Enhanced CWE Flow-Based Market Coupling

Presentation of the updated feasibility report

PLEF SG1, October 28th 2011, Paris

Background

- The Memorandum of Understanding of the Pentalateral Energy Forum signed in 2007 sets as an objective the analysis, design and implementation of a flow-based market coupling between the five countries of the CWE region.
- After that decision, the following major steps have been made and milestones accomplished:
  - TSOs and PXs successfully launched the CWE MC on November 9, 2010.
  - During 2010 and 2011 the TSOs improved and fine-tuned the CWE FB.
  - From November 2010, TSO & PXs started the FB parallel run; so that the market impact of FBMC could be simulated.
  - In March 2011, the first version of the enhanced FBMC feasibility report was published. The preliminary results presented were promising.

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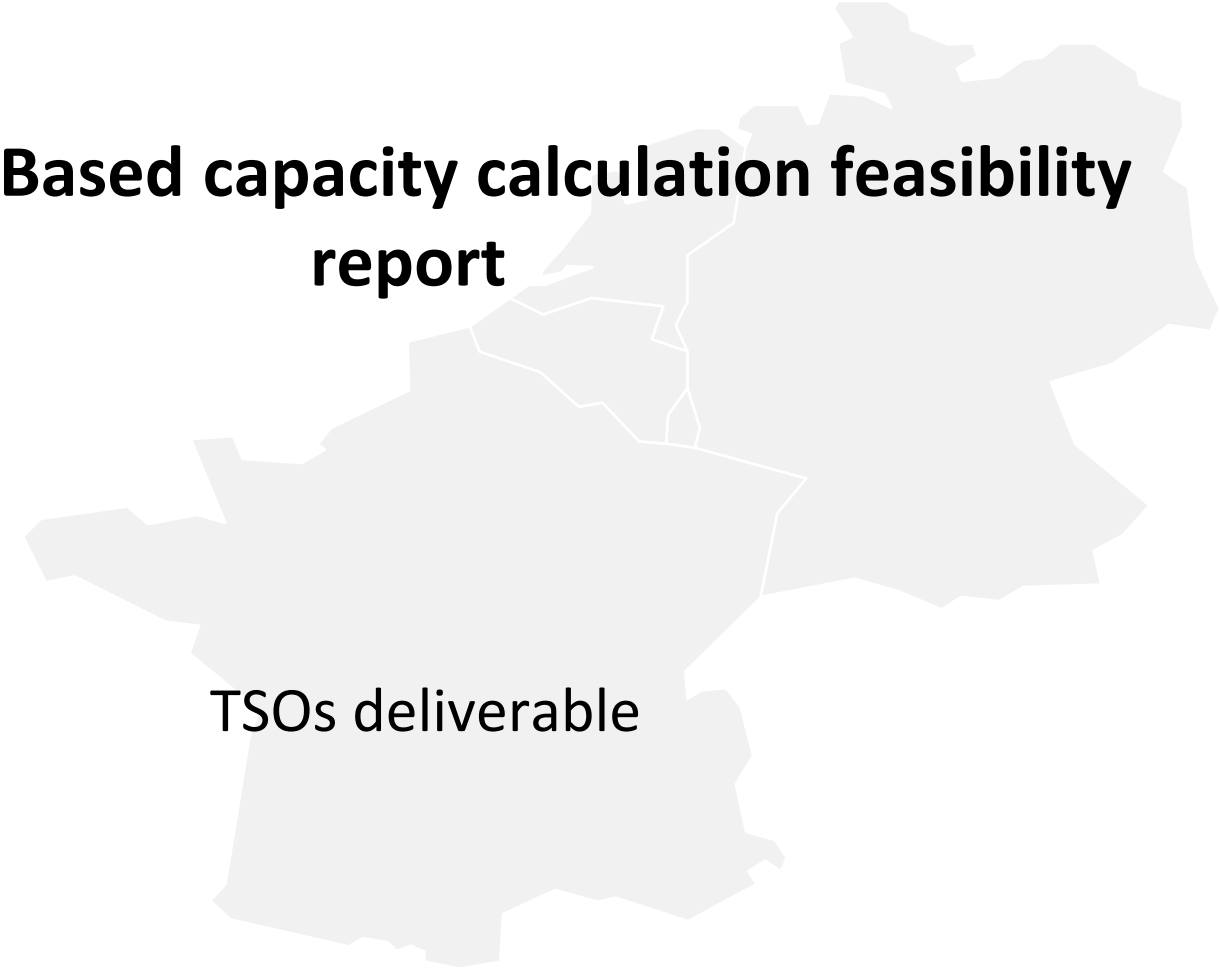
- Flow-Based capacity calculation feasibility report.
- Flow-Based Market Coupling market impact analysis.
- Interactions of CWE FB MC with coupling to other initiatives.
- Conclusions.

