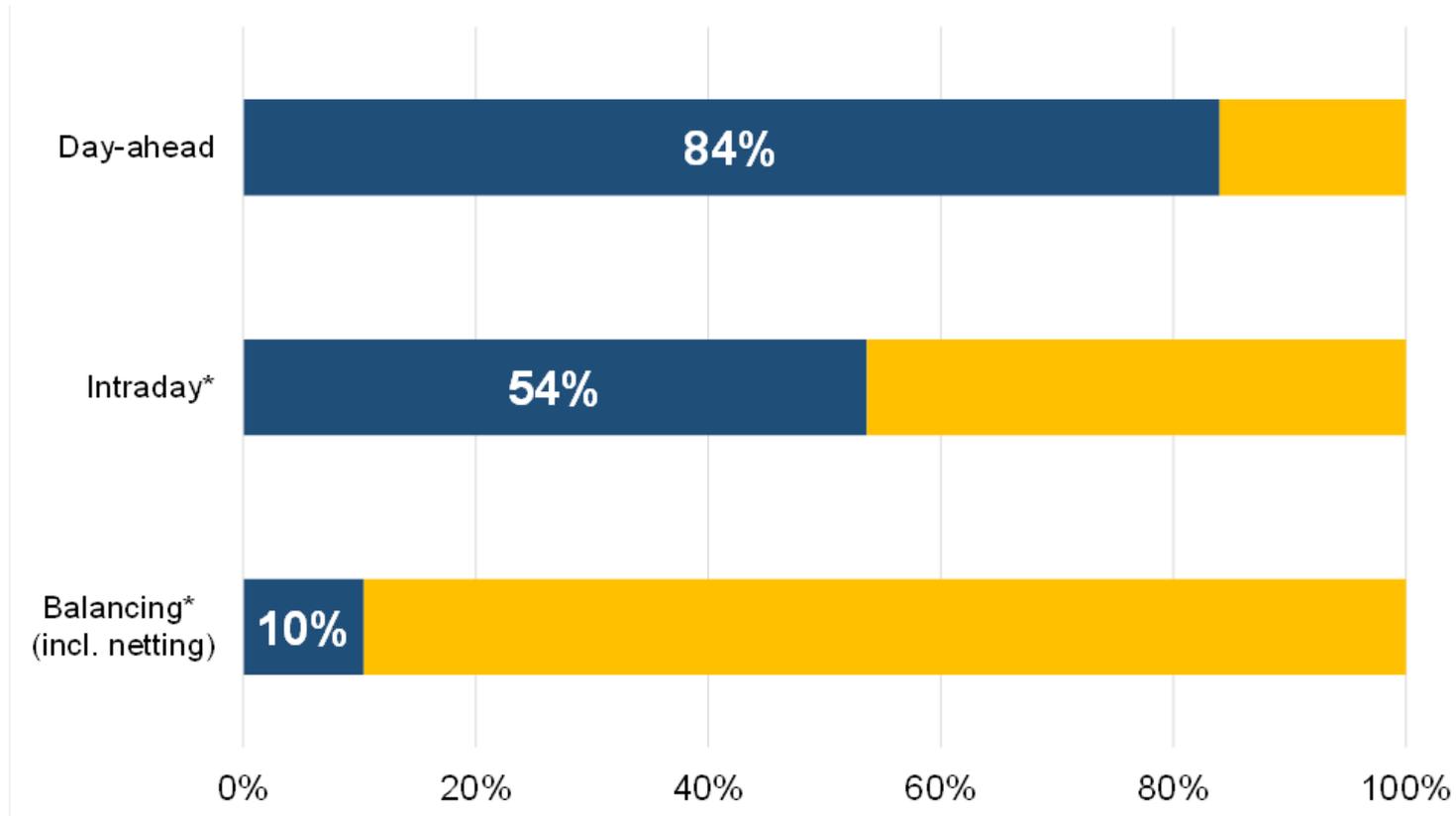
**Berlin, 24-25 November 2016**

## **Flexing the muscles: Is the power market robust for new technologies? – Session's Questions**

- Are intraday and balancing products and market places aligned with the needs of different generation and flexibility options, or do their differences across EU member states restrict optimisation potential and complicate coordination between TSOs?
- How can all flexibility and generation technologies be fully integrated across borders?
- Is the whole EU transmission network actually coordinating enough to maximise its capacity or does this require smaller pricing zones?

