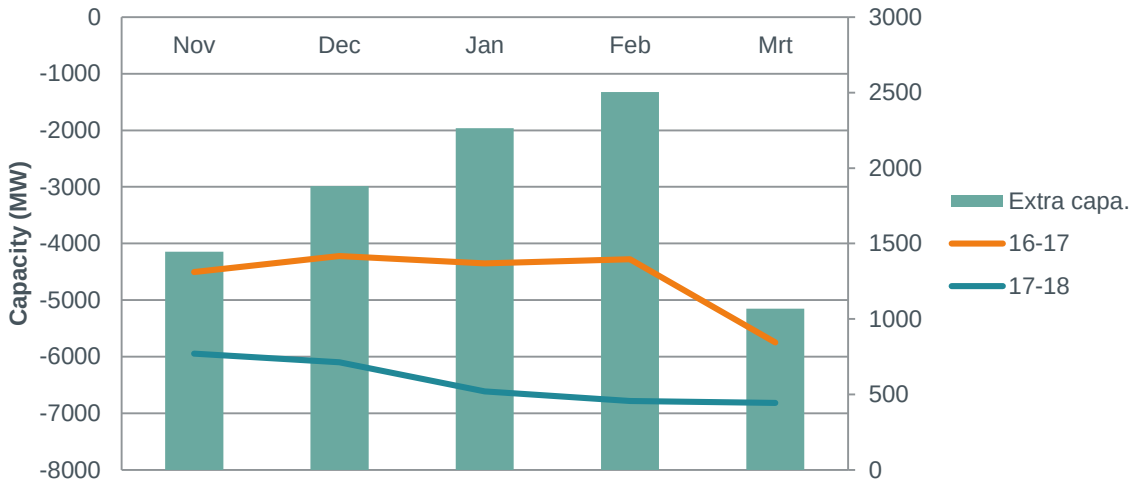
FB improvements, Min RAM 20%, EC.

Max. import capacity for BE + FR

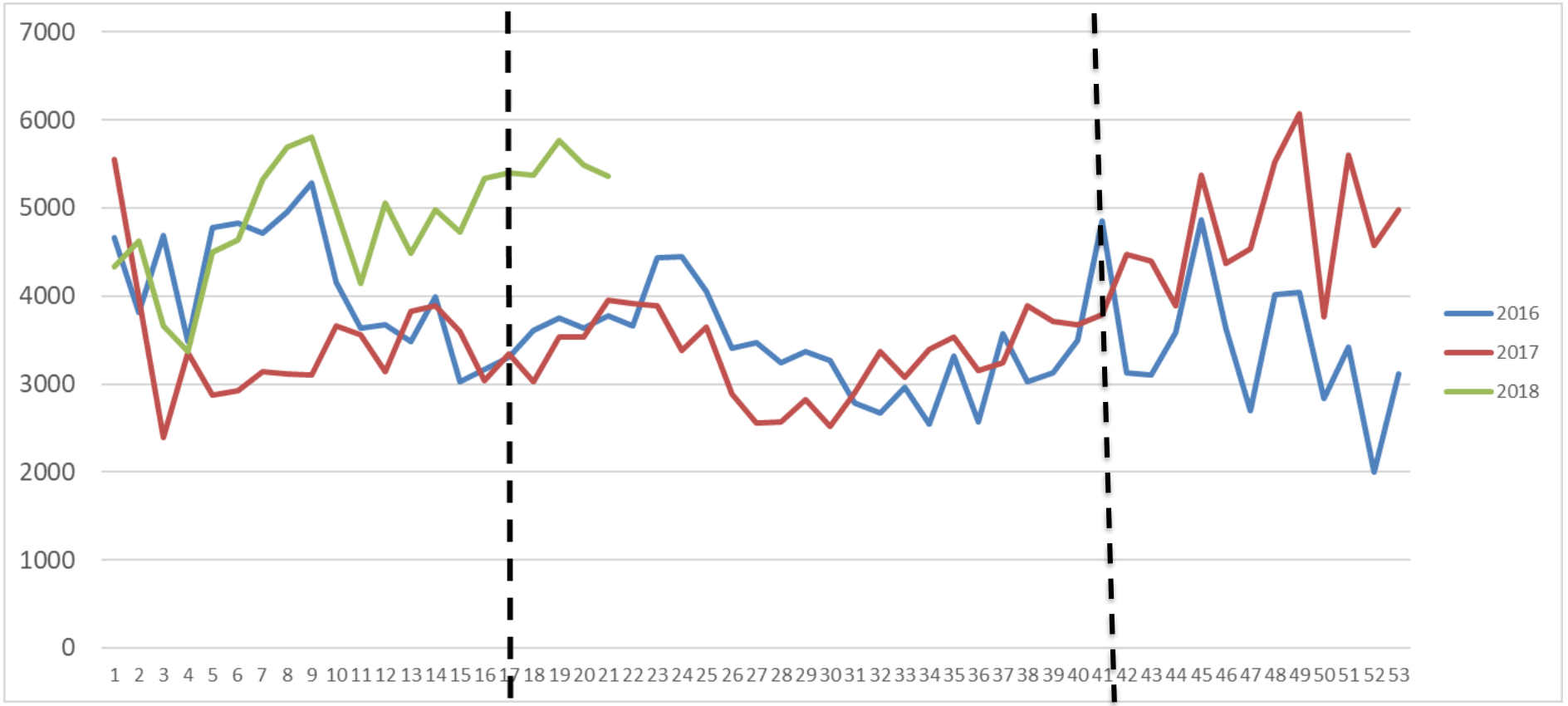
- As shown previous User Group, comparison of this indicator with previous winter (2016-2017) shows an increase in max import capacity of 1800 MW on average



