

9th Internationale Energiewirtschaftstagung

Wien

12.02.2015

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

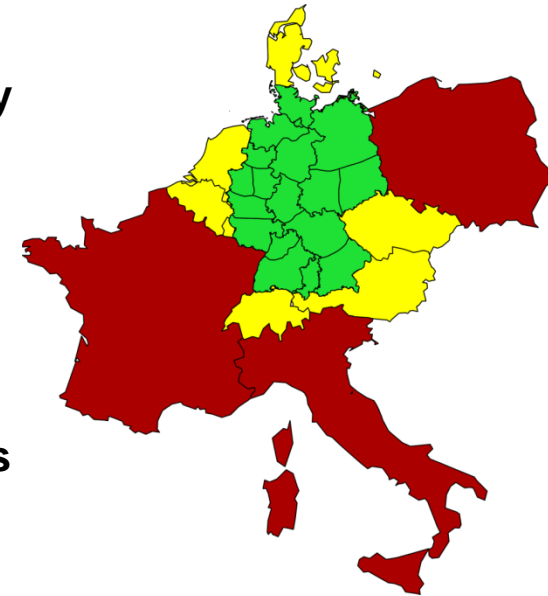
2. Setting

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**

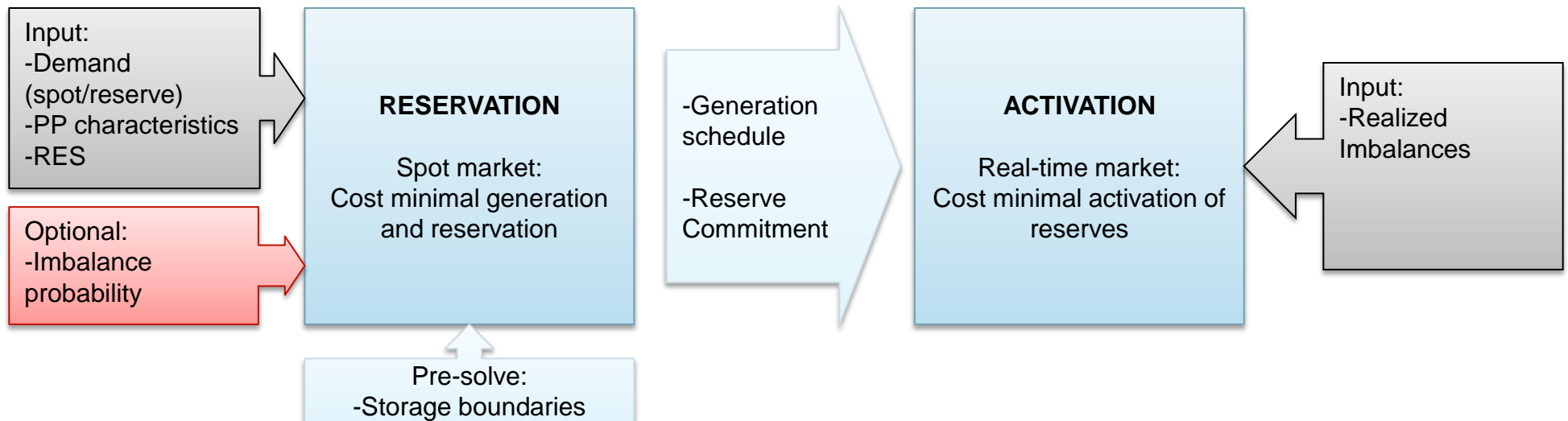
