



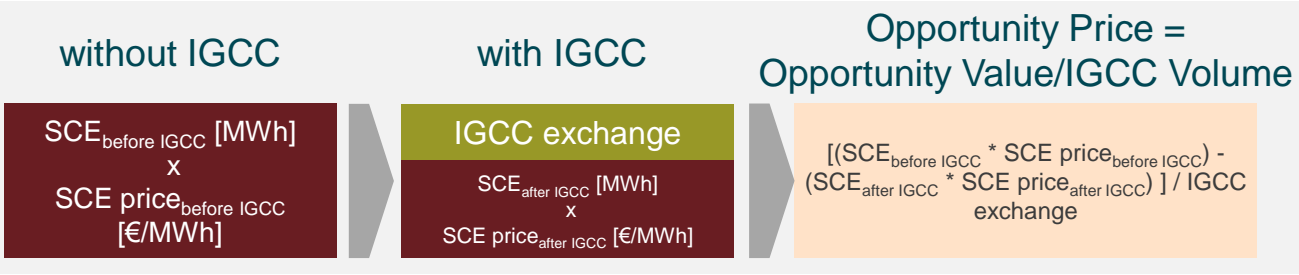
# IGCC REGULAR REPORT ON SOCIAL WELFARE

Q3 / 2017

# IGCC-Settlement – Basic Principle

## (Methodology applied from 01/02/2016)

Opportunity Prices for Imbalance Netting



IGCC Initial Settlement Price

- IGCC Initial Settlement Price ( $P_{\text{IGCC}}$ ): **Energy weighted average** of the **opportunity prices** ( $C_{\text{Imp},i}$  and  $C_{\text{Exp},i}$ )
  - Symmetric price for IGCC imports and exports
- $$P_{\text{IGCC}} = \frac{\sum_{i=1}^n (C_{\text{Imp},i} E_{\text{Imp},i} + C_{\text{Exp},i} E_{\text{Exp},i})}{\sum_{i=1}^n (E_{\text{Imp},i} + E_{\text{Exp},i})}$$

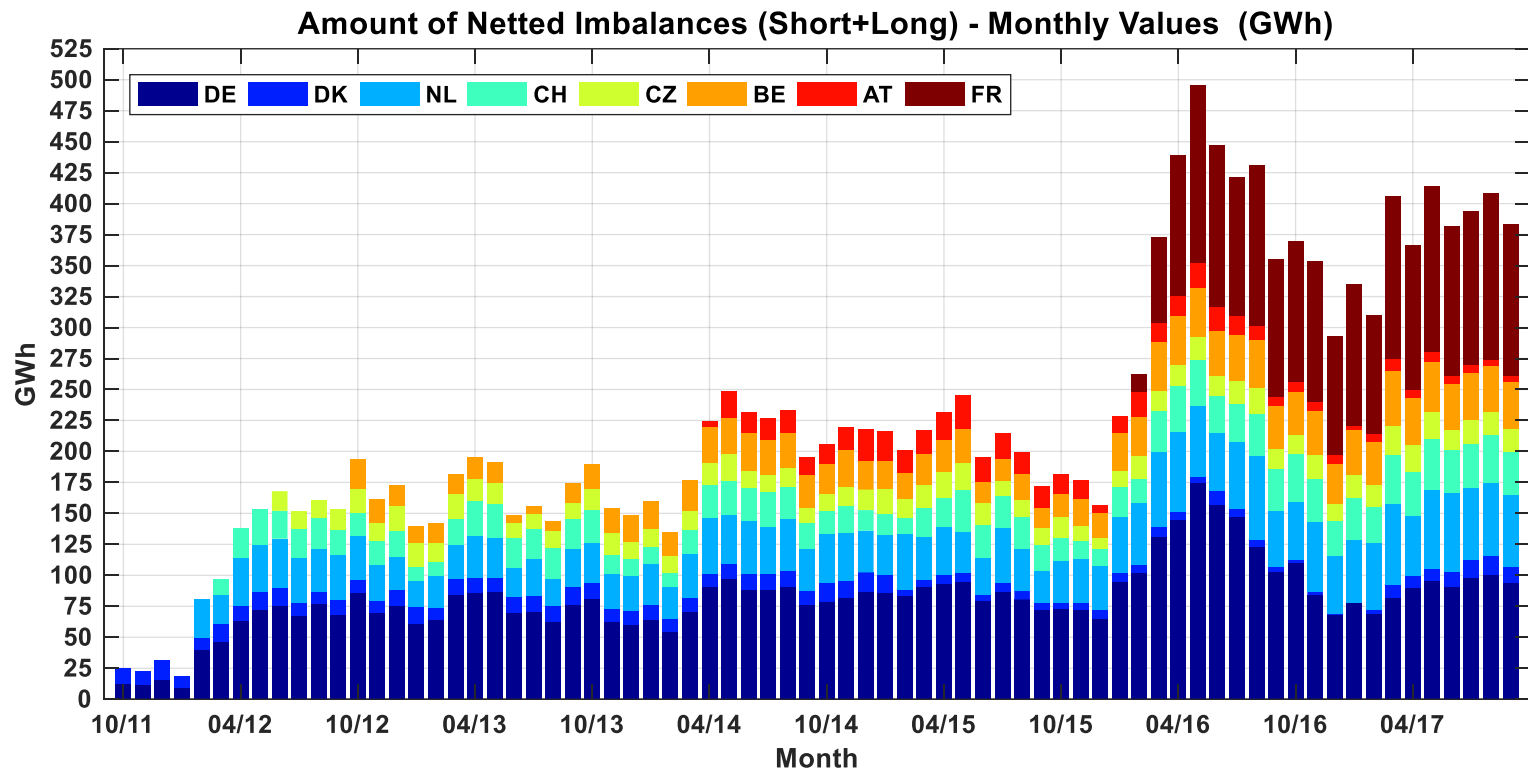
IGCC Settlement Ex-post Adjustment

- In case of negative individual benefits for one or more IGCC Members but positive overall benefit of the IGCC, an ex-post adjustment of settlement is performed in order to guarantee TSO neutrality.
- IGCC adjusted settlement prices ( $P'_{\text{IGCC}}$ ) which may vary from member to member depending on their benefit before the adjustment