CWE TSOs implemented MinRAM 20% from April 26th

- Minimum Remaining Available Margin (minRAM): introduction of a minRAM of 20 % of the thermal capacity on all critical network elements (internal and cross-border) leading to a considerable increase of minimal cross-border capacities.

Average weekly CWE exchanges

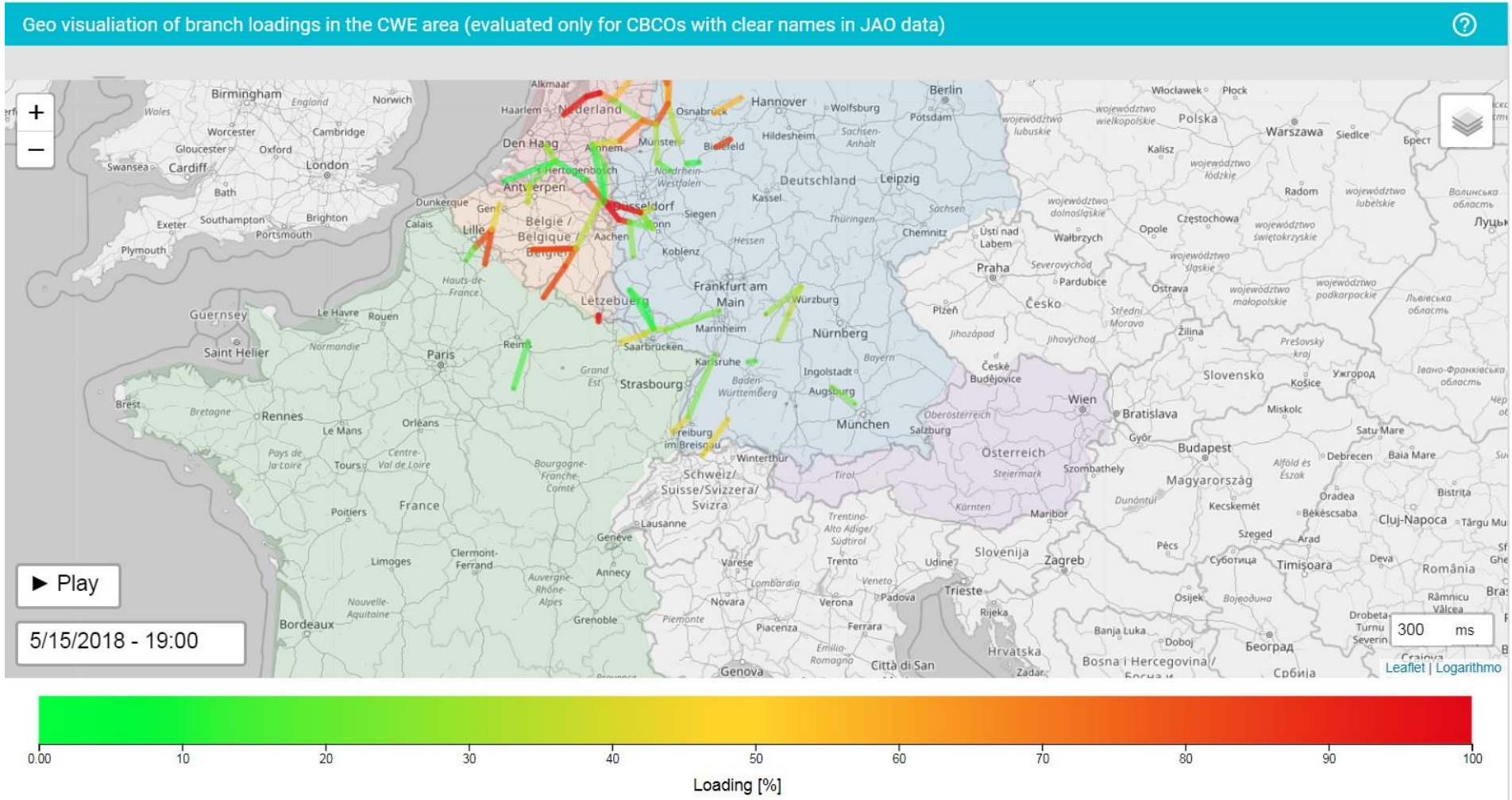