Setting

- **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

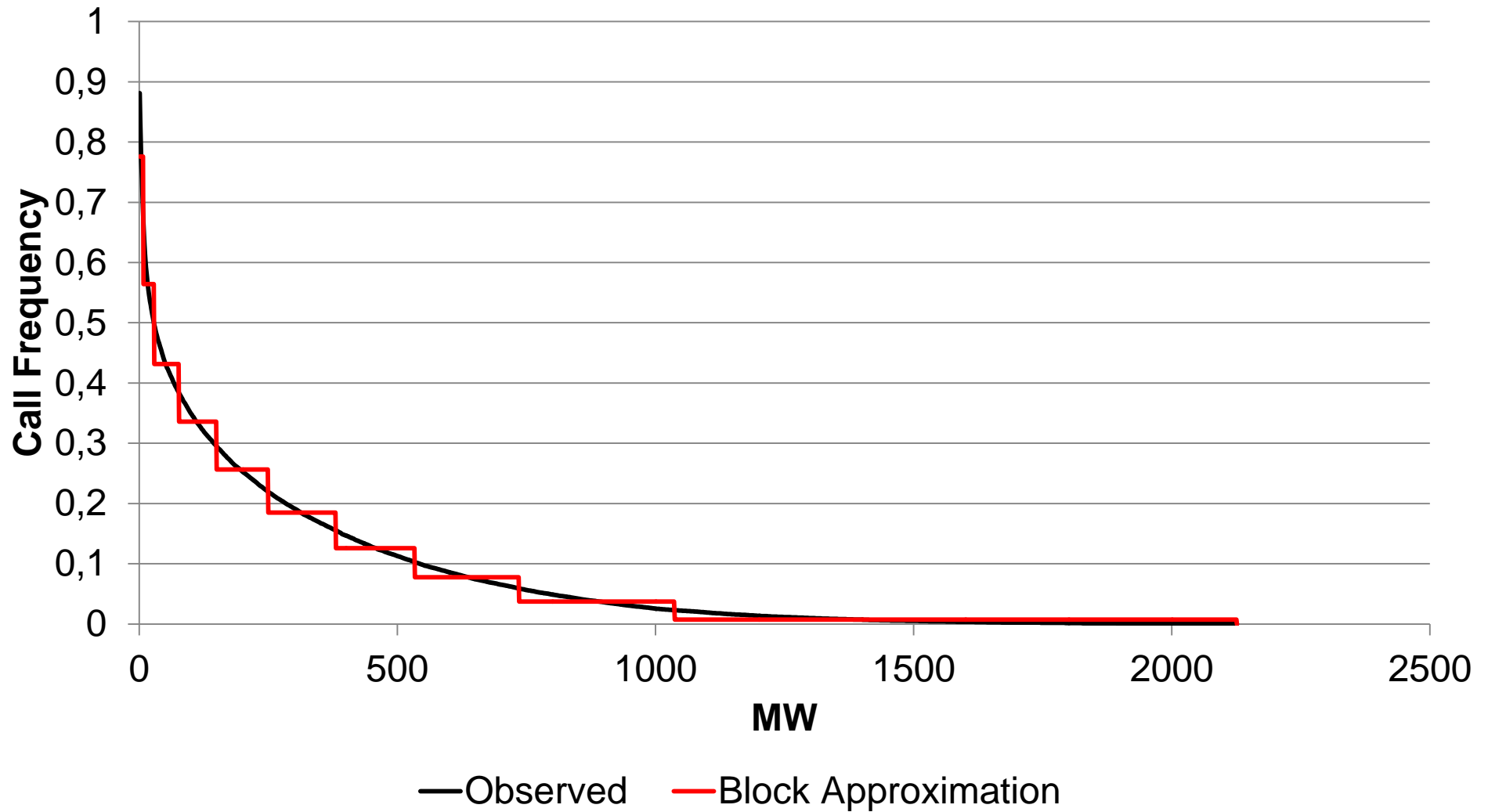


Model Structure

- **Cost minimization unit-commitment model with hourly resolution, 53x 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

