ENERDAY 2015 - 10th Conference on Energy Economics and Technology
Dresden
17.04.2015

Cross-Border Balancing Cooperation in the Alpine Region: Benefits and Challenges

Casimir Lorenz, Clemens Gerbaulet
TU Berlin, Workgroup for Infrastructure Policy
DIW Berlin, Department of Energy, Transportation, Environment

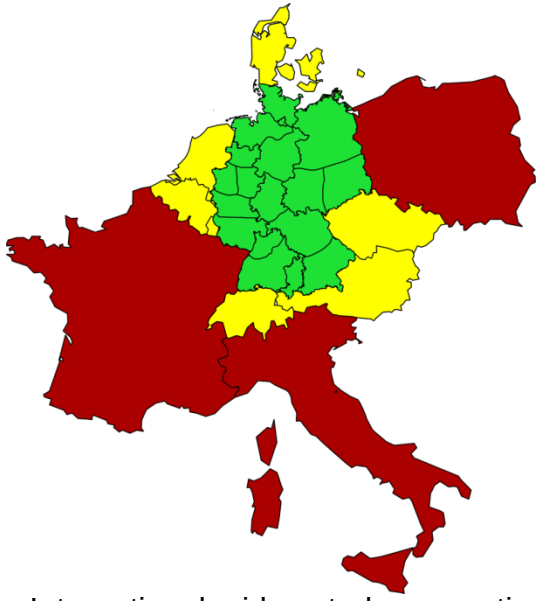
Agenda

1. Motivation
2. Setting
3. Model Structure
4. Results

Motivation

- **Balancing capacity/energy** is used by TSOs to **balance the electricity system** when **positive or negative deviations** from the scheduled production or consumption are occurring

- **Increasing share of fluctuating renewable energy sources could lead to an increasing amount of necessary balancing capacity**
- **Continuous growth of intermittent share requires further actions as auction timing is limited**



The International grid control cooperation

- **The new Network Code on Electricity Balancing by the ENTSO-E fosters cross-border exchange of balancing services with the objective to lower overall costs**
  - Harmonization of electricity balancing rules
  - Cooperation by imbalance netting, joint activation and joint reservation of reserves
- **IGCC allows for imbalance netting between German TSOs and different neighboring TSOs**

→ **We want to quantify the benefits of cooperation on balancing markets**

Setting

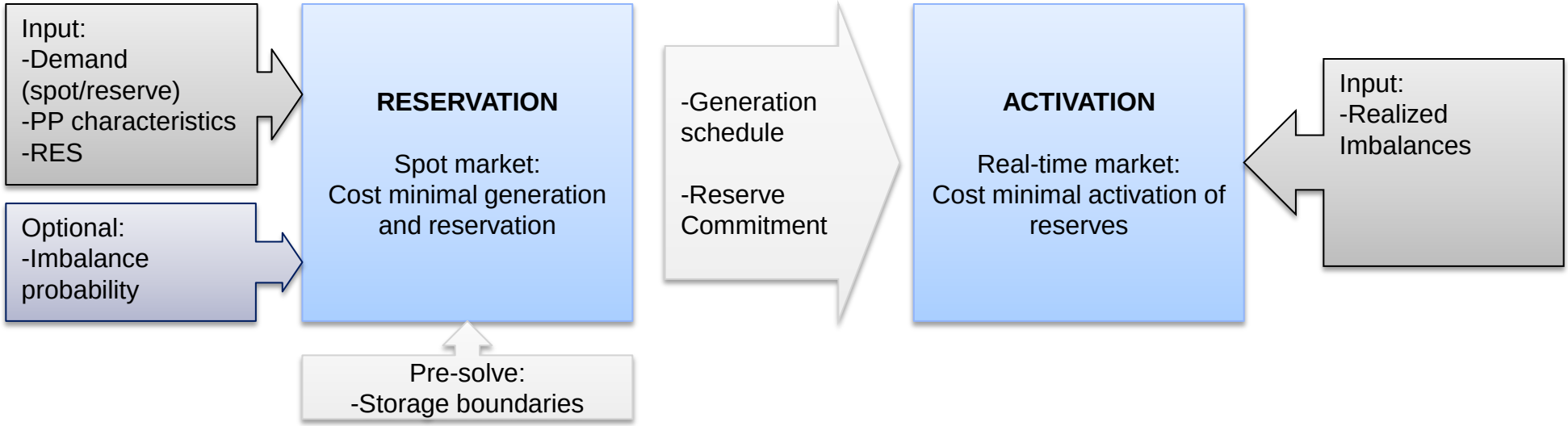
- **We want to quantify the benefits of cooperation on balancing markets**
  - Regarding the influence of balancing services on total system cost
  - Distributional effects of increased international cooperation