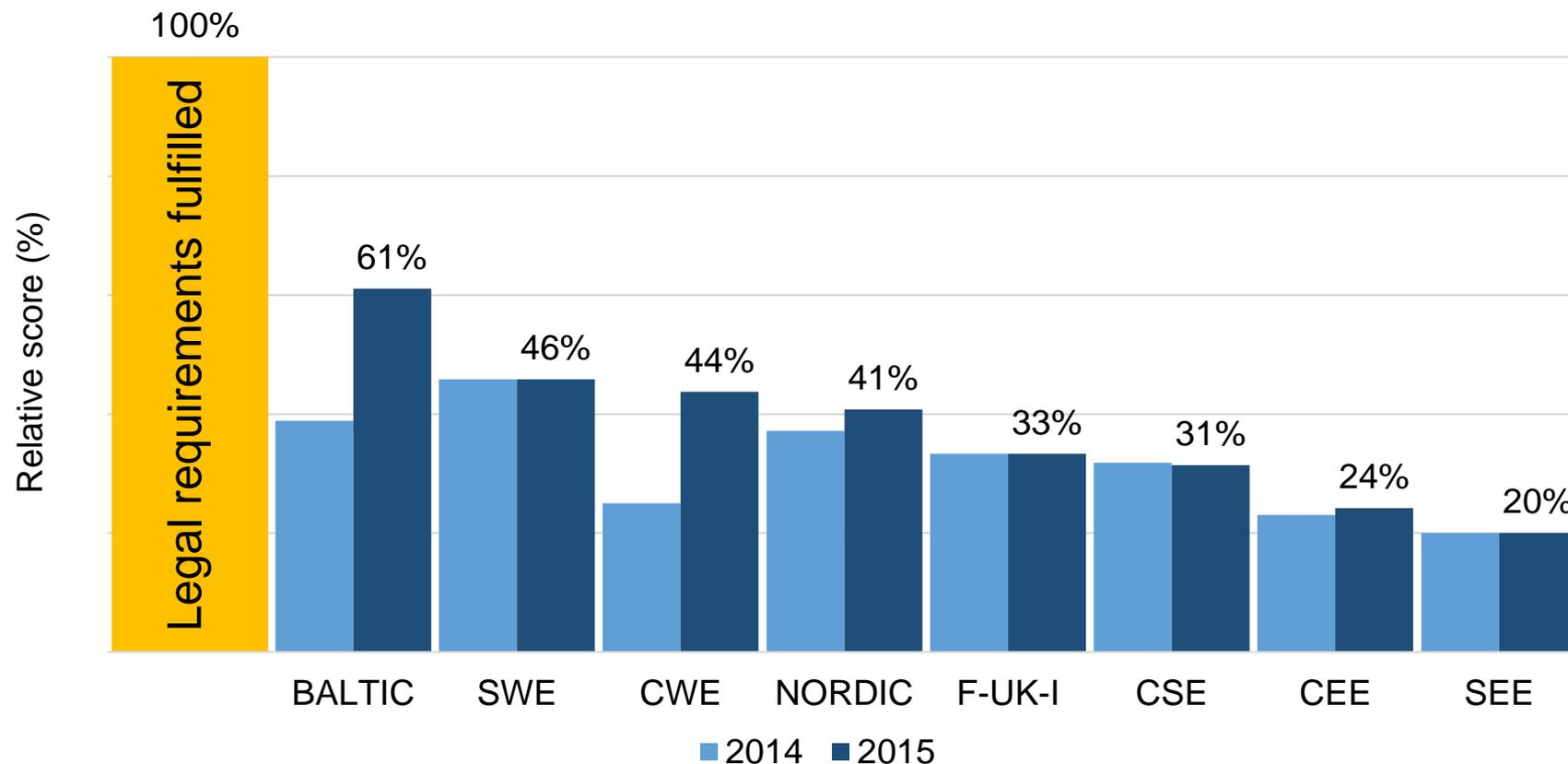
**The use of cross-zonal capacity in the Day-Ahead timeframe is close to optimal, but in the Intra-Day and balancing market timeframes it could be significantly improved**