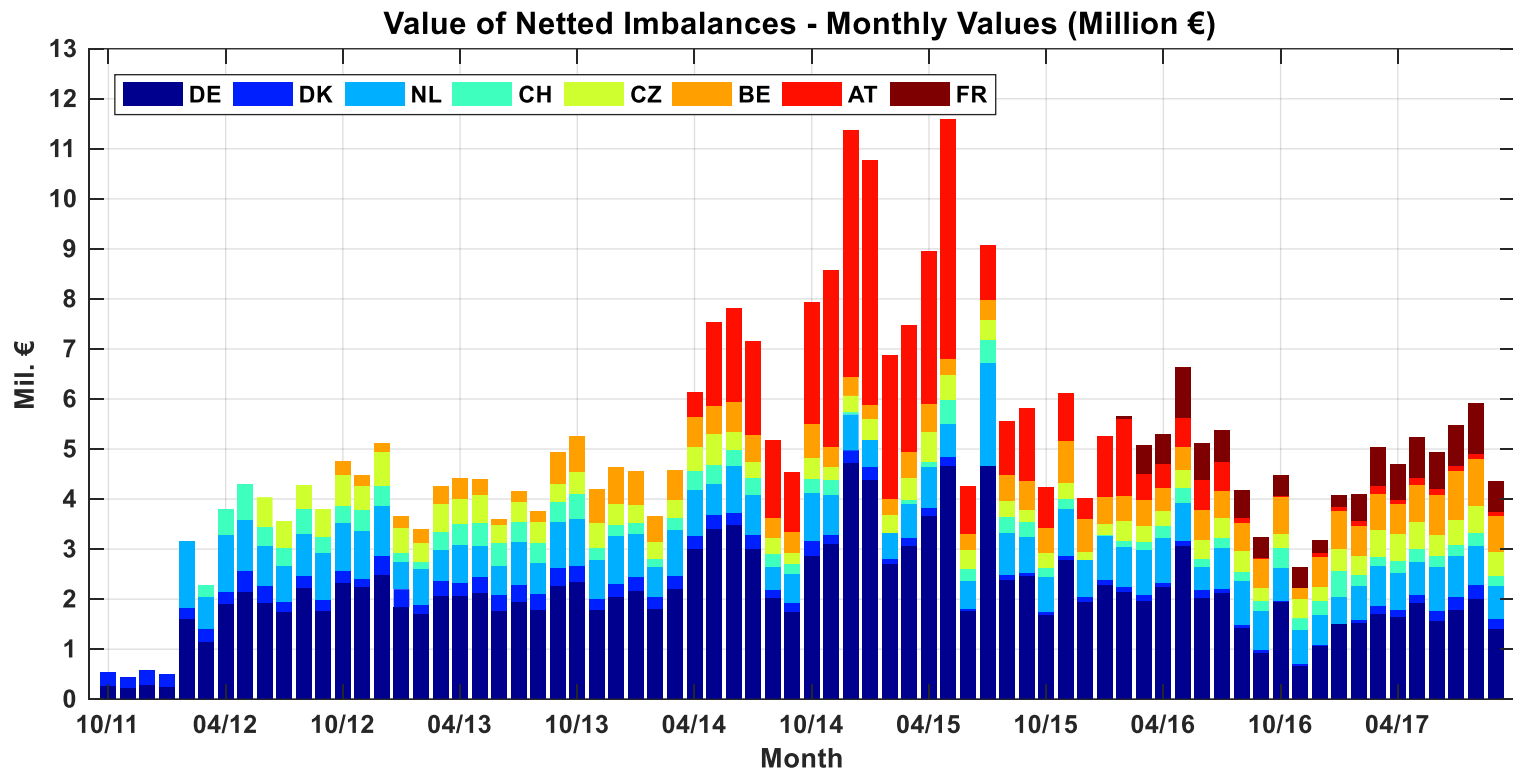
Calculation of Cost Reduction

- Cost reduction for a participant is driven by the spread between the opportunity price and the IGCC adjusted settlement price
- $$B'_i = \sum_{t=1}^T (C_{\text{Imp},i,t} - P'_{\text{IGCC},i,t}) \cdot E_{\text{Imp},i,t} + \sum_{t=1}^T (P'_{\text{IGCC},i,t} - C_{\text{Exp},i,t}) \cdot E_{\text{Exp},i,t}$$