1 – Flow-Based capacity calculation feasibility report



TSOs deliverable

Summary

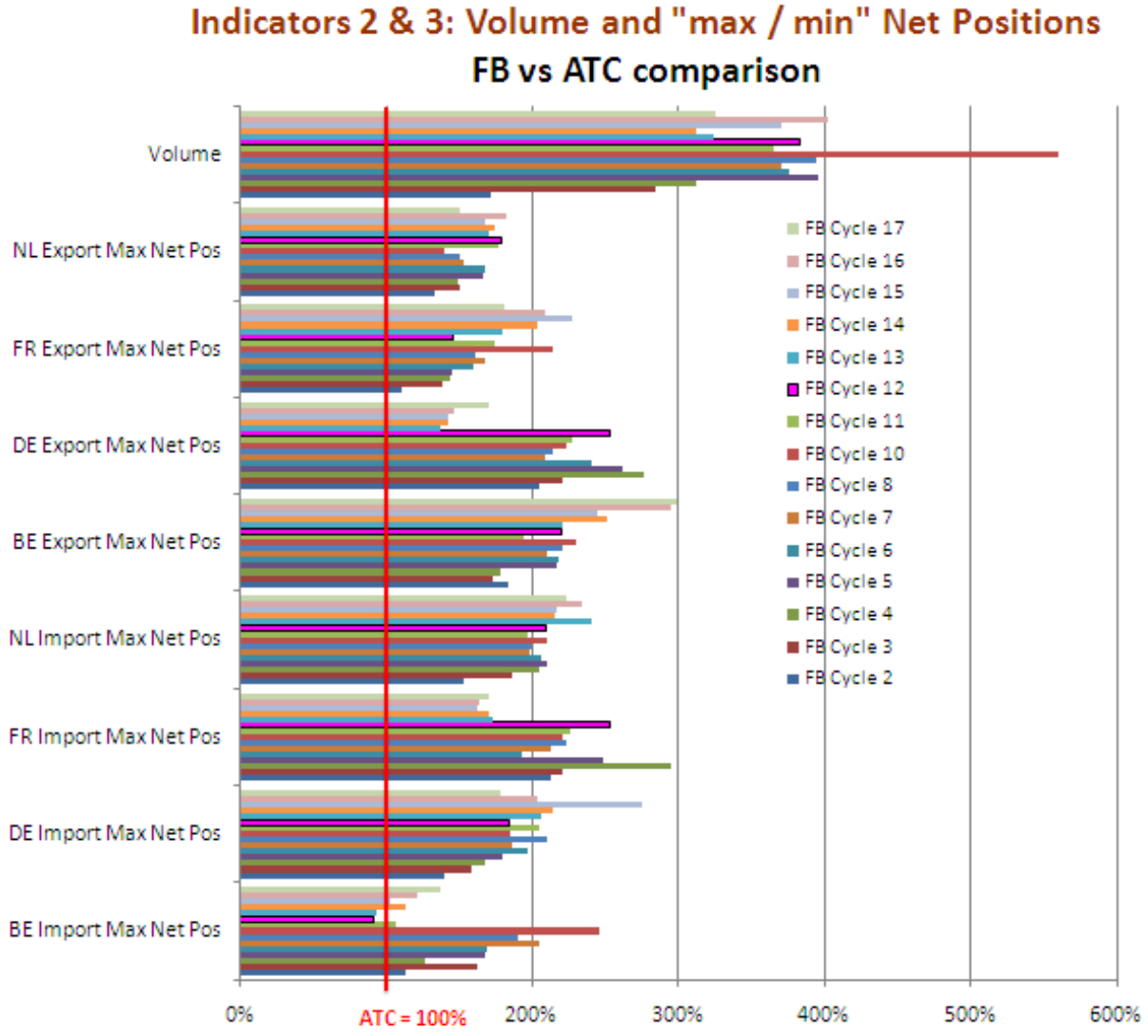
- Continuation of the experimentation from March to July 2011 (five additional weeks of data including constrained summer days) enables to confirm previous conclusions in terms of “capacity indicators”.

- CWE TSOs guarantee the compatibility of DA FB with the current ID ATC process and now propose a method to deduce ID ATCs from the DA FB domain.

- CWE TSOs are now in the process of assessing statistically “flow reliability margins”, in order to confirm the market results presented in the report, and committed to implement operational values before the external parallel run.

Continuation of experimentation cycles

- The conclusions exposed in march are confirmed by the results of five additional weeks of experimentation, from March to July.
- Results confirm the robustness of the method in the constrained weeks of June and July.
- Results obtained with "flow reliability margins" assumptions to be assessed and fine-tuned in a next step