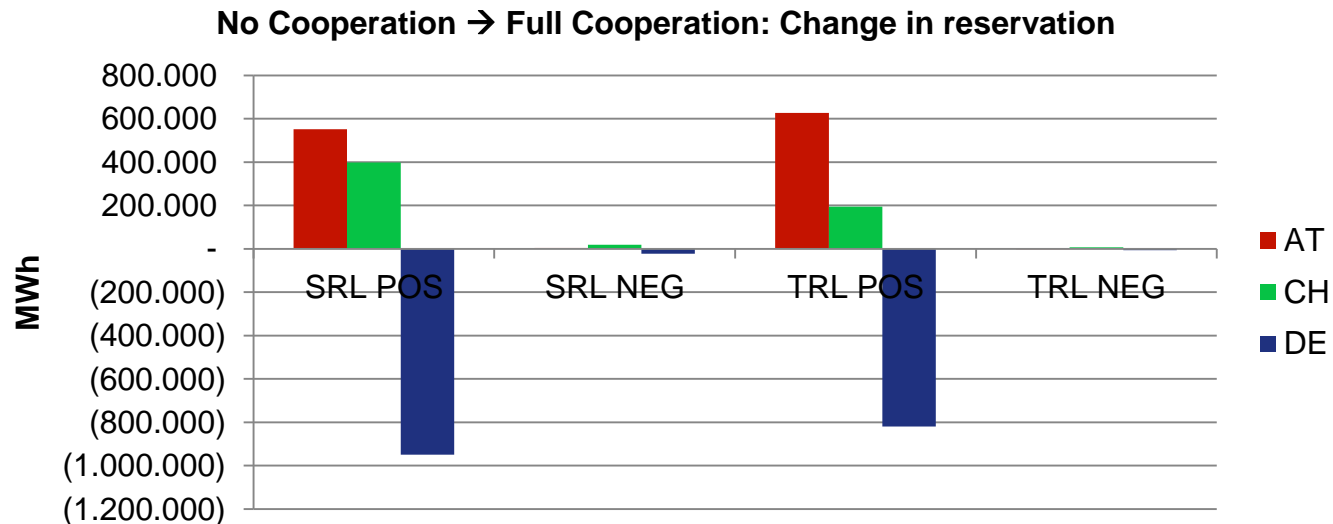


Positive Secondary Control Calls in Germany 2013

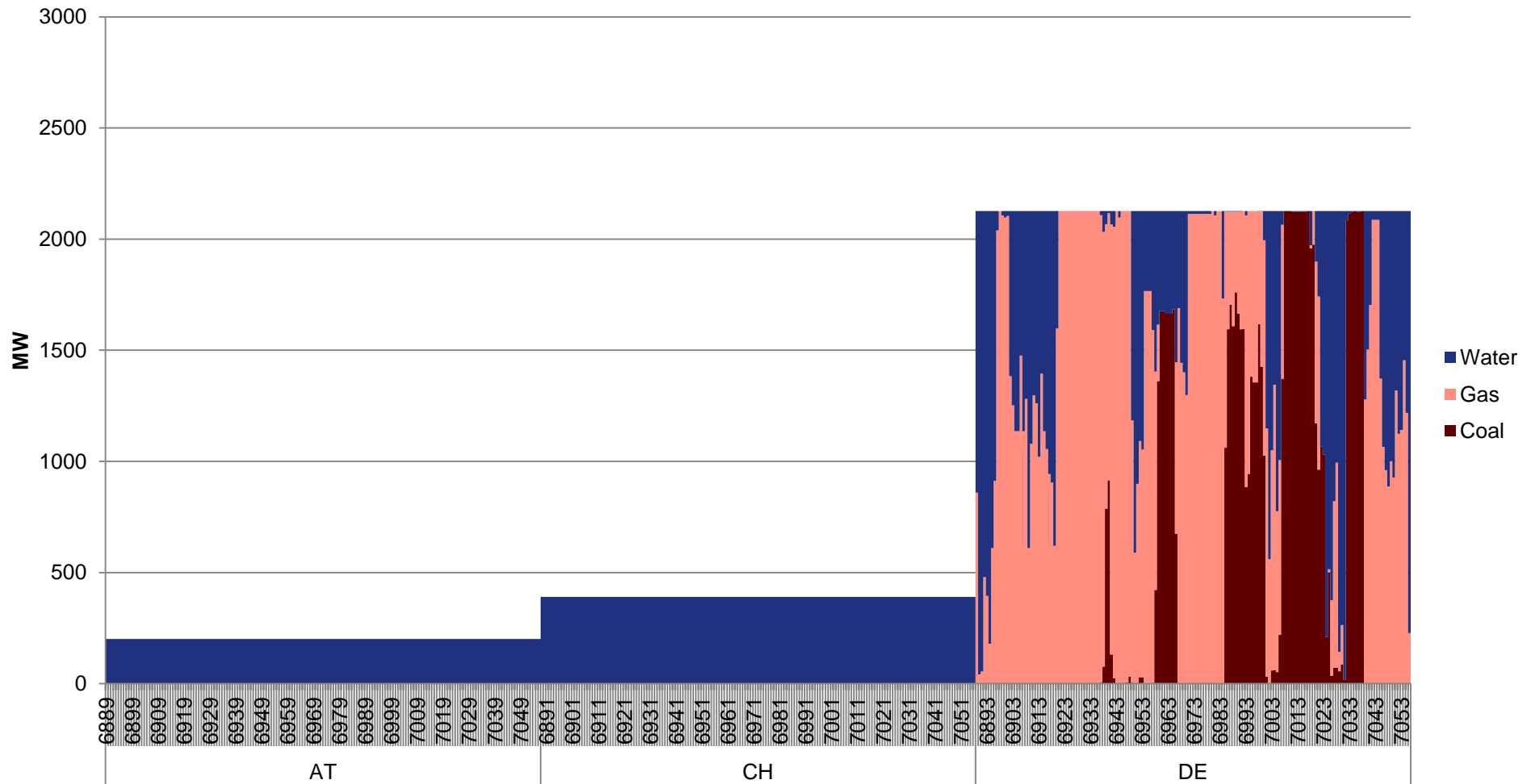


Results