- **Our case: Cooperation between Austria, Germany, and Switzerland**
  - Different generation portfolios (Hydro in AT & CH, fossil in DE)
  - Good interconnection

- **Scenario dimensions:**
  - Different levels of cooperation
    - No Cooperation
    - Cooperation: Joint procurement of secondary and tertiary reserves with a common merit order list, allowing interconnector reservation to exchange balancing services
  - Anticipation of reserve activation costs

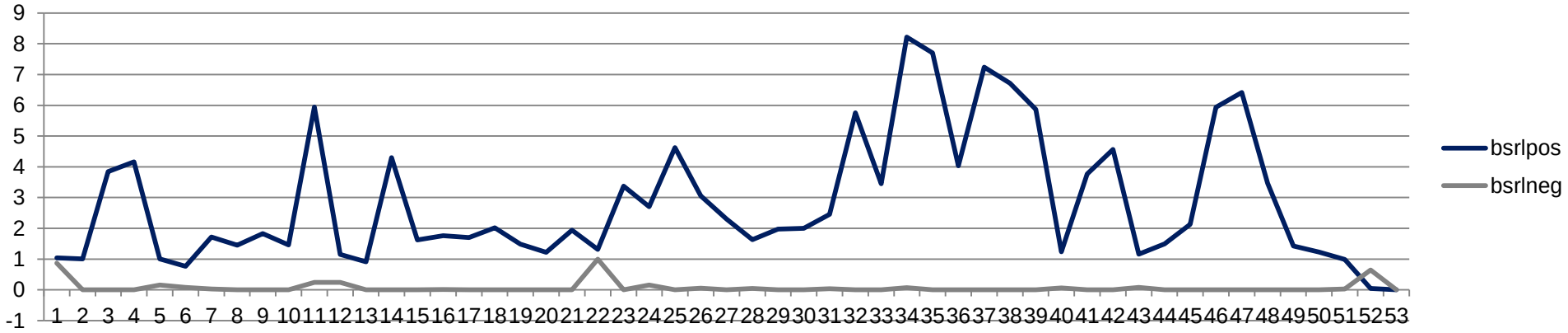
Model Structure

- **Cost minimization unit-commitment model with hourly resolution, 53 x 168 hours**
- **Block sharp representation of power plant portfolios**
- **NTC transmission constraints between AT,CH,DE**
- **Fixed import and exports for other neighboring countries' cross border interaction**
- **Two-step model: 1) reservation and 2) reserve activation**
- **Optional: Anticipating the cost of activated reserve volumes**