**Efficient use of interconnectors in the different timeframes in 2015**



## Coordination in capacity calculation can be further improved

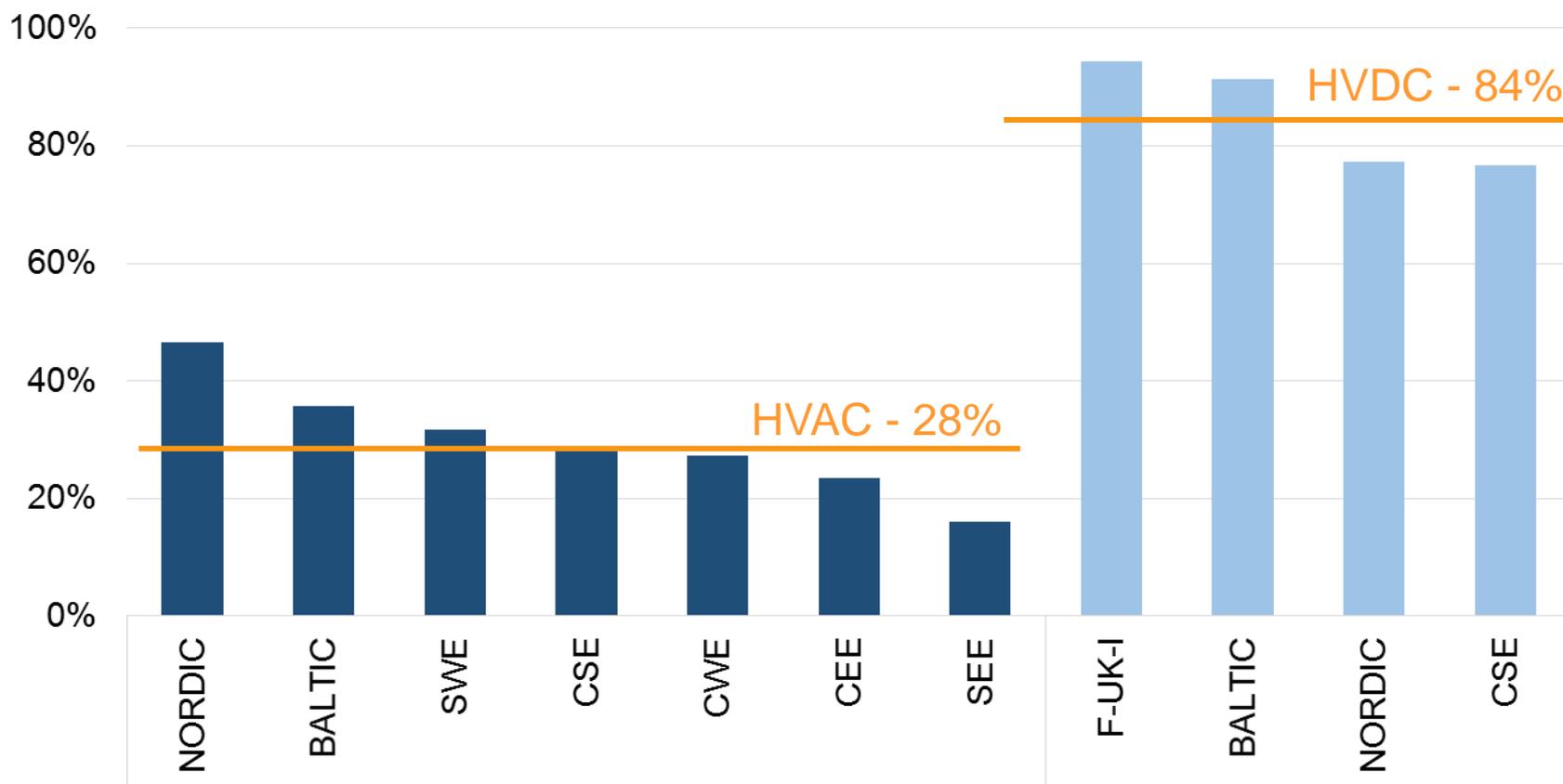
Regional performance based on fulfilment of capacity calculations requirements – 2014-2015 (%)



**Bilateral or partly coordinated capacity calculation methods are applied on many borders; on some borders, capacity is not recalculated in all timeframes**