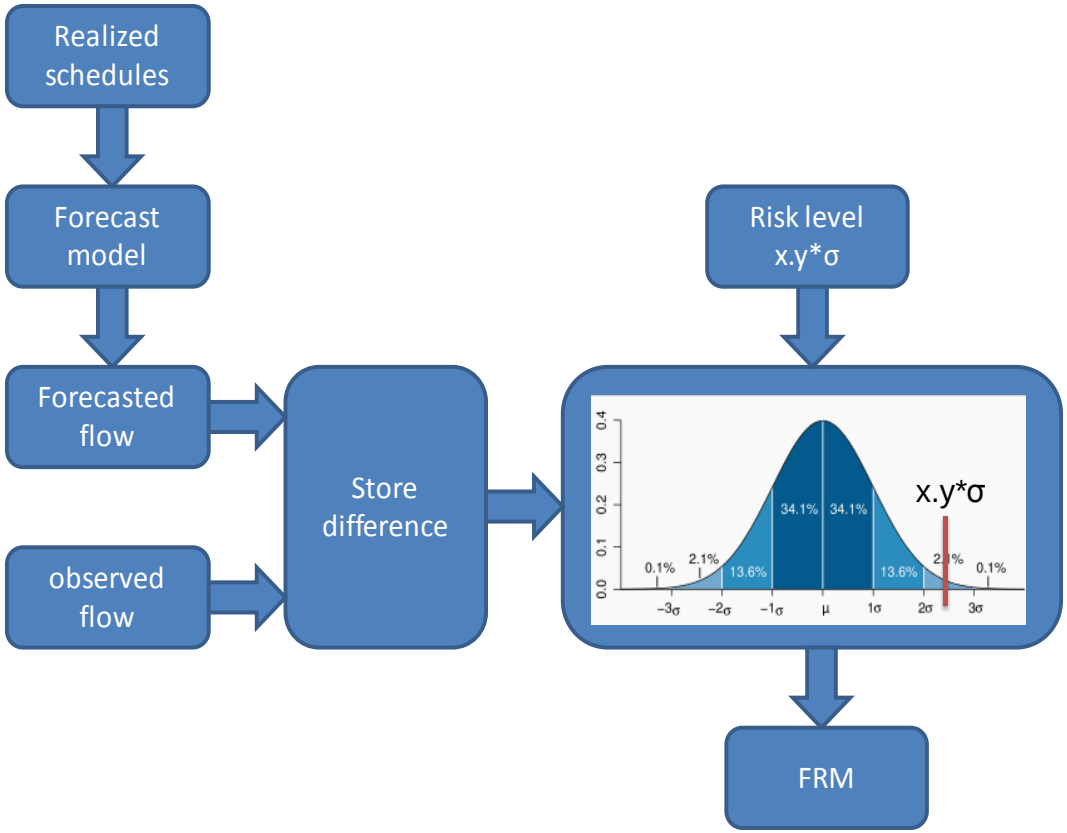


Compatibility with ID Process

- CWE TSOs guarantee the compatibility of DA FB with the current intraday ATC process by proposing a method to deduce positive ID ATC from the FB Domain.
- The idea behind the proposed method is to share the available margin, for each critical branch, between the four CWE borders that are positively influenced with equal shares.
- This method is considered straightforward, fair and transparent.
- The method has been tried on several experimental cycles, in which simulated ID ATCs have been compared to historical ones. Globally, application of the method has a positive impact on ID ATCs
- Finally, while this proposal is "only" a split of capacity corresponding to a "level 0" in the AHAG-AESAG framework (meaning that those ID ATC are not computed on DACF nor IDCF), it can be seen as a preliminary step leading to improved process of ID capacities computation.

Status on FRM settlement (1)

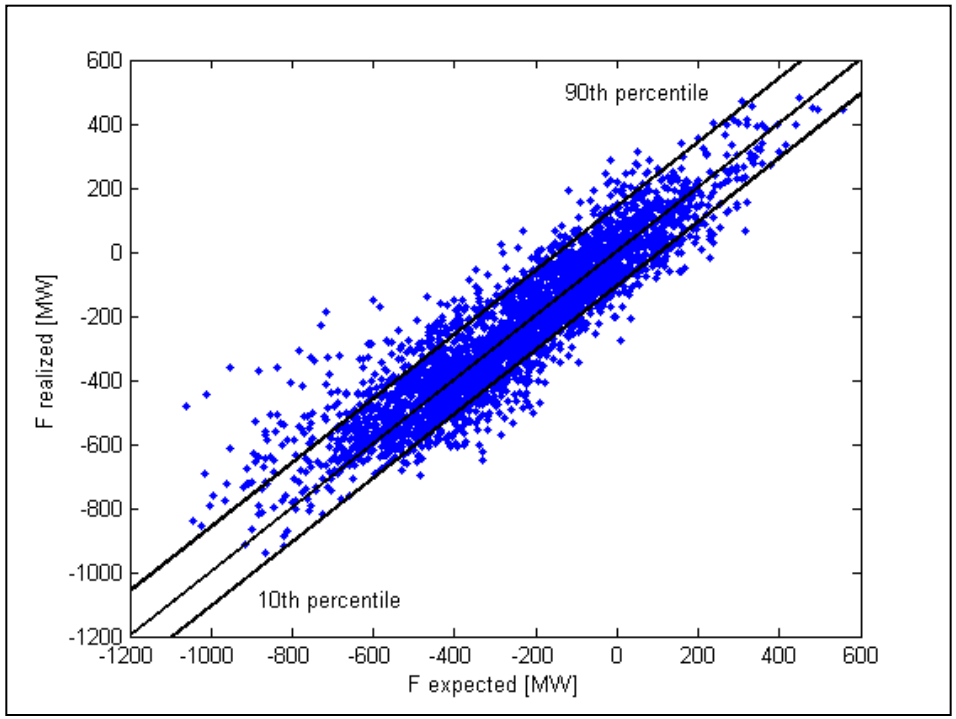
- Context : CWE TSO committed in March to run a statistical assessment of the so-called "FRM" or "Flow Reliability Margins", based on the comparison of the observed flows vs. flows predicted by the model.