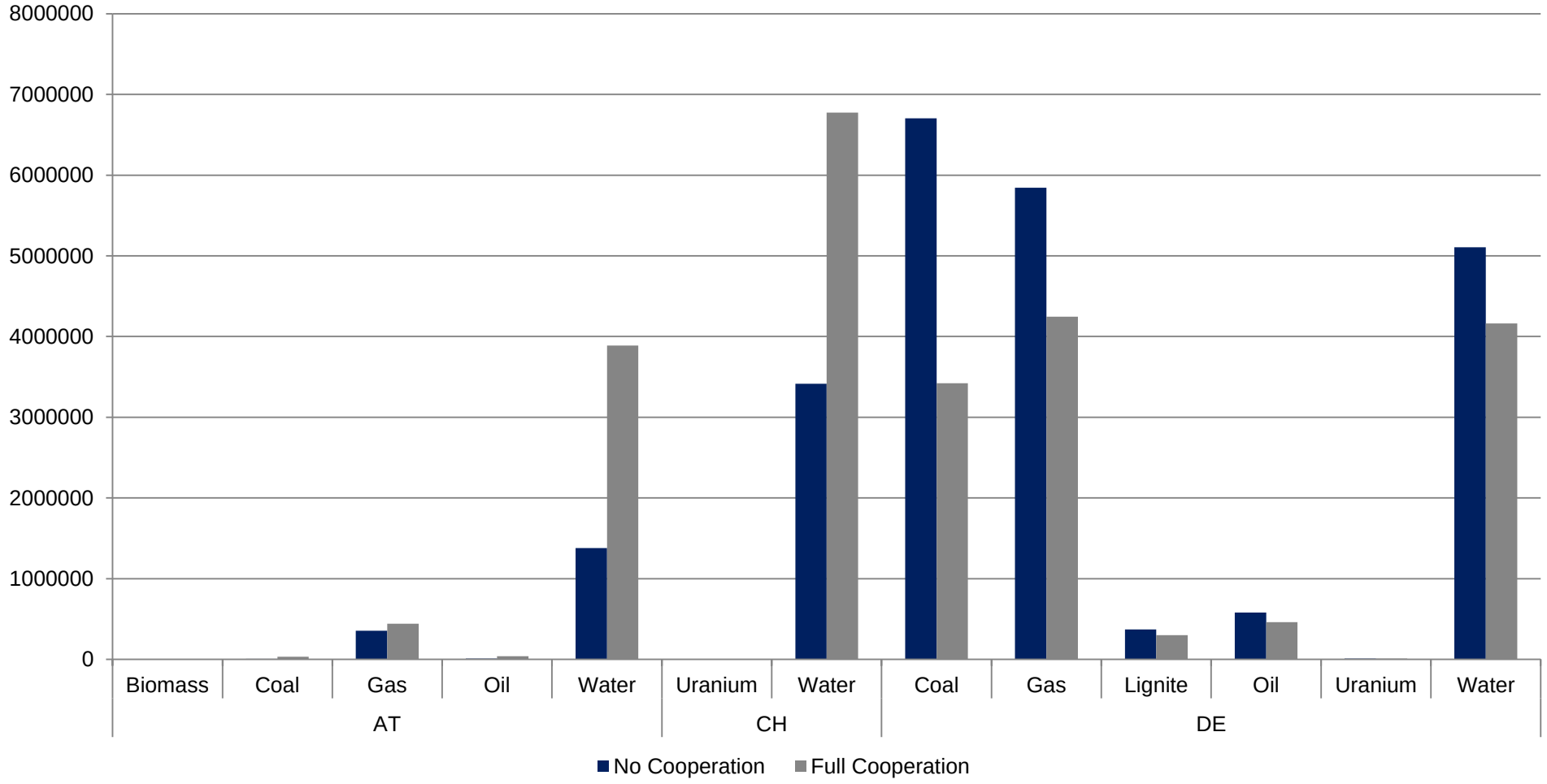


Results 1:

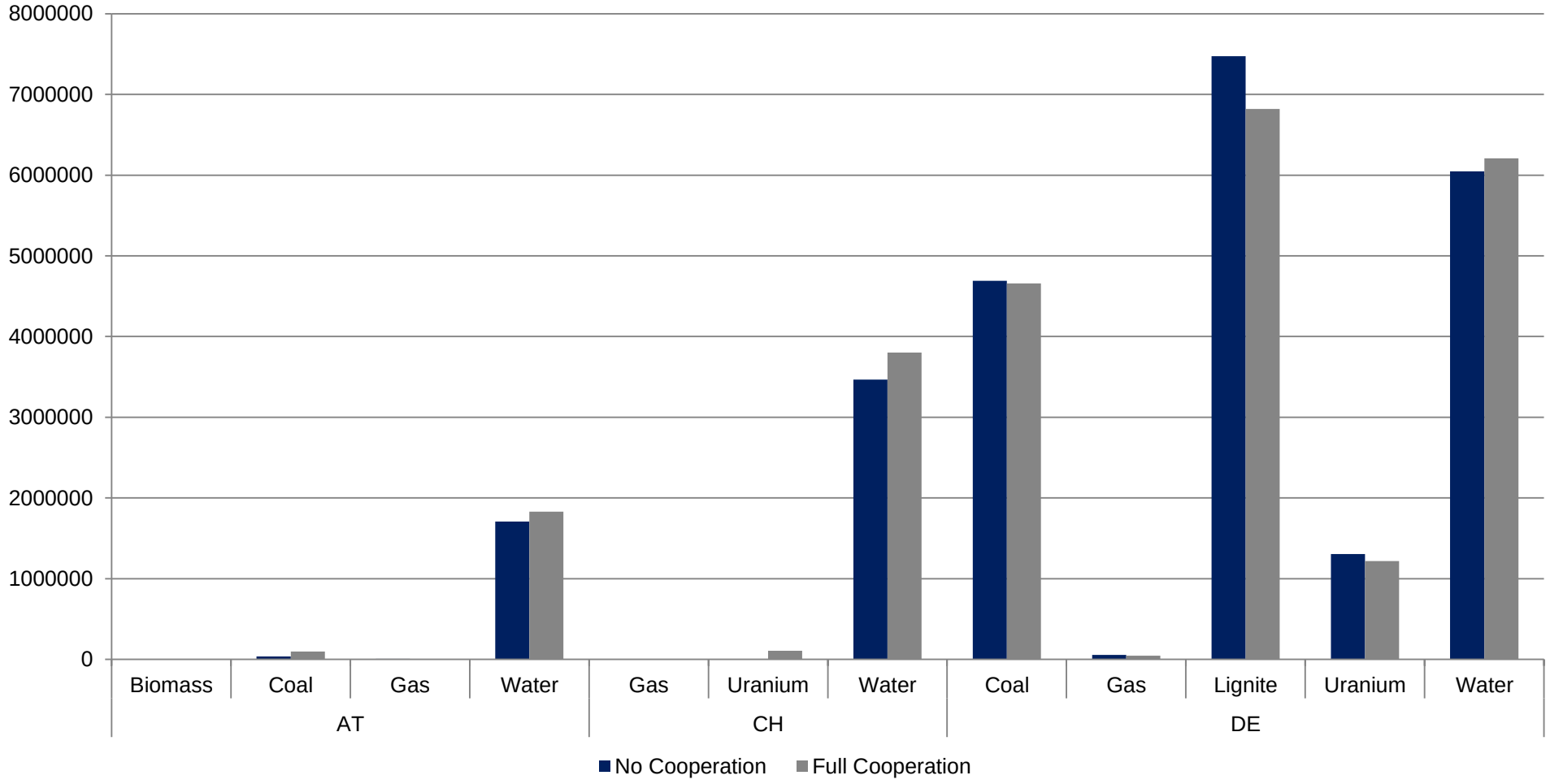
- **Reserve provision *cost* for the Alpine Region can be reduced by 32 % from 119 million € to 79 million € by a joint reserve procurement**
- **These costs are much lower than current real balancing cost due to:**
  - No strategic behavior included
  - Pessimistic assumptions on CHP must run constrains
  - Optimistic assumptions on CHP power plant flexibility
  - No block biddings and no portfolios
  - Hourly resolution
- **Prices for SRL in Germany:**



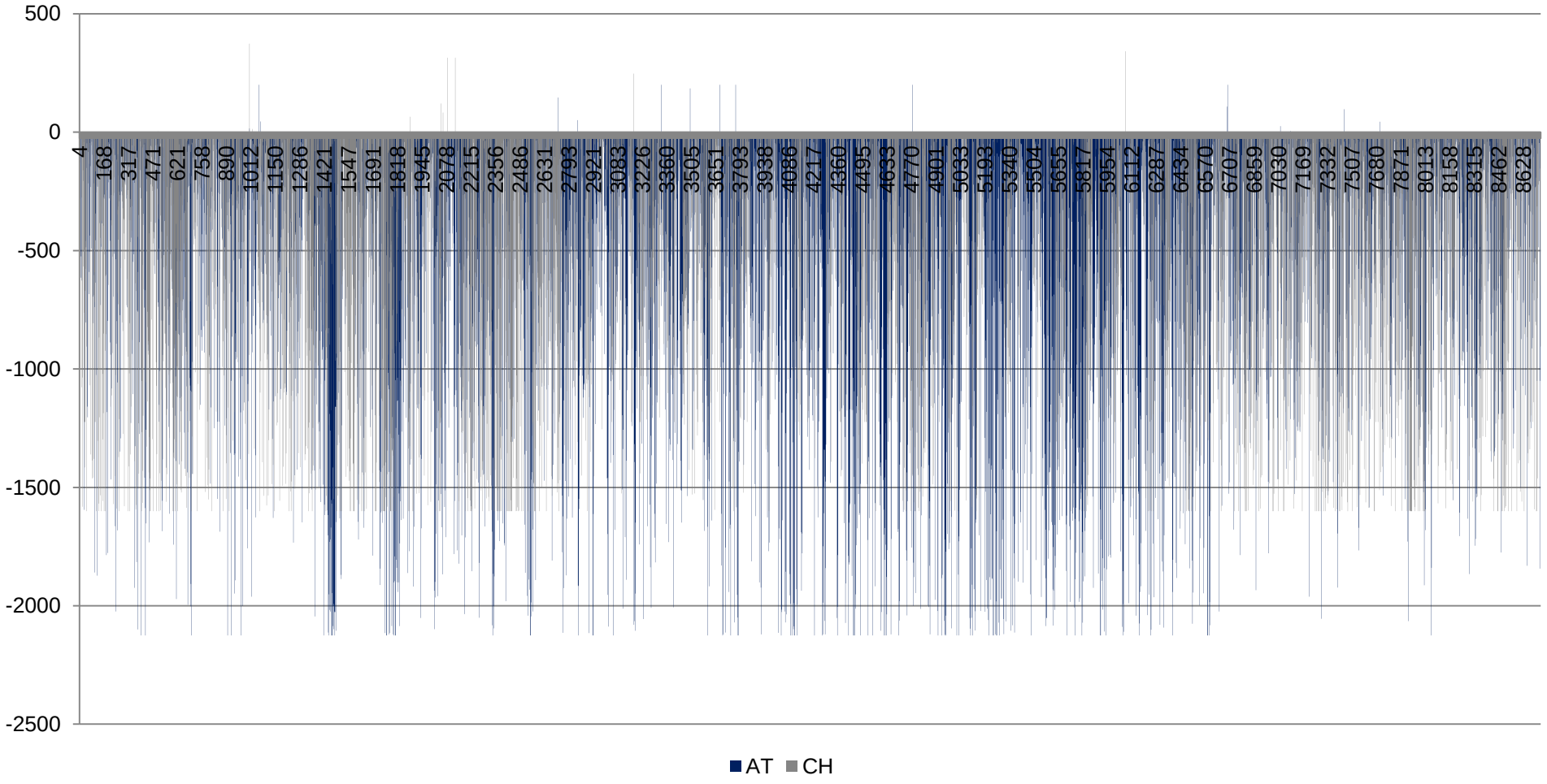
Results 2: Contracted Positive Secondary Reserves [MW*h]