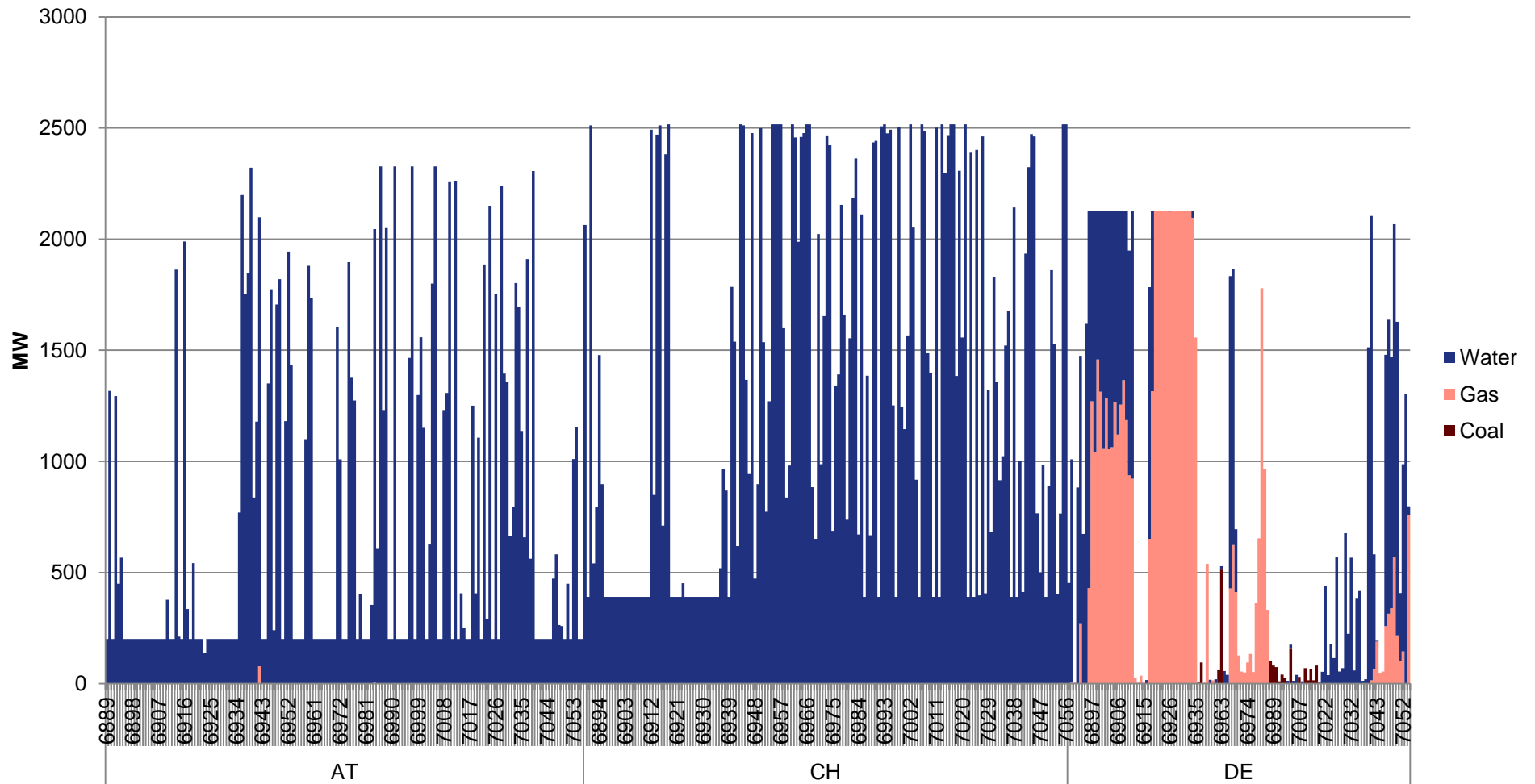
- **Preliminary results:**
 - Four exemplary weeks
 - No consideration of scenarios with anticipation of activation cost
- **Full Cooperation leads to cost reductions of 35% on the balancing capacity market**
- **Strong shift of reservation to Austria and Switzerland from Germany**