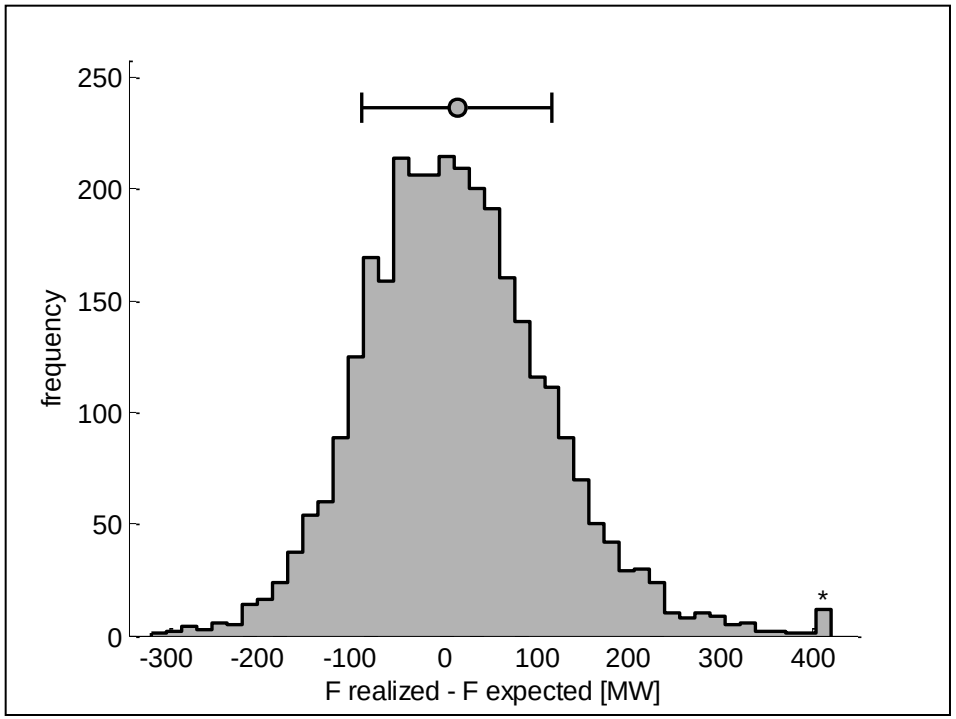


- CWE TSOs are now engaged in a thorough study in order to implement FRM values in their FB operational process: this will guarantee the quality, stability and safety of the FB approach CWE TSO propose to put in place.

Status on FRM settlement (2)

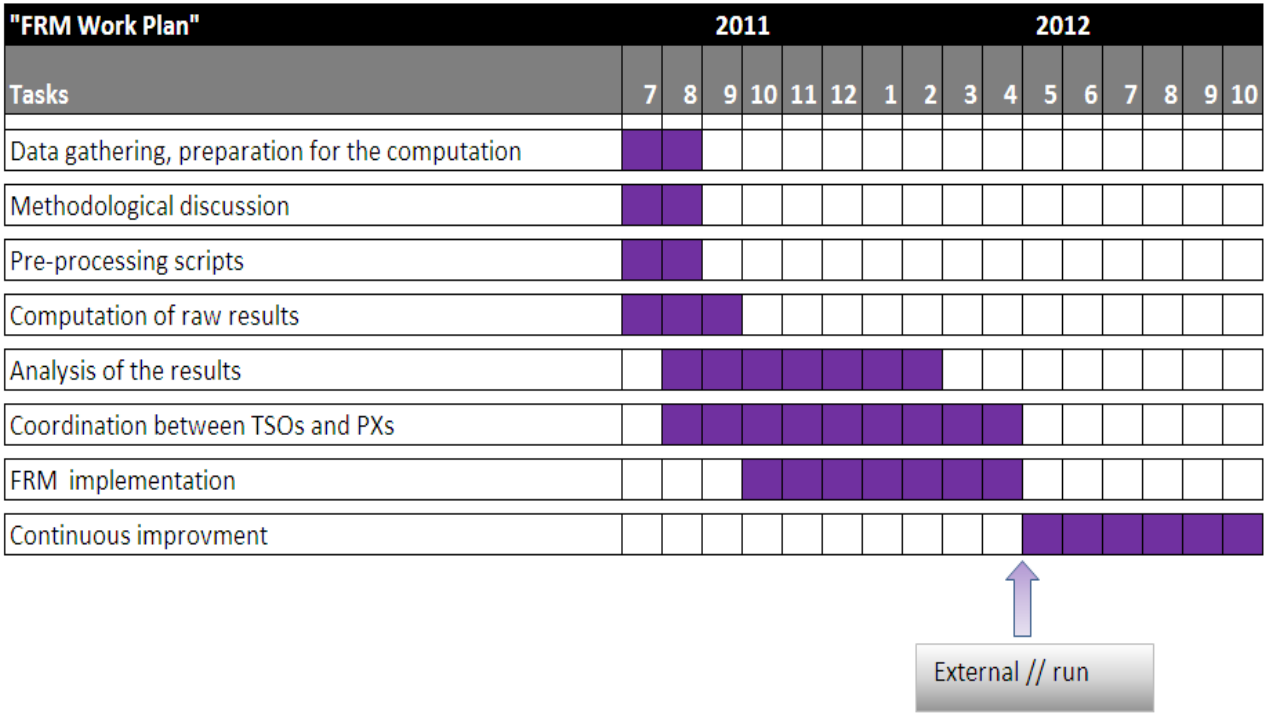
- The reasons why this FRM settlement phase represents a significant effort are threefold:
  - On the one hand, the amount of data to process in order to compute raw data only is very heavy.
  - On the second hand, raw data will then have to be analyzed in order to extract valuable information.
  - Finally, CWE TSOs will have to adjust their operational process in order to integrate the FRM values.
- However, this study is needed to confirm the FB model quality and the market results obtained during the experimentation
- Today, raw distributions are computed for the CBs of the CWE TSOs. A sample is shown for a given CB, for illustration.