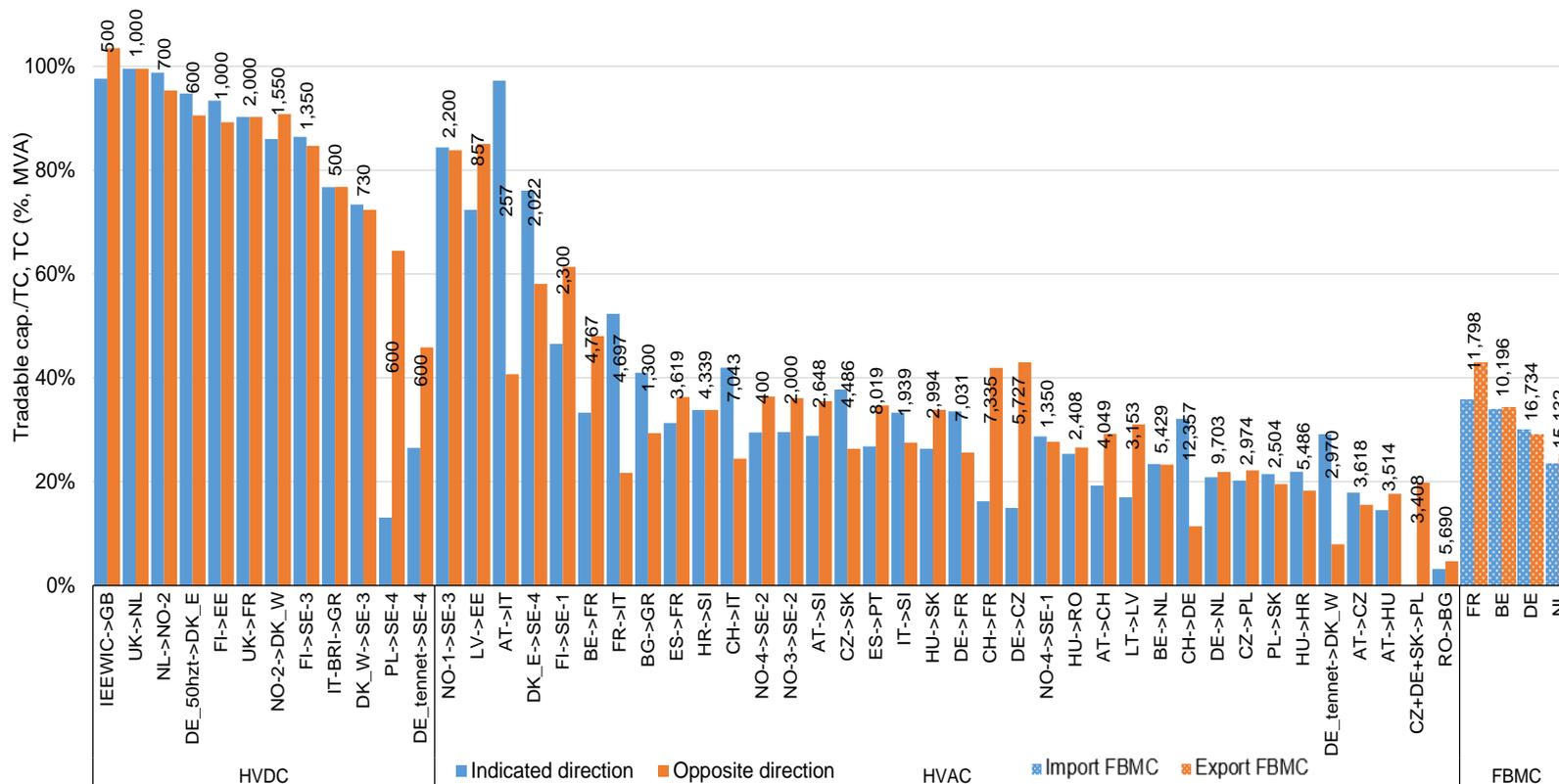
## In Europe, a large share of the physical interconnection capacity is not used for trading

Share of the aggregated thermal capacity of interconnectors made available for trading – 2015 (%)



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Share of the aggregated thermal capacity of interconnectors made available for trading – 2015 (%)



## Recommendation No 02/2016 of 11 November 2016 on High-Level Principles (HLP) for:

- the common capacity calculation methodologies (CCMs)
- the redispatching and countertrading cost sharing methodologies (CSMs)

### CCMs

HLP1: limitations on internal network elements should not be considered in the CCMs

HLP2: the capacity of the cross-zonal network elements considered in the CCMs should not be reduced in order to accommodate loop flows