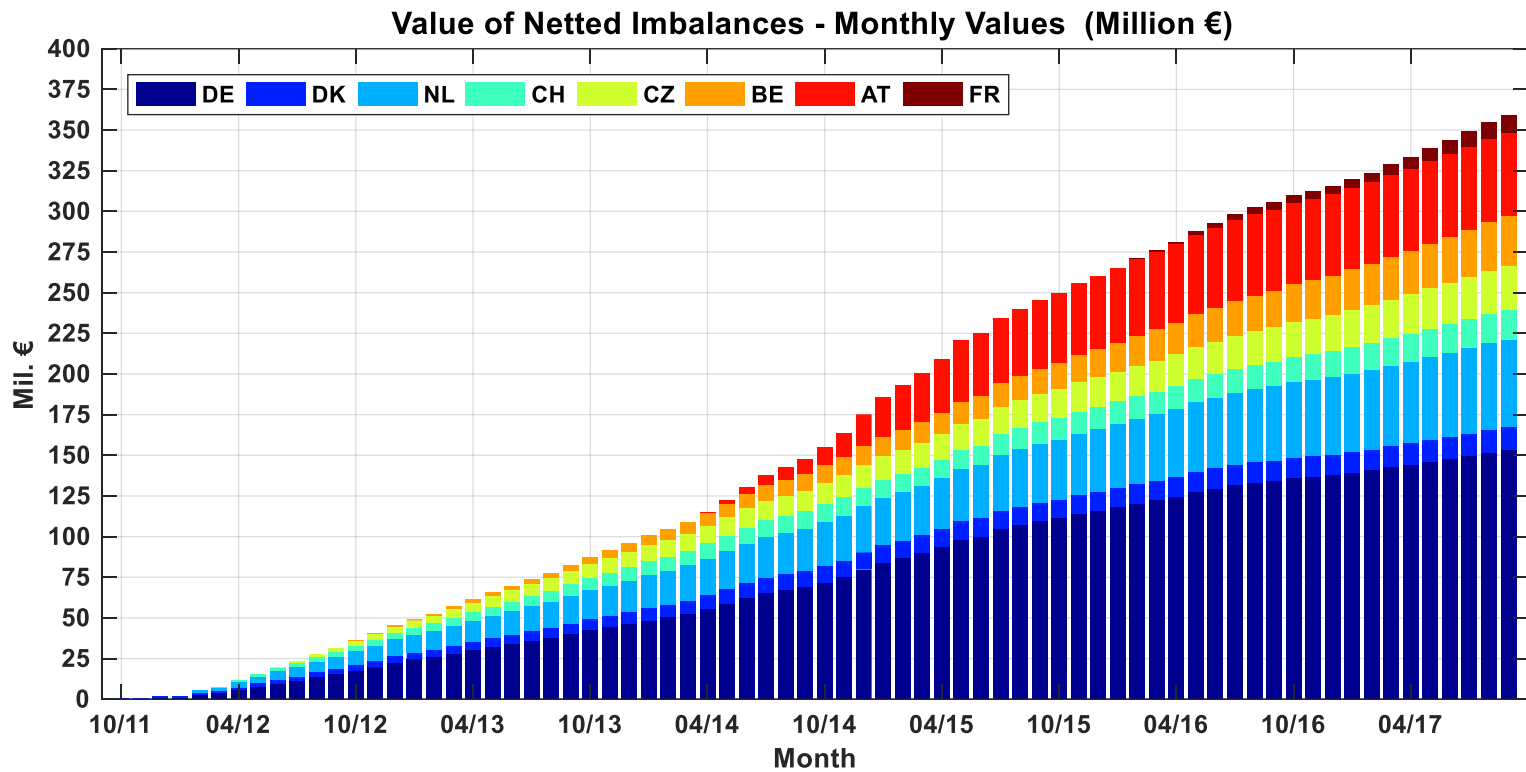
# Monthly Volumes of Netted Imbalances



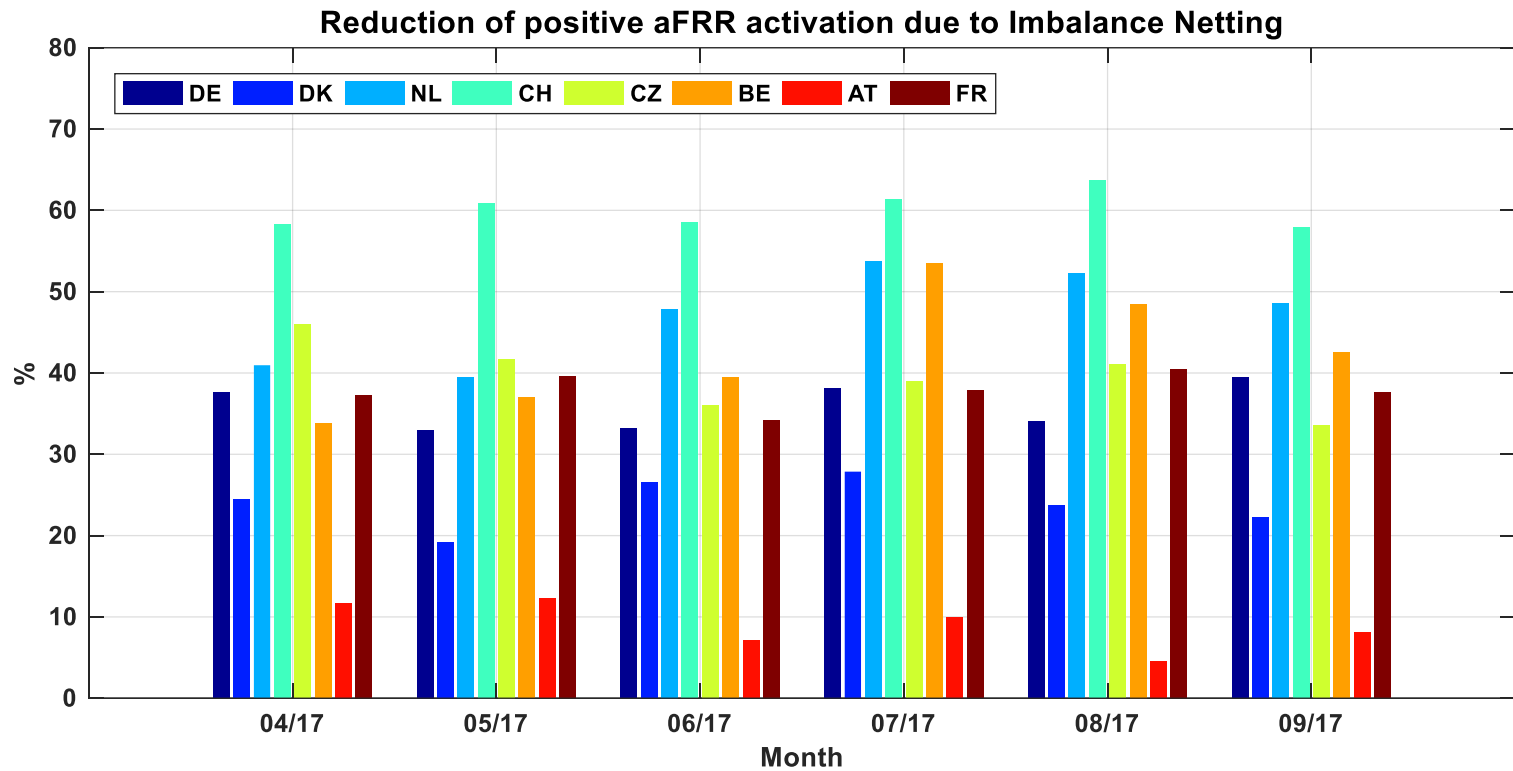
# Monthly Value of Netted Imbalances



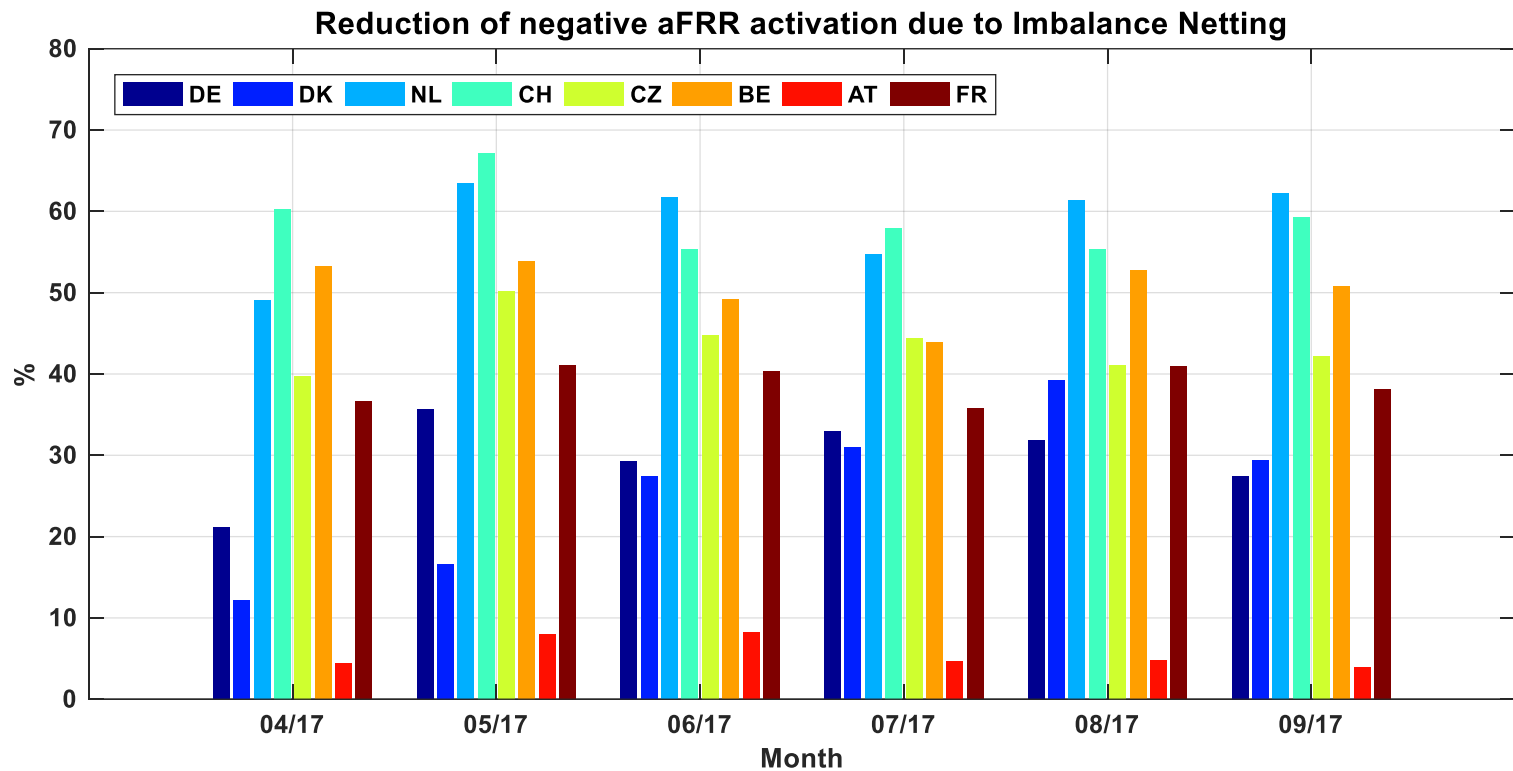