Status on FRM settlement (3)

- CWE TSOs propose the following roadmap :



- The main features of this workplan are the following:
  - The target for FRM implementation is May 2012, that is the launch of the external parallel run.
  - FRM definition and implementation will be carried out by TSOs, but in coordination with Power Exchanges within dedicated working groups of the CWE FB project.
  - After implementation, FB results will be closely monitored. Especially, data quality improvements will be investigated. To this respect, FRM values are assumed to be reliable quantitative indicators.

2 – Flow-Based Market Coupling market impact analysis

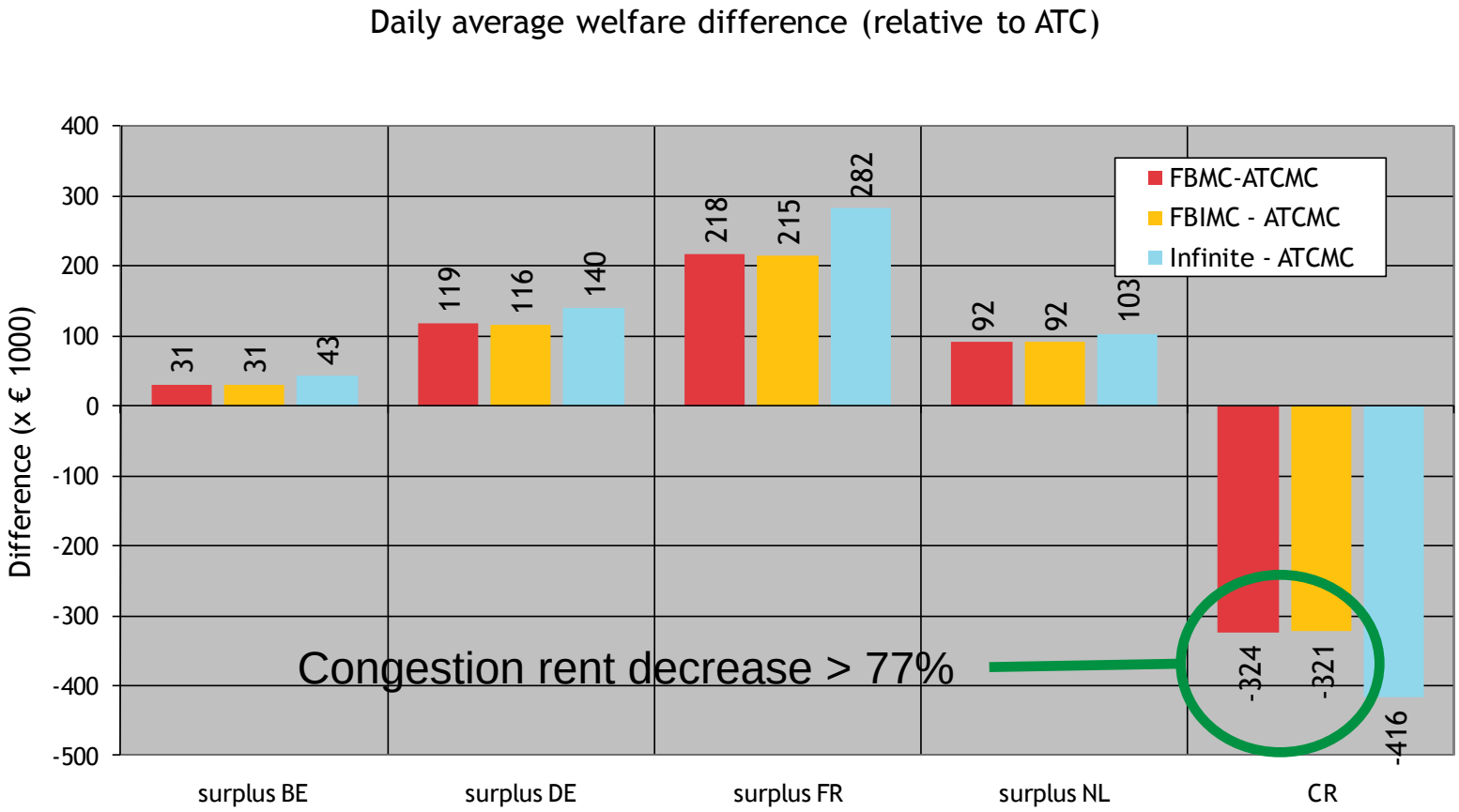
TSOs and PXs deliverable

Summary

- The conclusions of the previous report are confirmed. FB Market Coupling has a positive impact on the market compared to ATCMC:
  - More welfare: >133 k€/day, i.e., more than 87% of the possible welfare increase reached if unlimited exchange capacity existed.
  - Increased price convergence: 90% of full convergence instead of 58% in ATC, for the given period of simulations and assumed reliability margins .
- Non intuitive situations have been found. It is possible to remove them without significant differences of performance, however decision still has to be made.