**Deviations from the HLP are possible, but they should be duly justified**

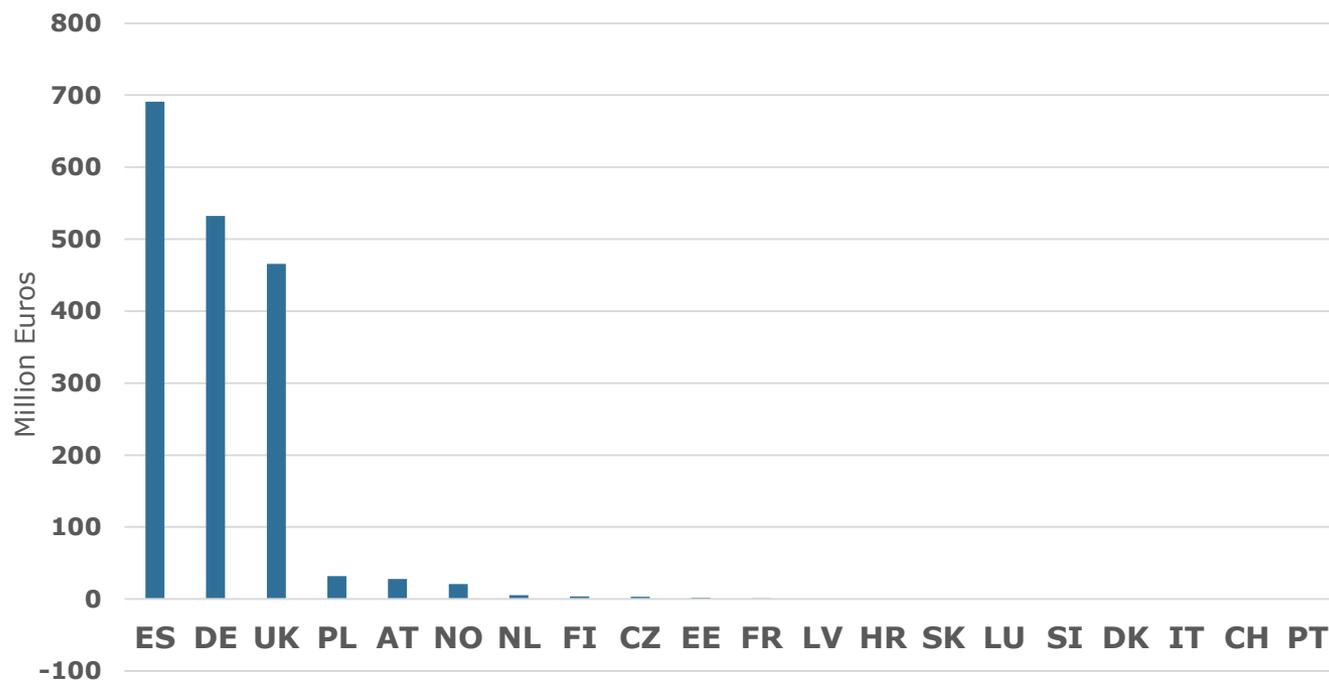
### CSMs

HLP3: the costs of remedial actions should be shared based on the 'polluter-pays principle' where the unscheduled flows over the overloaded network elements should be identified as 'polluters' and they should contribute to the costs in proportion to their contribution to the overload

The use of remedial measures in Europe has become more frequent in recent years, due to:

- inadequate bidding zone configuration – and thus the need to deal with intra-zonal congestion
- increased share of intermittent RES generation - making the location of network congestions more dynamic

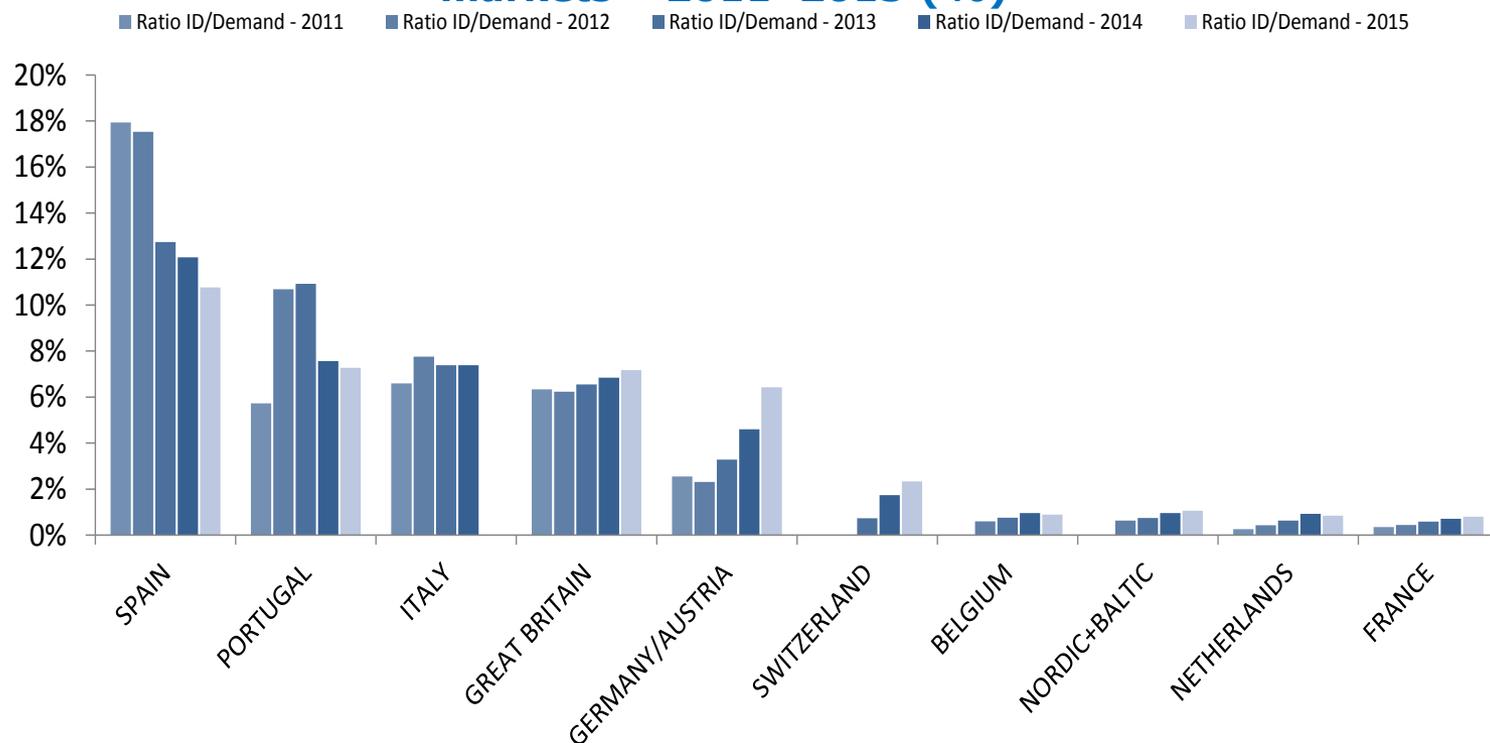
Cost of remedial measures - 2015



**Liquidity in intra-day markets is generally increasing, but not in all regions**

- **the 42% increase in liquidity in the DE-AT intra-day market between 2014 and 2015 is due to measures in Germany aimed at reducing RES exemptions from balancing responsibility**