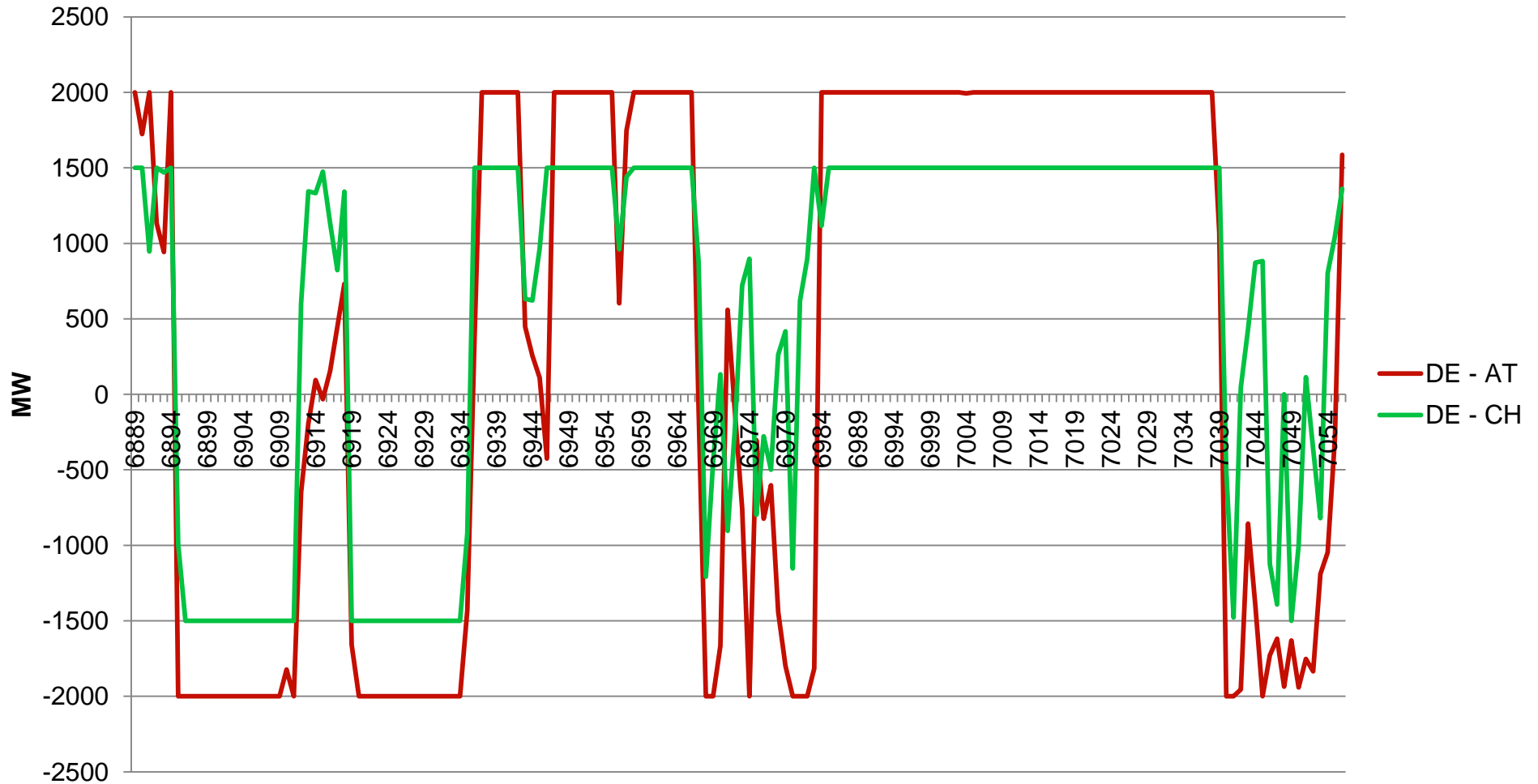
Results: Positive Secondary Reserve – No Cooperation