(Details on next slides)

Social welfare (DAMW) increase per country



ATCMC: current ATC based MC

FBMC: FB Market Coupling

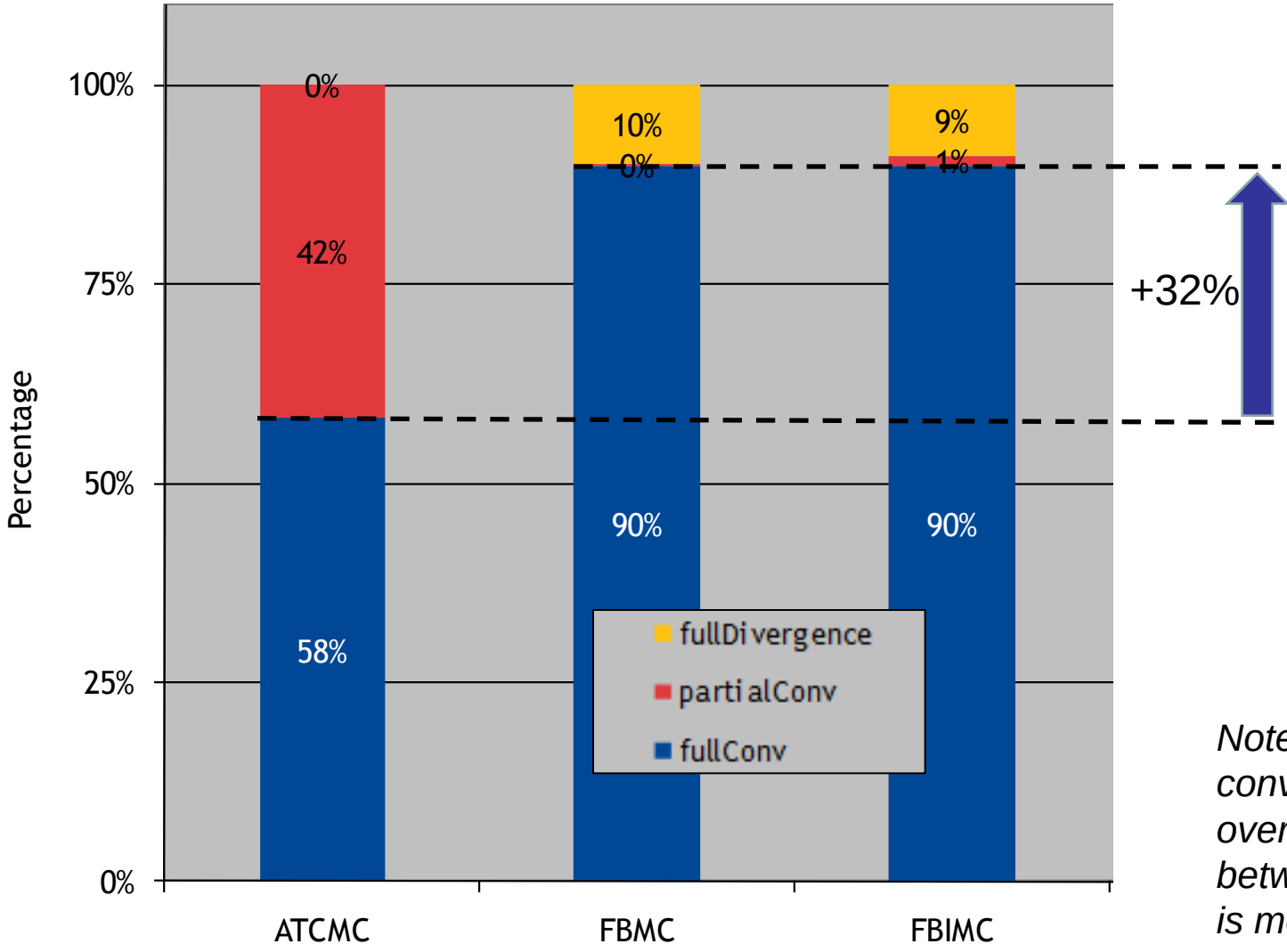
FBIMC[(1)]: FBMC + intuitiveness enforced

Infinite: Hypothetic MC with unlimited exchange capacity

As all surplus bars are postive, all countries benefit from the social welfare increase.