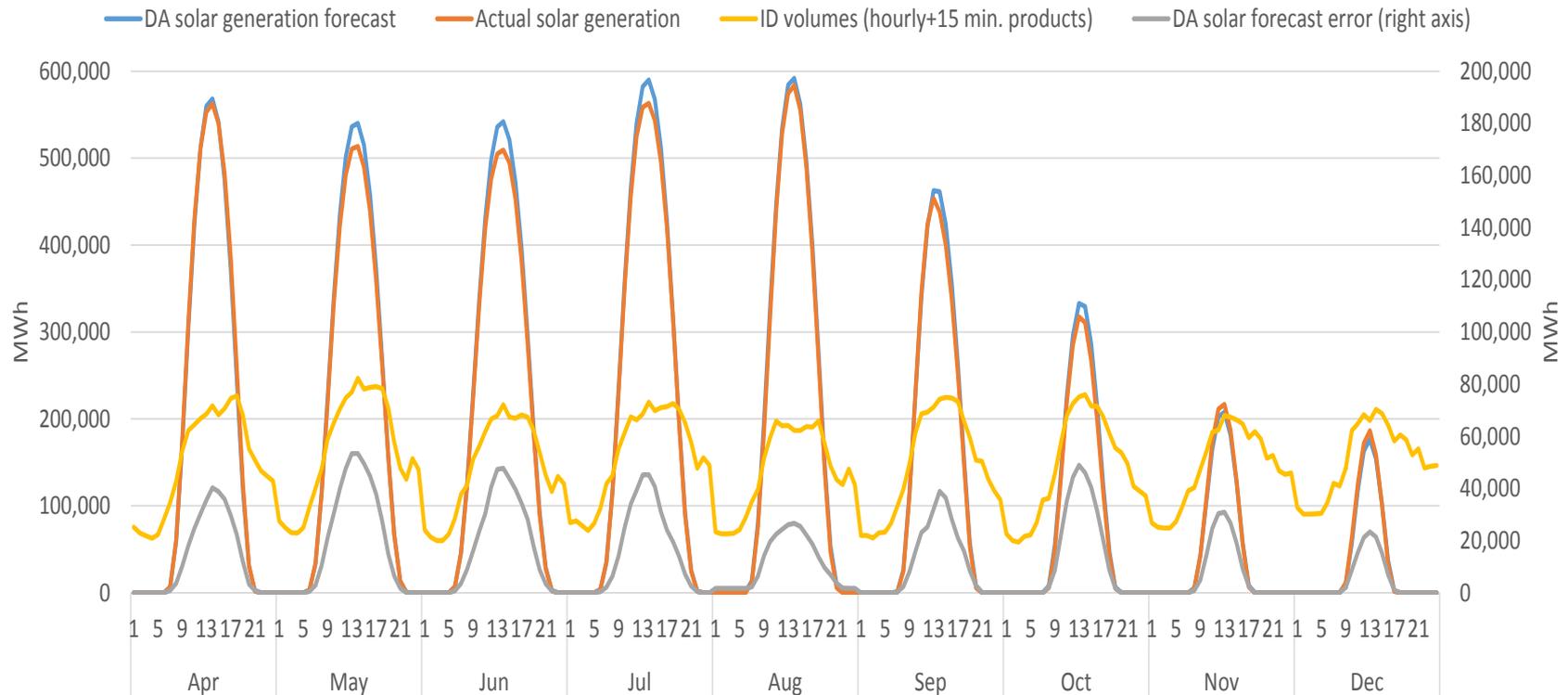
**Intra-day traded volumes as a percentage of electricity demand in a selection of EU markets – 2011–2015 (%)**



**Liquidity in intra-day markets typically correlates positively with forecast errors for intermittent (RES) generation (and with intermittent generation levels)**

**- the hourly correlation coefficient for German solar production over the period April-December 2015 was 0.55 (and 0.56)**