# Value of Netted Imbalances - Development



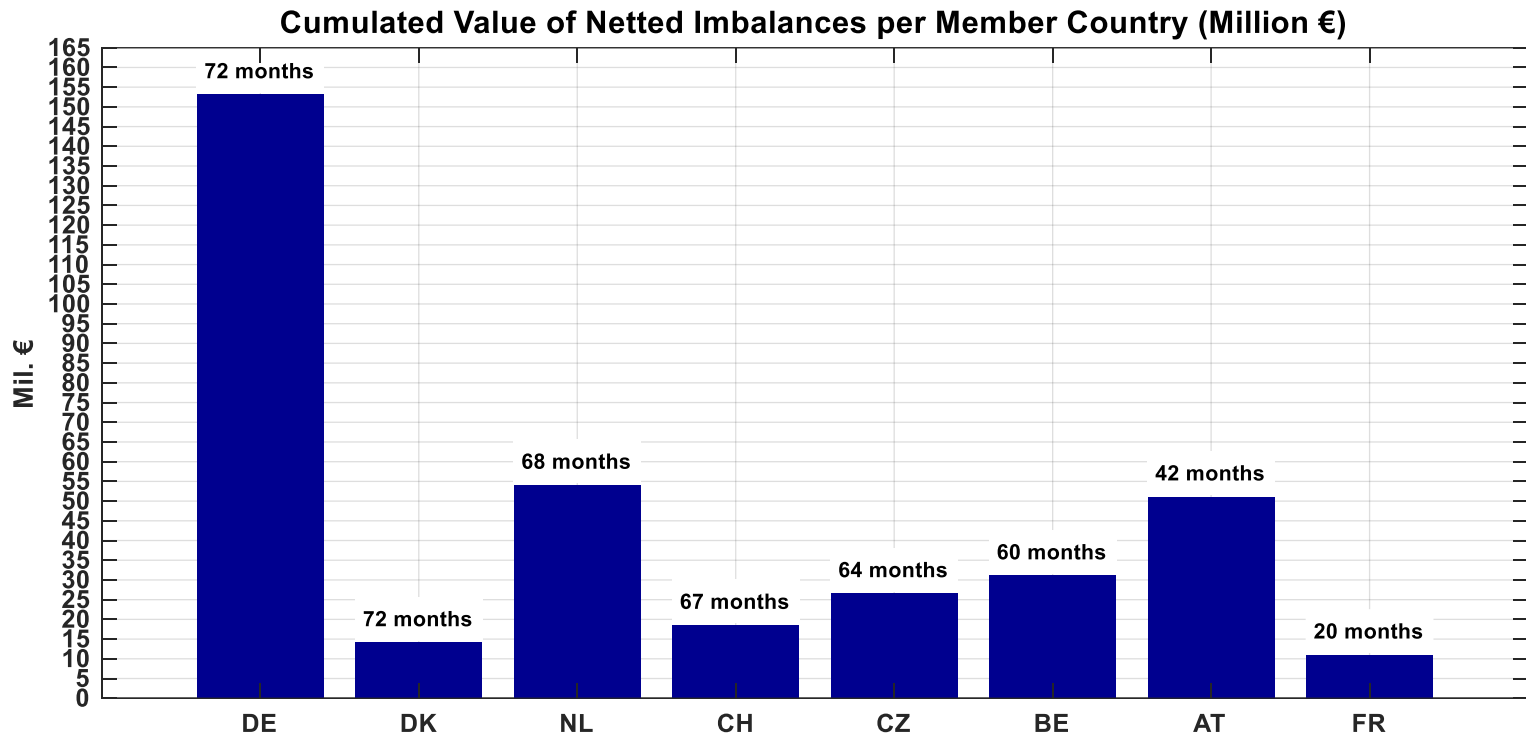
# Monthly Percentage of Avoided pos. aFRR-Activations (last 6 Months)