Results 2: Contracted Negative Secondary Reserves [MW*h]

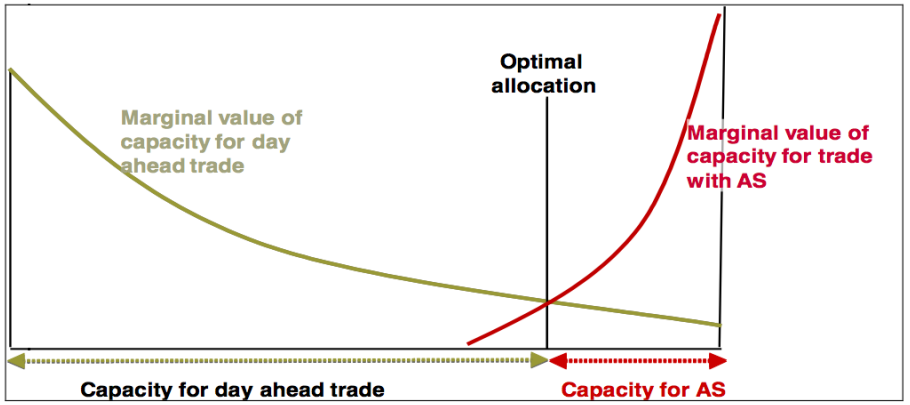


Results 3: Cross-Border Balancing Exchanges with DE [MW]



Conclusion

- **Cross-border exchanges of balancing capacity leads to significant cost reductions**
- **Cost reductions are dependent on the generation portfolios of the participating countries**



Source: ENTSO-E (07/2011) Position Paper on Balancing Services

- **Austria and Switzerland seem to be able to provide relatively cheap balancing capacity**
- **→ Despite the currently very high prices in Austria**

- **Assumptions regarding future market design are crucial**
  - Bidding periods / Interconnector reservation

- **Hypothesis: Cross-border exchanges are only beneficial with flexible interconnector reservation**

Thank You for Your Attention!

Claudio Casimir Lucas Lorenz
DIW Berlin / Workgroup for Economic and Infrastructure Policy (WIP)

Berlin University of Technology (TU Berlin)
School of Economics & Management (Fak. VII)
WIP Workgroup for Economic and Infrastructure Policy

Sekretariat H 33
Straße des 17. Juni 135
D-10623 Berlin

http://wip.tu-berlin.de
cl@wip.tu-berlin.de

Positive Secondary Control Calls in Germany 2013