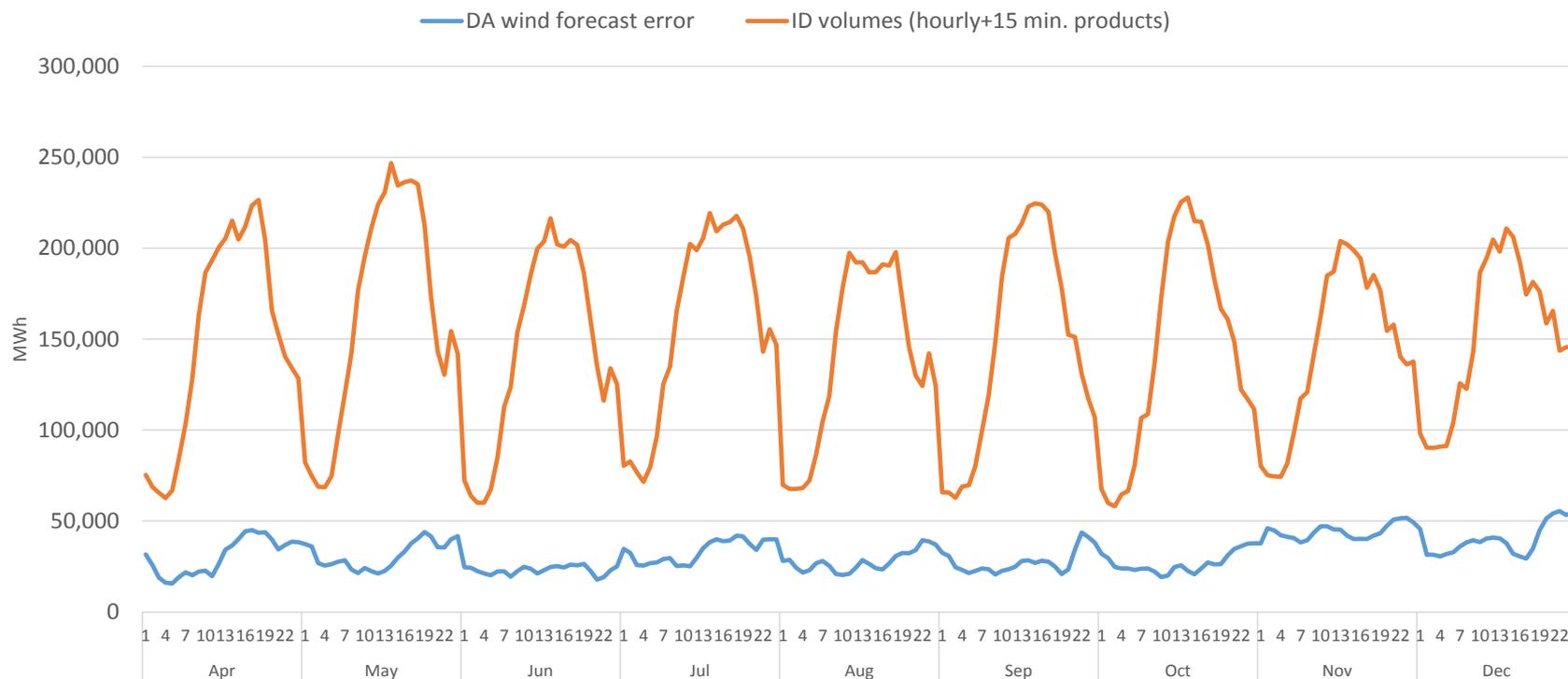
**Average hourly intra-day volumes (continuous trading) and average hourly solar electricity generation forecast error in Germany – April–December 2015 (MWh)**



## However:

- **the hourly correlation coefficient for German wind production forecast error over the period April-December 2015 was only 0.22**

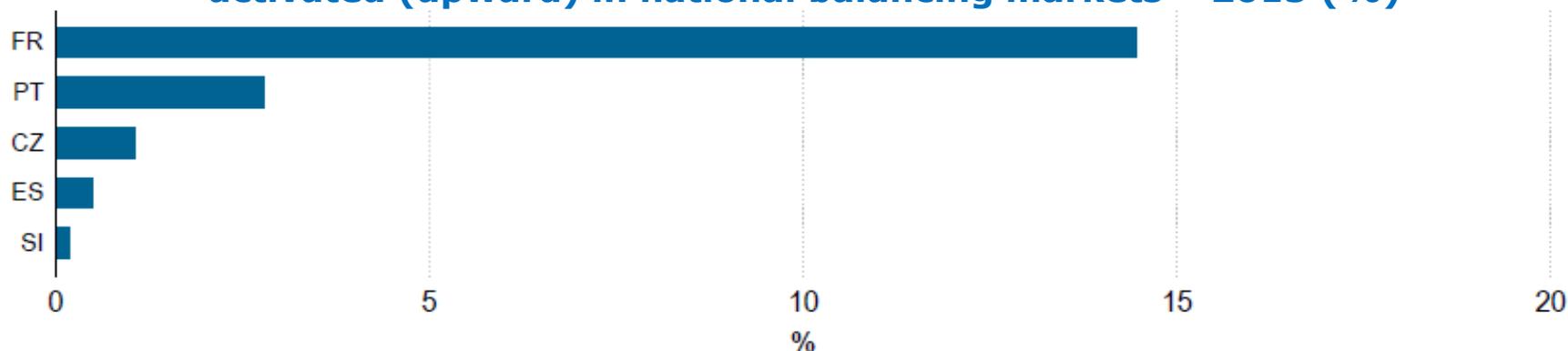
## Average hourly intra-day volumes (continuous trading) and average hourly wind electricity generation forecast error in Germany – April–December 2015 (MWh)