# Monthly Percentage of Avoided neg. aFRR-Activations (last 6 Months)

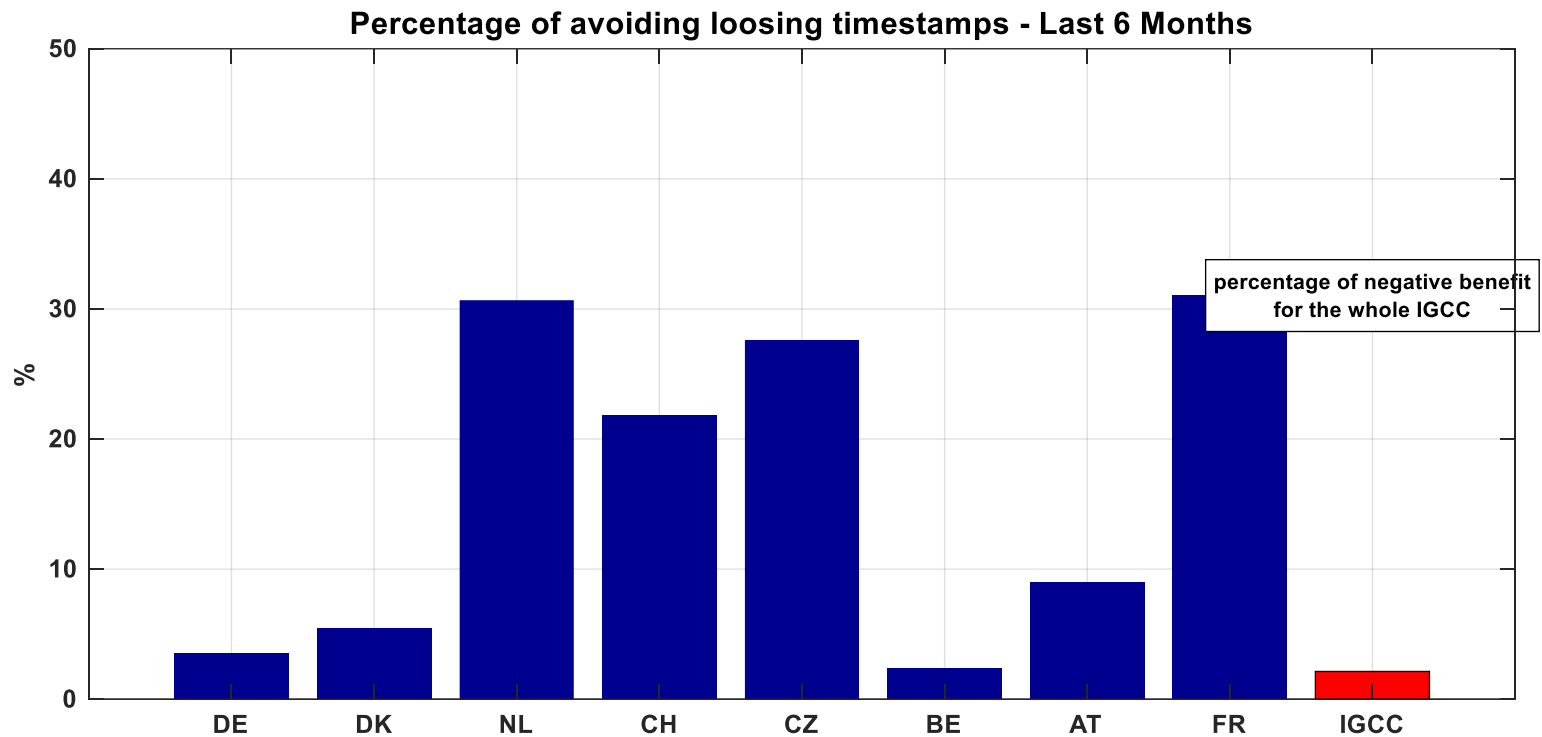


# Cumulated Value of Avoided Activations