Introduction of 20% minimum RAM further increases the averages exchanges + makes the actions taken before last winter even more robust

Changes introduced before winter 2017 translated into higher exchanges in CWE compared to 2016

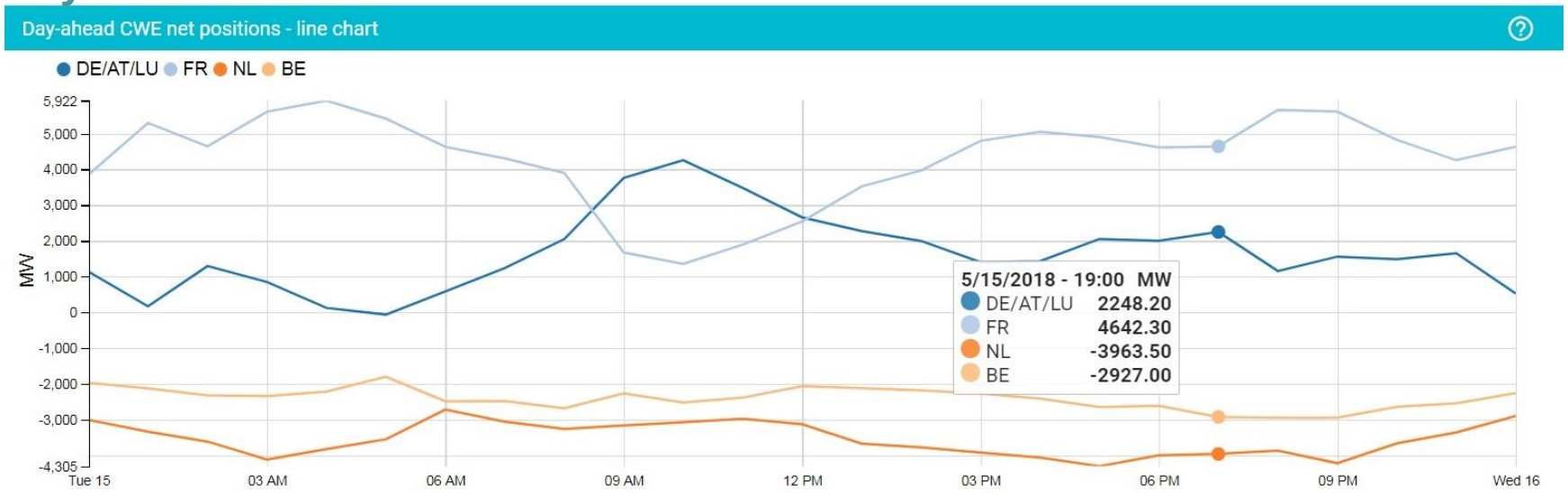
Illustrative example of high exchanges in CWE leading to congestion management in operations