(1) FBIMC implements a source to sink intuitiveness, cf. next slides

Price convergence



(convergence ⇔ price difference below 0.005 €/MWh)

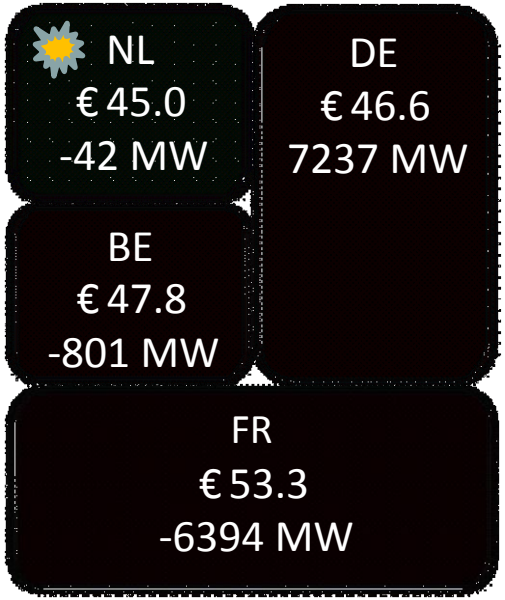
- **Full convergence**: same price in all bidding areas.
- **Partial convergence**: at least 2 bidding areas with the same price.
- **Full divergence:** all bidding areas having different prices.

Note: in FBMC, partial convergence disappears but the overall price divergence (difference between the max. and min. price) is most of the time reduced.

Intuitiveness

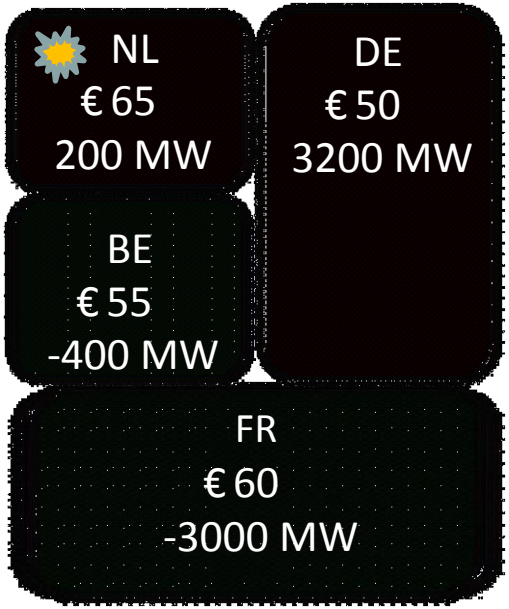
- Non intuitiveness can lead to 2 different situations:

The cheapest zone imports instead of exporting cheap energy…



(Situation March 5th, 24:00)

The most expensive zone exports instead of importing cheap energy…



(Illustrative Situation)

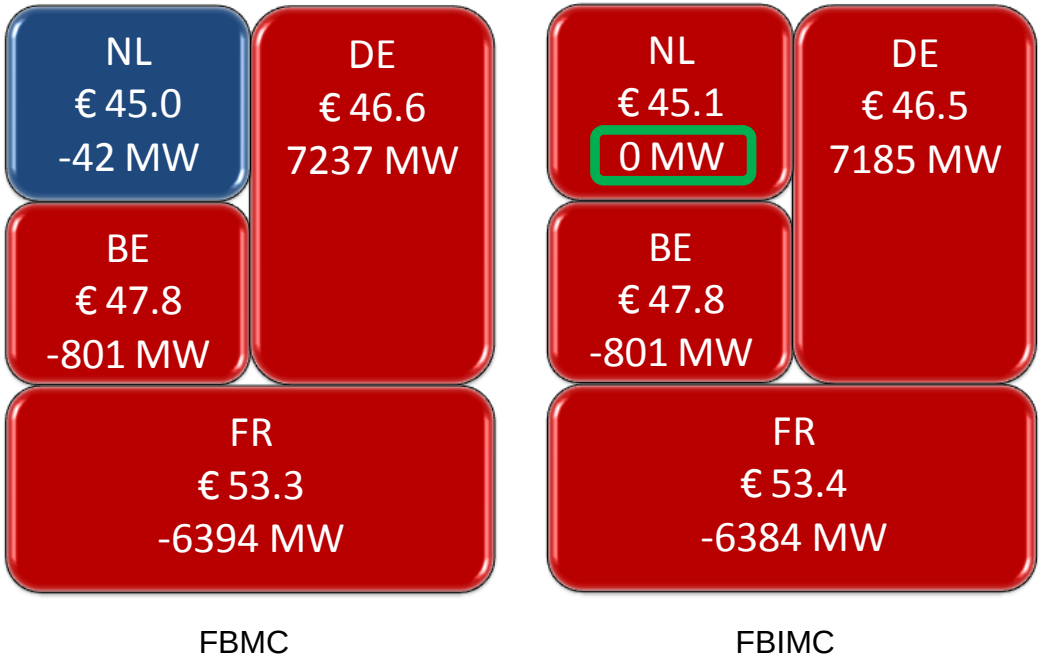
… in order to maximize global DA welfare

Intuitiveness

FBIMC "solves" this non-intuitiveness

- Example of March 5th, 24:00

  Solved by "cancelling" NL imports:



Intuitiveness

- Occurrence of non-intuitiveness: less than 1.5% of all situations (less than 15% of congested situations).
- No unacceptable degradation with FBIMC:
  - No degradation of convergence.
  - Loss of welfare below 2k€/day (less than 2% of the welfare gain).
- More information in the report:
  - Mathematical definitions of intuitiveness;
  - Detailed analysis of non-intuitive situations;
  - Mathematical description of the FBIMC model.