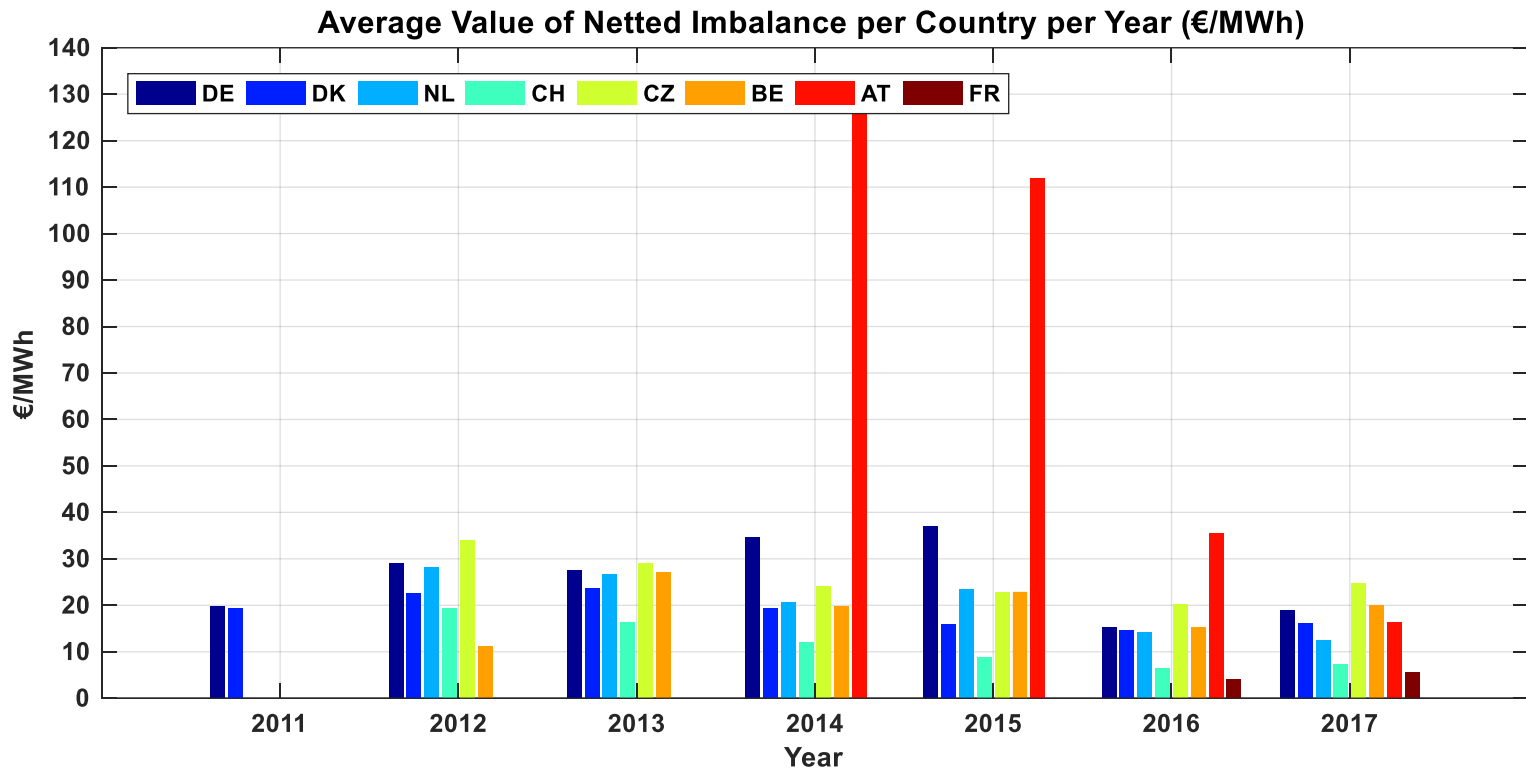




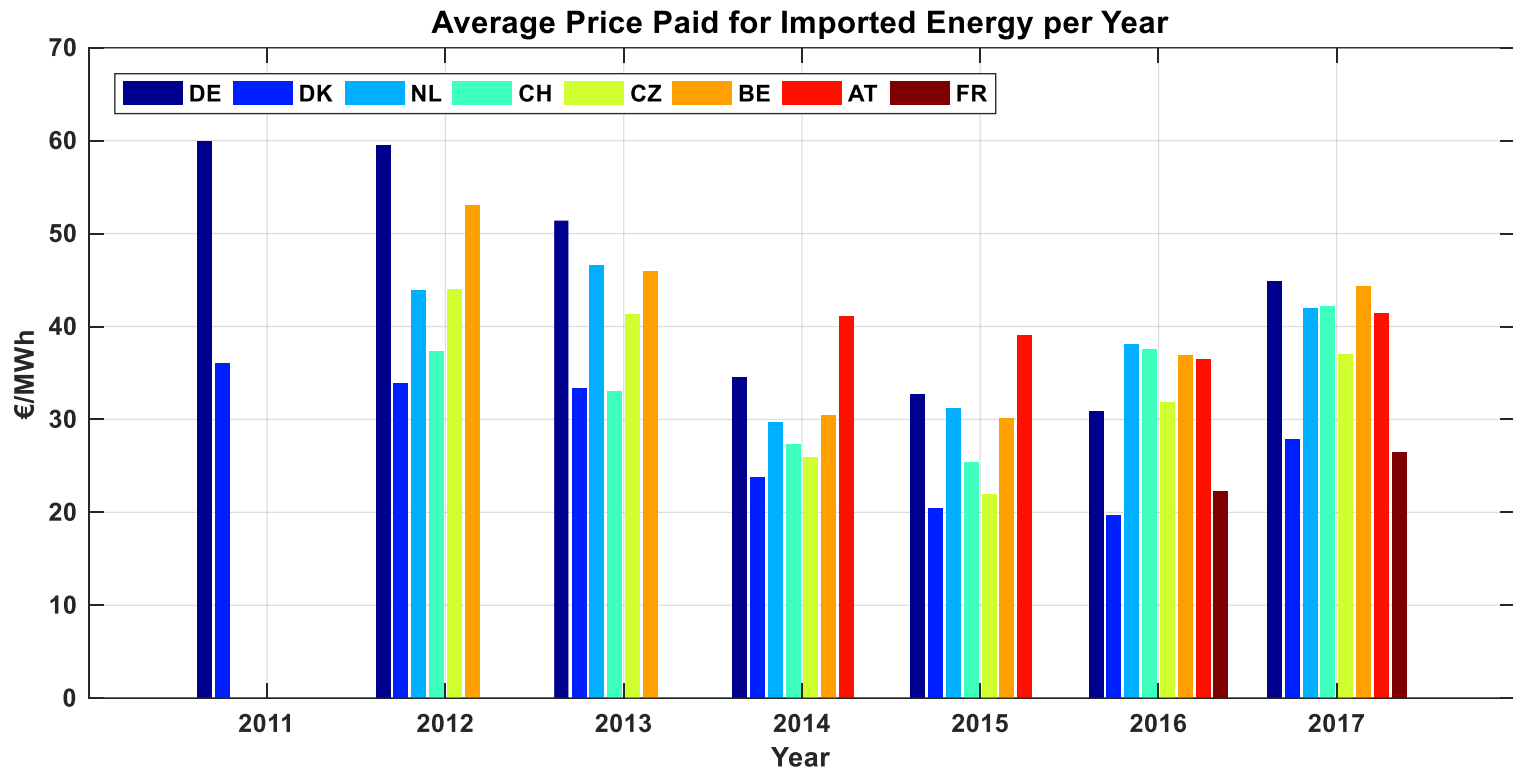
# Percentage of avoiding losing timestamps due to the second step of settlement method