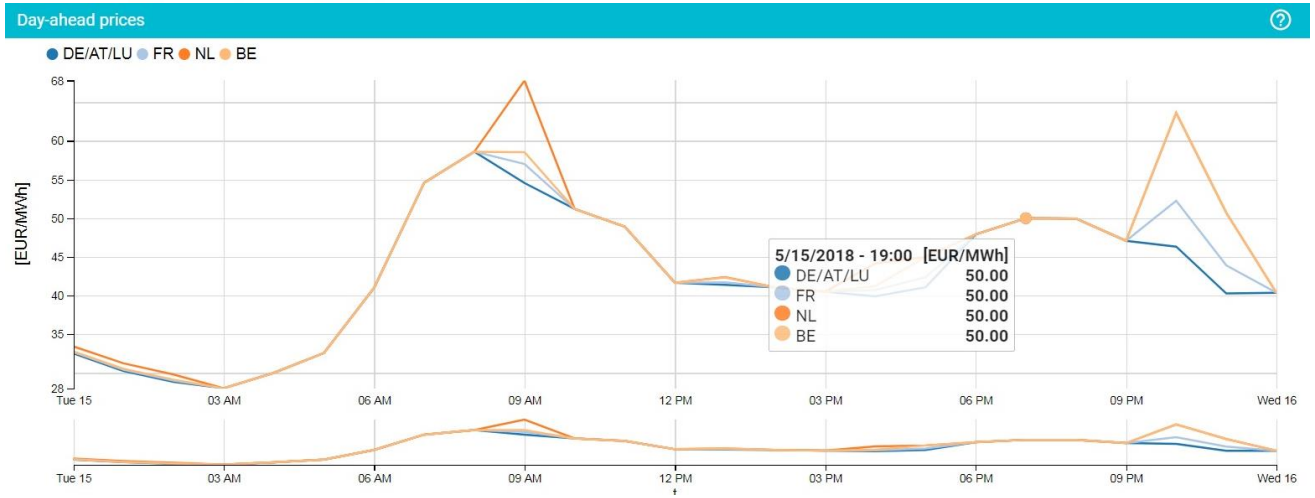
May 15th - 19:00 – branches limiting FB domain



Illustrative example of high exchanges in CWE leading to congestion management in operations