Intuitiveness

- Open questions:
  - Whether or not to enforce intuitiveness is still under discussion. It is a market design issue. Arguments are currently being gathered and studied (economical theory, acceptance, robustness, interaction with other projects…) in order to support the final decision.
  - Two definitions of intuitiveness exist[1]. Most of the time, they are equivalent. For 4 situations (4% of congested situations, 0.4% of all situations), they are not.

[1]Depending on whether commercial flows must follow interconnectors/electrical boundaries. See Section 3.3. for details.

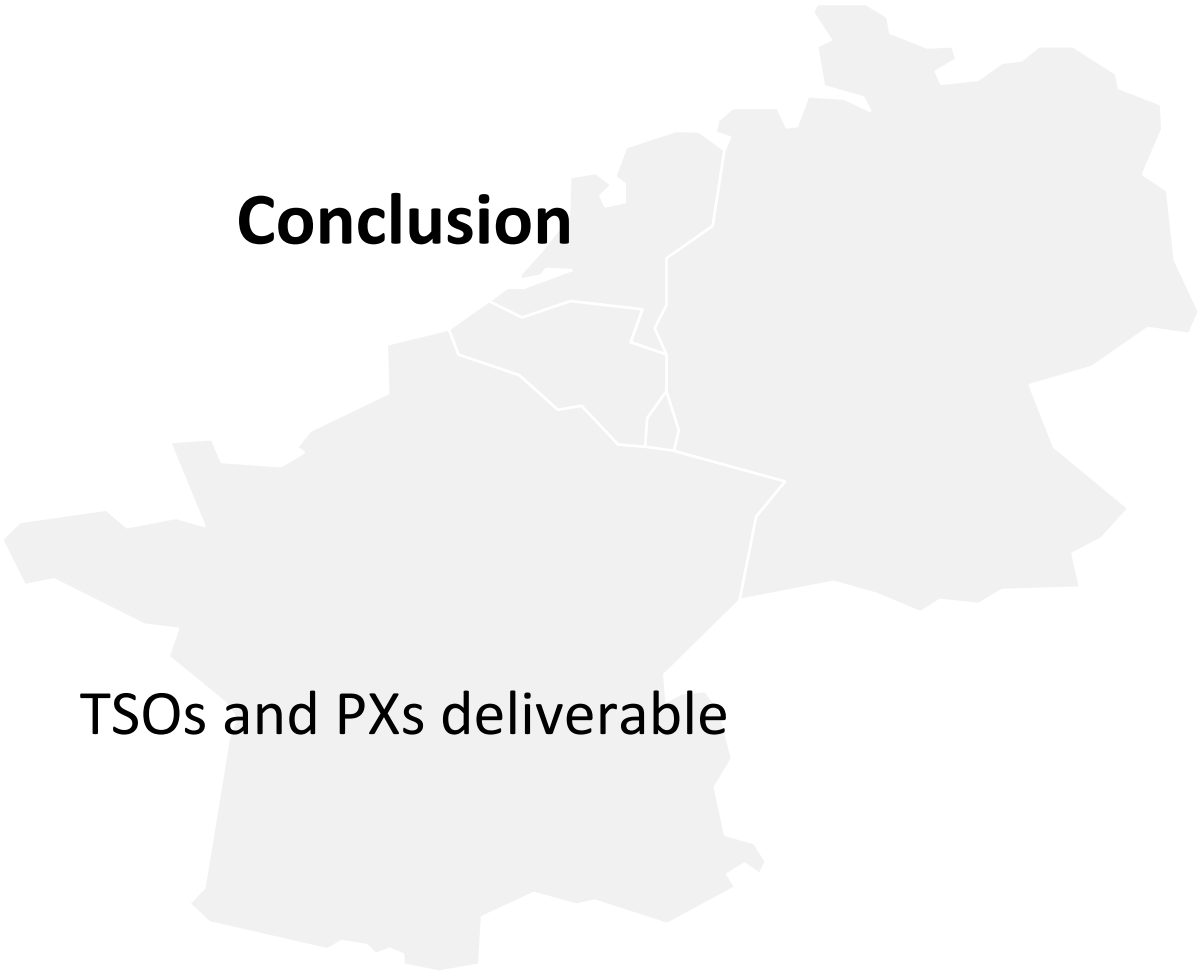
3 – Analysis of the interactions with coupling to other initiatives

TSOs and PXs deliverable

Updates from previous report

- CWE FB MC is consistent with the latest Florence forum roadmap.
- Technical exchanges with CEE are ongoing through the CEWE initiative.
- Upgrade of ITVC to support FB is seen as a possible backup if NWE project is delayed.
- More details are given on the advanced FB-ATC hybrid market coupling methodology.

Conclusion



TSOs and PXs deliverable

Conclusions

- Significant increase in the capacity domain with same level of SoS is confirmed thanks to 5 additional weeks of results.
- Compatibility with current ID ATC process is ensured.
- FB Market Coupling has a positive impact on the market. Whether to accept non-intuitive situations is still an open question.
- CWE FB Market Coupling is compatible with neighbouring initiatives.
- Work will continue on refining the FRM parameters and the methodology, keeping in mind that results included in the report are based on basic assumptions which have to be fine-tuned. Resulting FRM values shall be implemented for the external parallel run.