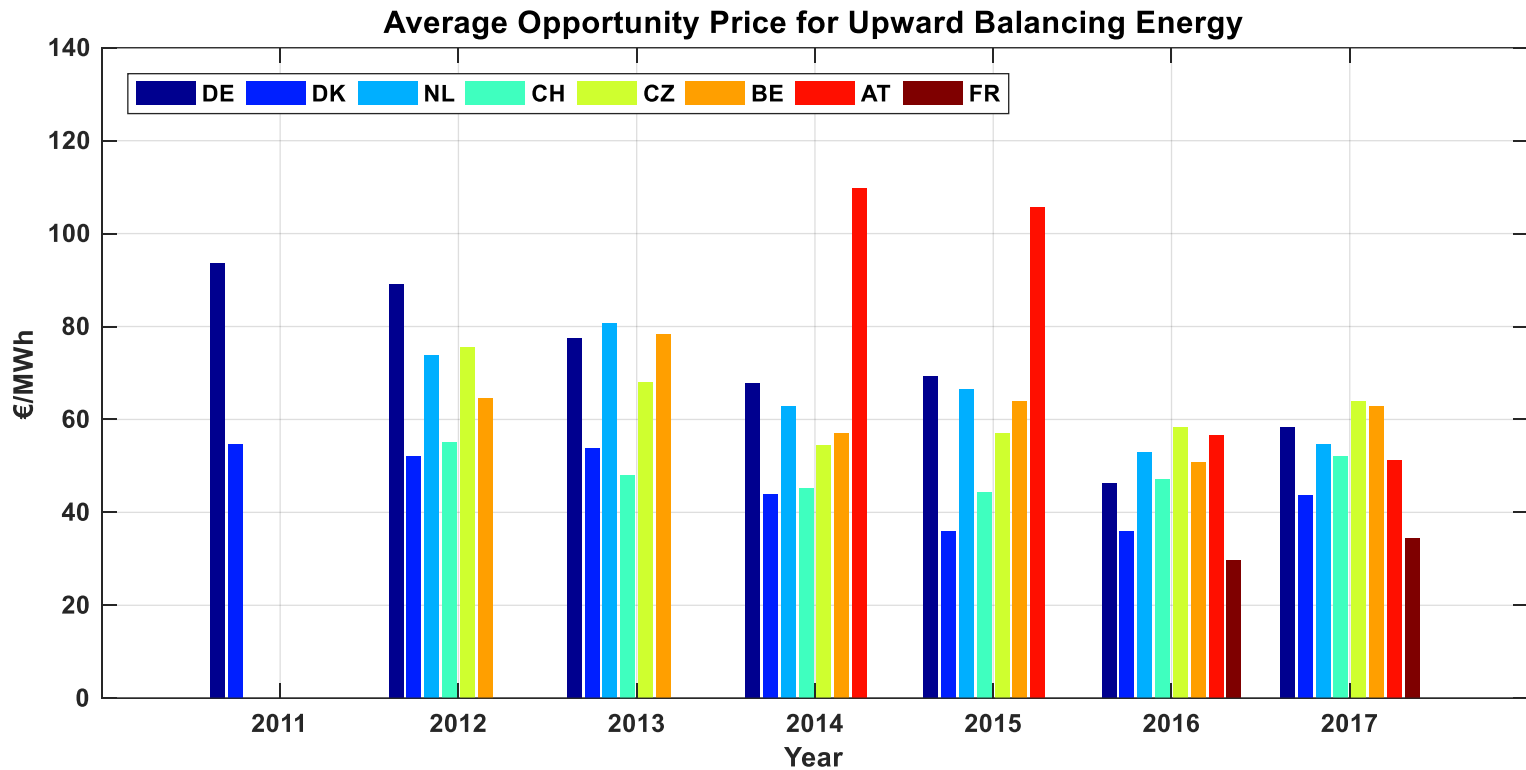
# Average Value of Netted Imbalance per Country per Year in €/MWh



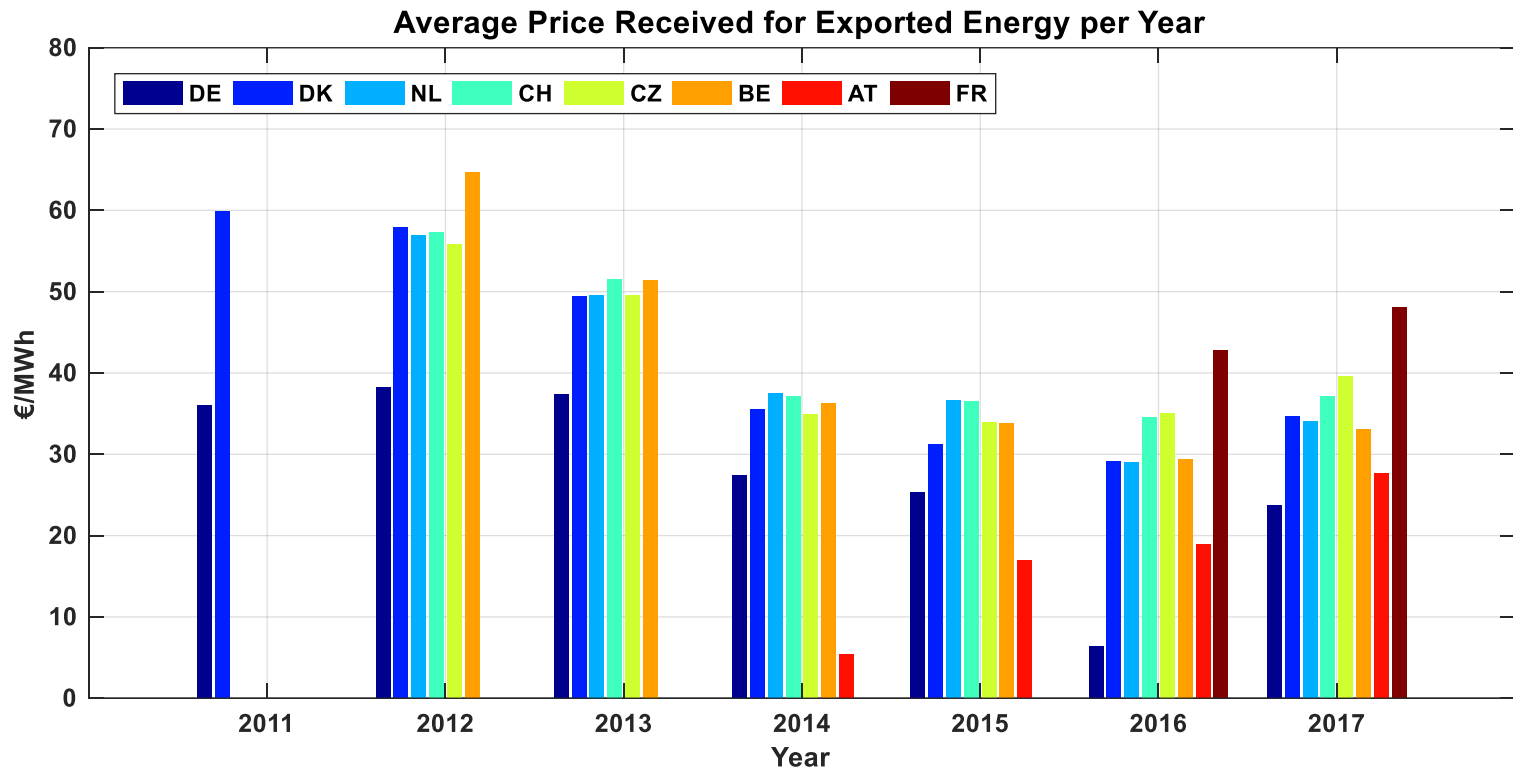
# Average Price Paid for Imported Energy per Year