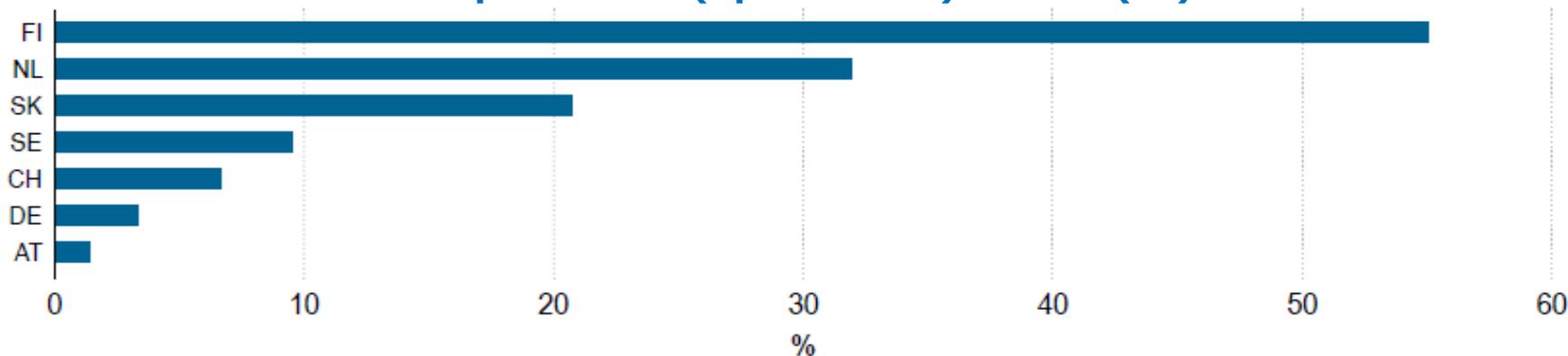
**The cross-border integration of balancing markets is progressing in some regions, but it is still generally limited**

- **common procurement of FCR involving the German, Austrian, Dutch and Swiss TSOs since April 2015**

**Share of the balancing energy activated abroad in the total balancing energy activated (upward) in national balancing markets – 2015 (%)**

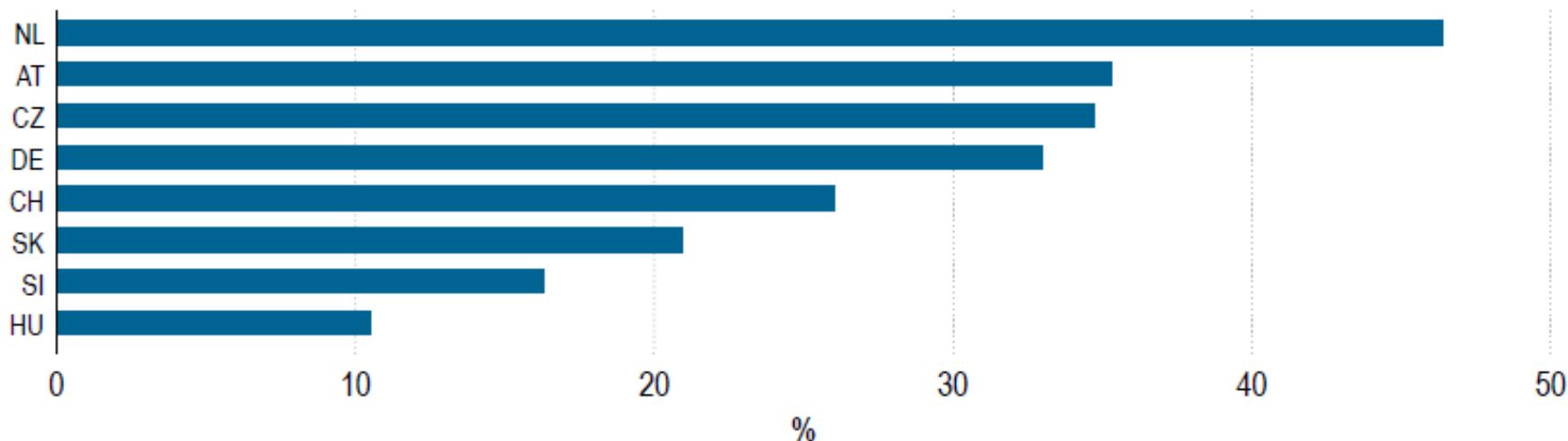


**Share of the balancing capacity contracted abroad in the reserve capacity system requirements (upward FCR) – 2015 (%)**



## The most successfully applied tool to exchange balancing services continued to be the utilisation of imbalance netting across borders

**Imbalance netting as a percentage of the total need for balancing energy (activated plus avoided activation due to netting) from all types of reserves in national balancing markets – 2015 (%)**



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**Thank you  
for your attention**