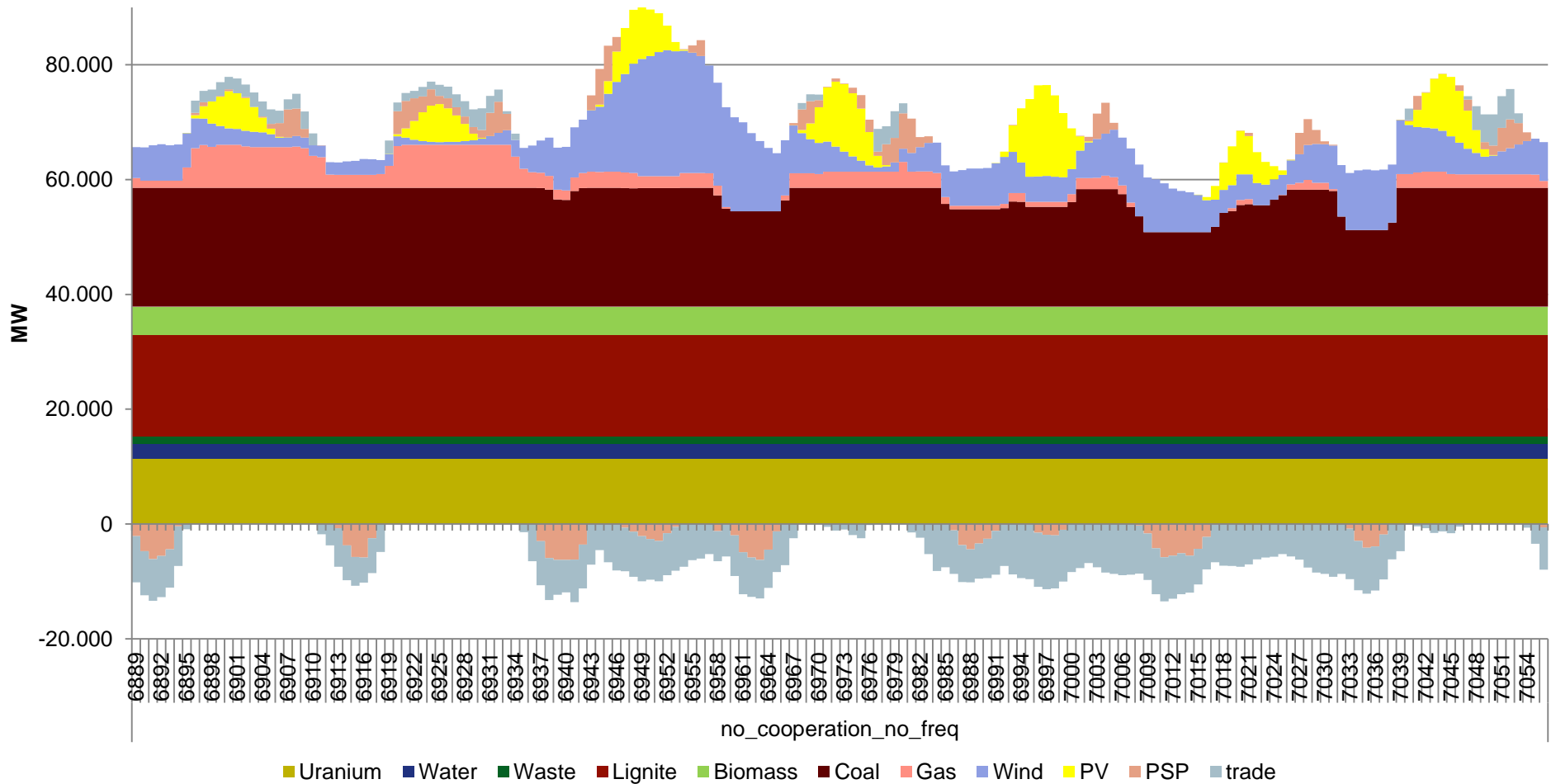
Results: Positive Secondary Reserve – Full Cooperation



Results: Spot market exchanges – Full Cooperation

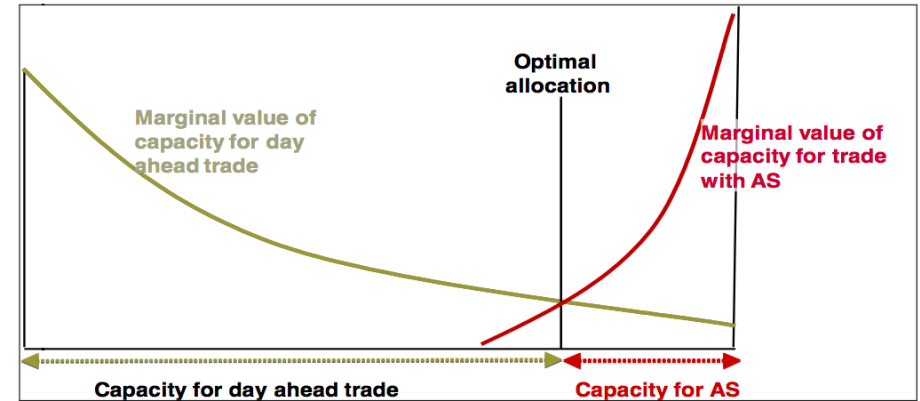


Results: Dispatch Germany



Conclusion

- **Cross-border exchanges of balancing capacity leads to significant cost reductions**
- **Cost reductions are dependent on the generation portfolios of the participating countries**
- **Austria and Switzerland seem to be able to provide relatively cheap balancing capacity**
- **Assumptions regarding future market design are crucial**
 - Bidding periods for SRL/TRL
 - Interconnector reservation
- **Hypothesis: Cross-border exchanges are only beneficial with flexible interconnector reservation**



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

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