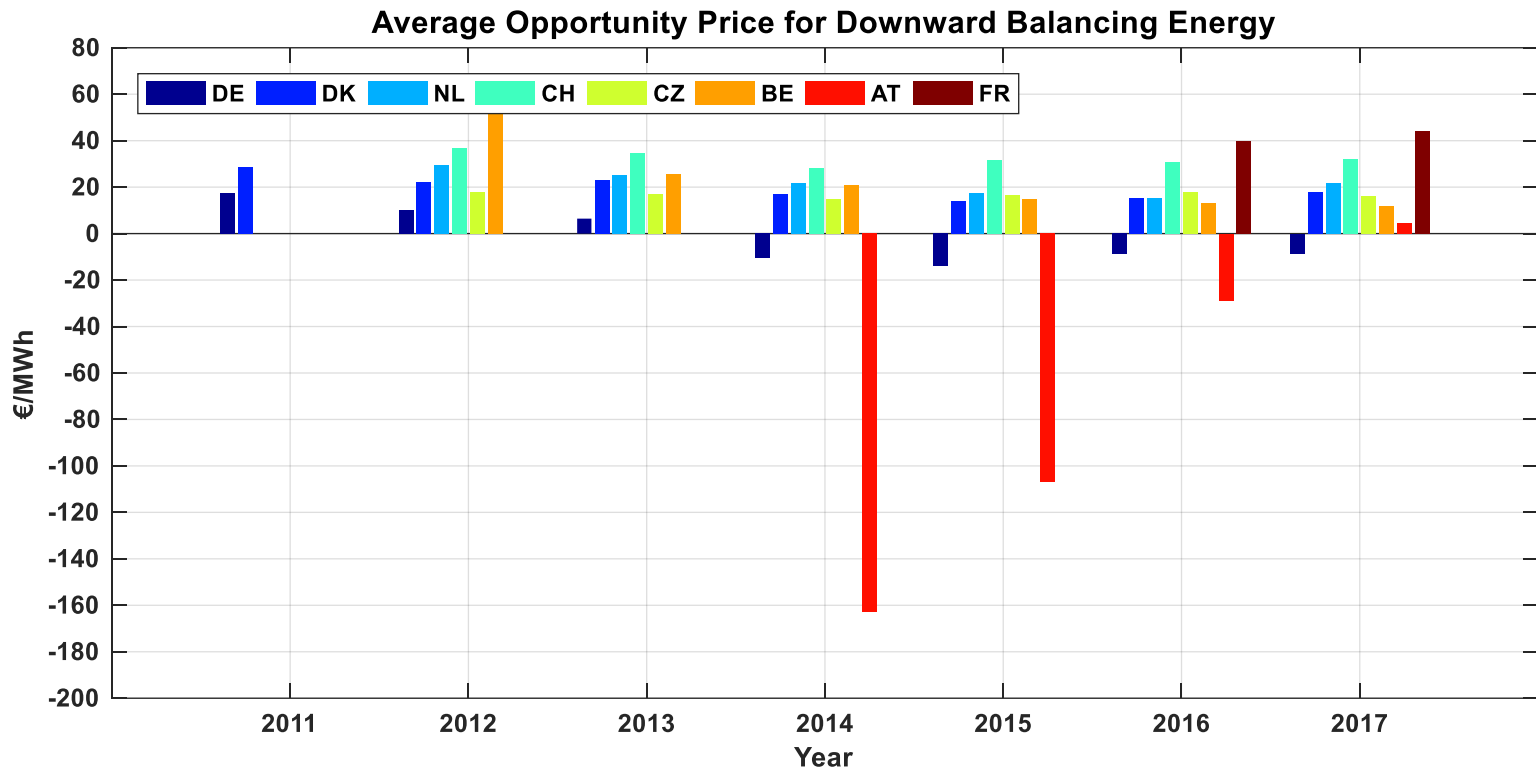
# Average Opportunity Price for Upward Balancing Energy



# Average Price Received for Exported Energy per Year



# Average Opportunity Price for Downward Balancing Energy



## Appendix - Mathematical formulas of figures

— Amount of netted imbalances (volume):

$$E_{short+long,i} = E_{exp,i} + E_{Imp,i}$$

— Amount of netted imbalances (value):

$$R_{IGCC} = \sum_{i=1}^n (C_{Imp,i} - C'_{IGCC}) \cdot E_{Imp,i} + \sum_{i=1}^n (C'_{IGCC} - C_{Exp,i}) \cdot E_{Exp,i}$$

## Appendix - Mathematical formulas of figures

- **Local value of the avoided activated positive balancing energy (imported by IGCC):**

$$LV_{paid,i} = \sum_{i=1}^n C_{Imp,i} \cdot E_{Imp,i}$$

- **Local value (received) of the avoided activated negative balancing energy (exported to IGCC):**

$$LV_{received,i} = \sum_{i=1}^n C_{Exp,i} \cdot E_{Exp,i}$$



## Appendix - Mathematical formulas of figures

— Average price paid for imported energy:

$$C_{paid,i} = \frac{\sum_{i=1}^n C_{IGCC,i} \cdot E_{Imp,i}}{\sum_{i=1}^n E_{Imp,i}}$$

— Average price received for exported energy:

$$C_{received,i} = \frac{\sum_{i=1}^n C_{IGCC,i} \cdot E_{Exp,i}}{\sum_{i=1}^n E_{Exp,i}}$$

## Appendix - Mathematical formulas of figures

### — Average opportunity prices upward:

$$OP_{upward,i} = \frac{\sum_{i=1}^n C_{Imp,i} \cdot E_{Imp,i}}{\sum_{i=1}^n E_{Imp,i}}$$

### — Average opportunity prices downward:

$$OP_{downward,i} = \frac{\sum_{i=1}^n C_{Exp,i} \cdot E_{Exp,i}}{\sum_{i=1}^n E_{Exp,i}}$$