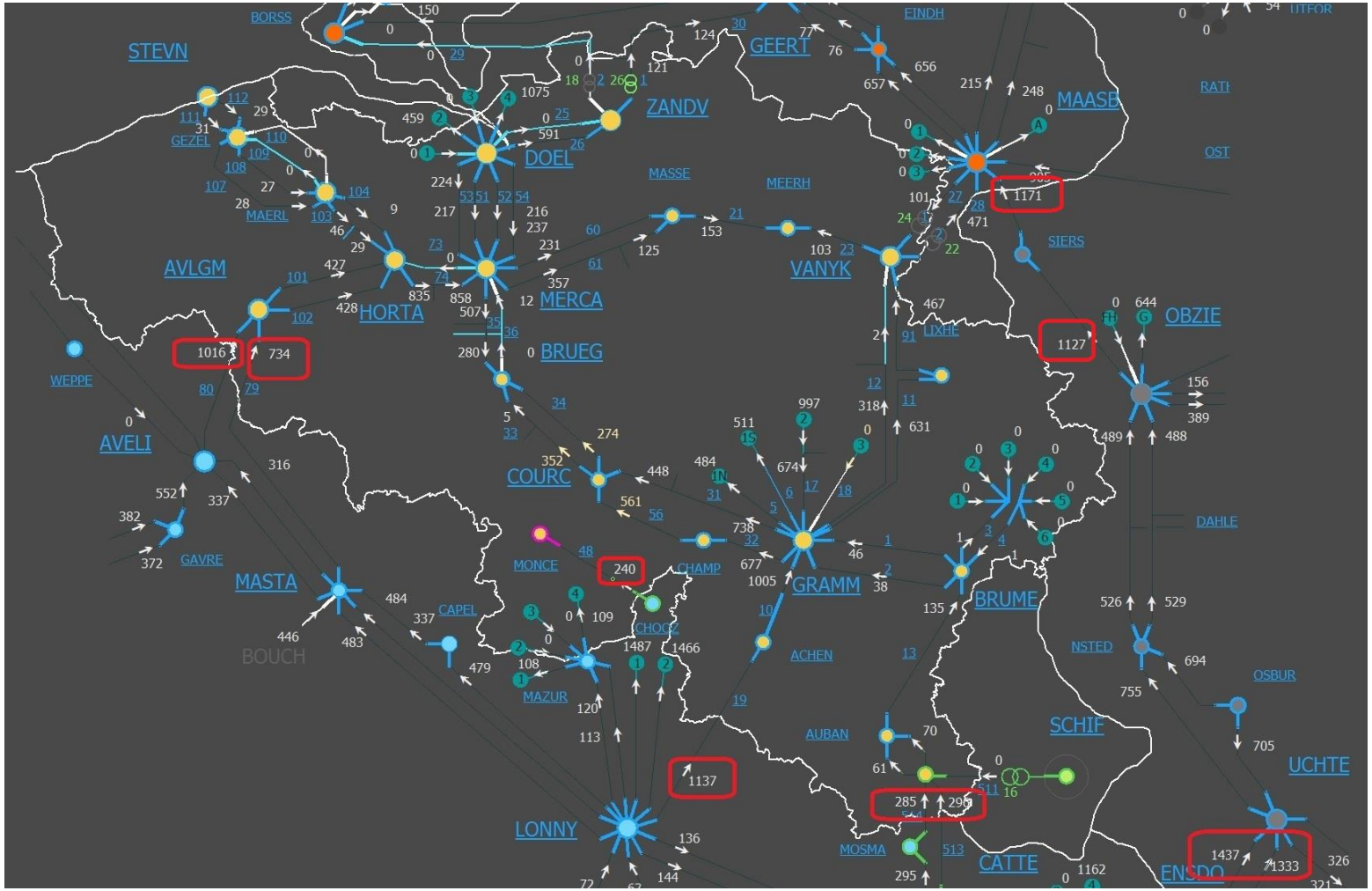
May 15th - 19:00 – market results





Illustrative example of high exchanges in CWE leading to congestion management in operations

May 15th - 19:00 – real time grid operations



Flows on south border ~= 3750 MW

Remedial actions required to manage the grid security

- Large usage of Belgian Phase shifters
- Split of belgian 150kV electrical zones to reduce N-1 constraints
- Special topology within Monceau station
- International coordination required due to congestions within cross-border lines FR→DE and DE→NL

  → trade-off solution to keep grid safe at CWE level
- Entso-E EAS system: Elia put in *Alert - N-1 violations*.

Increase External Constraint

Reminder: External Constraint ?

Elia uses an import limit constraint (external constraint) which is related to the dynamic stability of the network.

This limitation is estimated with offline studies which are performed on a regular basis. The offline study include a voltage collapse analysis and a stability analysis performed in line with article 38 of SO GLs. Indeed, as a small hub, Elia is facing voltage constraints and voltage collapse risks in case of low generation within Belgium grid.

Therefore Elia requires to maintain a certain amount of power needs to be generated within Belgium to prevent violation of voltage constraints (i.e. to prevent voltage dropping below the lower safety limit). The risks of dynamic instability are also analyzed to assess the amount of machines requested within Elia grid to provide a minimal dynamic stability to avoid transient phenomena's. These analysis and results lead to the use of a maximum import position.

Changes in External Constraints for the Belgian bidding zone (1)

Transparency Publication (JAO)

Dear Market Participants,

From business day Friday the 1st of June 2018 onwards, Elia System Operator S.A. will adapt the External Constraint value for import from 4500 MW to 5500 MW for the Belgian bidding zone. This change is valid for all time stamps and all days. This change will be applied from delivery day 01/06/2018 (day-ahead market coupling 31/05/2018) for the CWE day-ahead Flow-Based market coupling.

Best regards, Elia

Changes in External Constraints for the Belgian bidding zone (2)

- Before June 2018: E.C. had been set to 4500MW in order to have a certain amount of power needs (needed for dynamic reactive power control) to be generated within Belgium together with the use of own static reactive power control assets (capacitor banks, shunt reactors)
- From June 2018: E.C. increased to 5500MW
  - Despite the fact that the market has never been limited by the 4500MW EC, we want to be pro-active (cfr long term studies, counting on 6500MW)
  - Our offline studies confirmed that a value of 5500MW is feasible, taking into account voltage and dynamic stability.
  - Main driver for this increase is related to the fact that several important cables (including shunt reactor for cable compensation) have been taken into operation => creating additional reactive power capabilities.
  - On top of that Elia has installed a process to perform a (daily) voltage forecasting to identify must-runs (if ever this would be needed as a last resort)
  - Off course we continue to study this on a regular basis.

Many thanks for your attention!

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