



CWE FB MC project

PLEF SG1, March 30th 2012, Brussels



Content



1. CWE ATC MC Operational report
2. Detailed updated planning
3. Status on FRM settlement
4. FB model update since last PLEF
 - Intuitiveness
 - Hybrid Coupling
 - External parallel run & Utility Tool
5. Common website for CWE PXs and TSOs data publication
6. Integration of Swissgrid in CWE MC: status of Impact Assessment

1 - CWE ATC MC Operational Report - Content



▶ CWE Prices

- Feb 2011 to Feb 2012
- Oct 2011 to Feb 2012

▶ Price Convergence

- Average: Feb 2011 to Feb 2012
- Average: Oct 2011 to Feb 2012
- Evolution since ATC MC

▶ Price Volatility

- Average: Feb 2011 to Feb 2012
- Average: Oct 2011 to Feb 2012

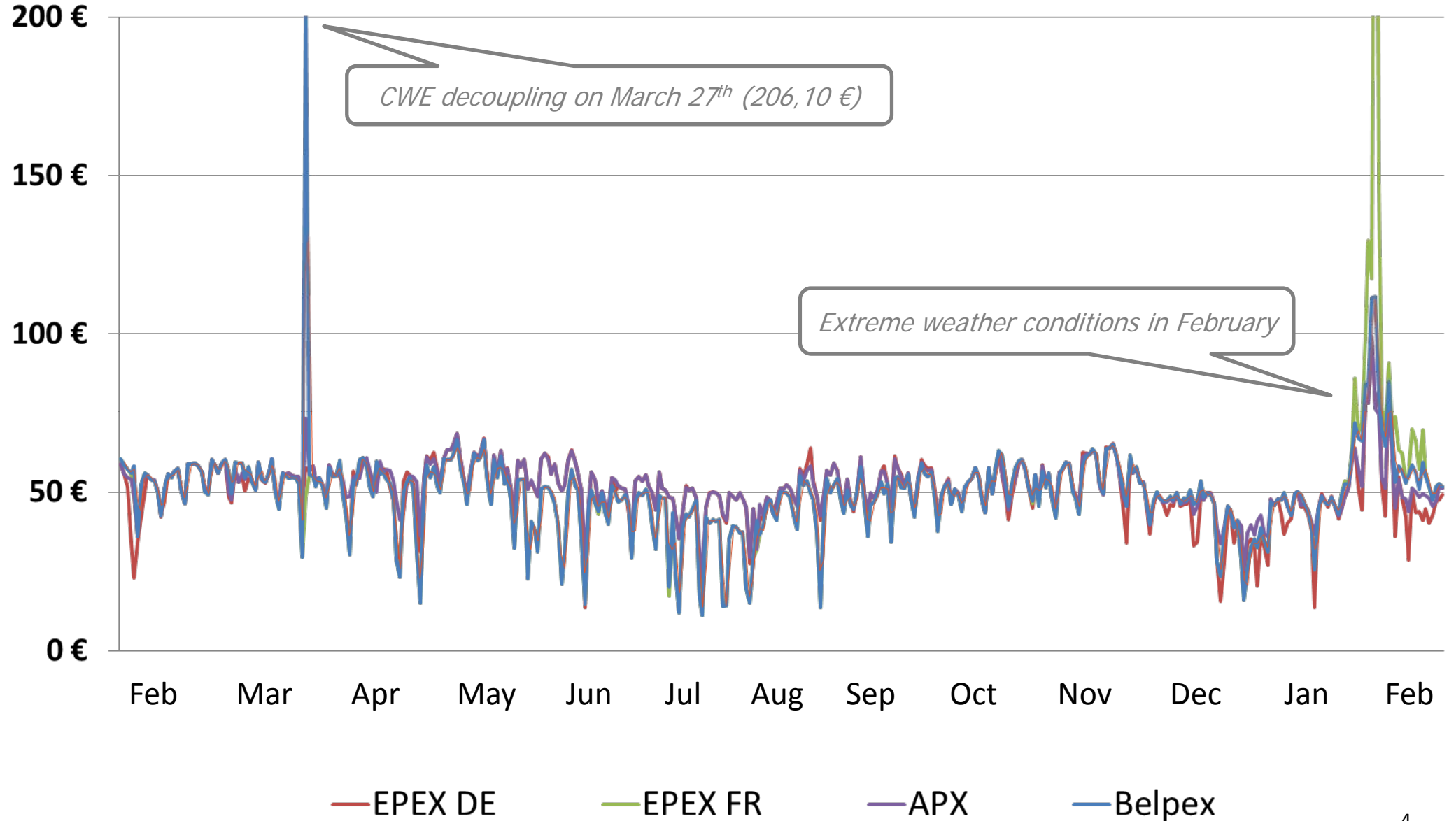
▶ ATC Utilization Rate

- Average: Feb 2011 to Feb 2012
- Average: Oct 2011 to Feb 2012

▶ Conclusions

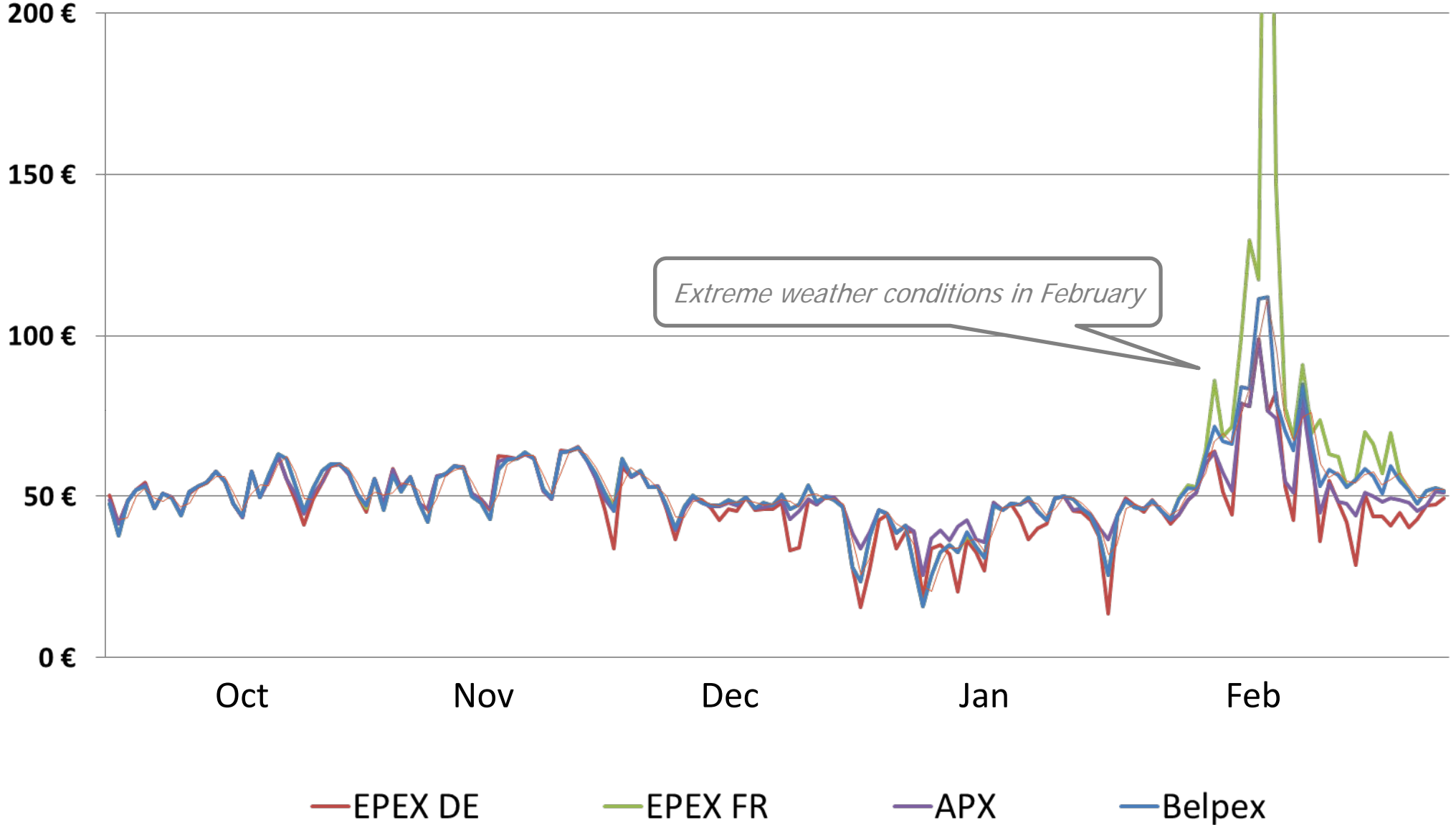
CWE Prices (daily baseload)

February 2011 to February 2012



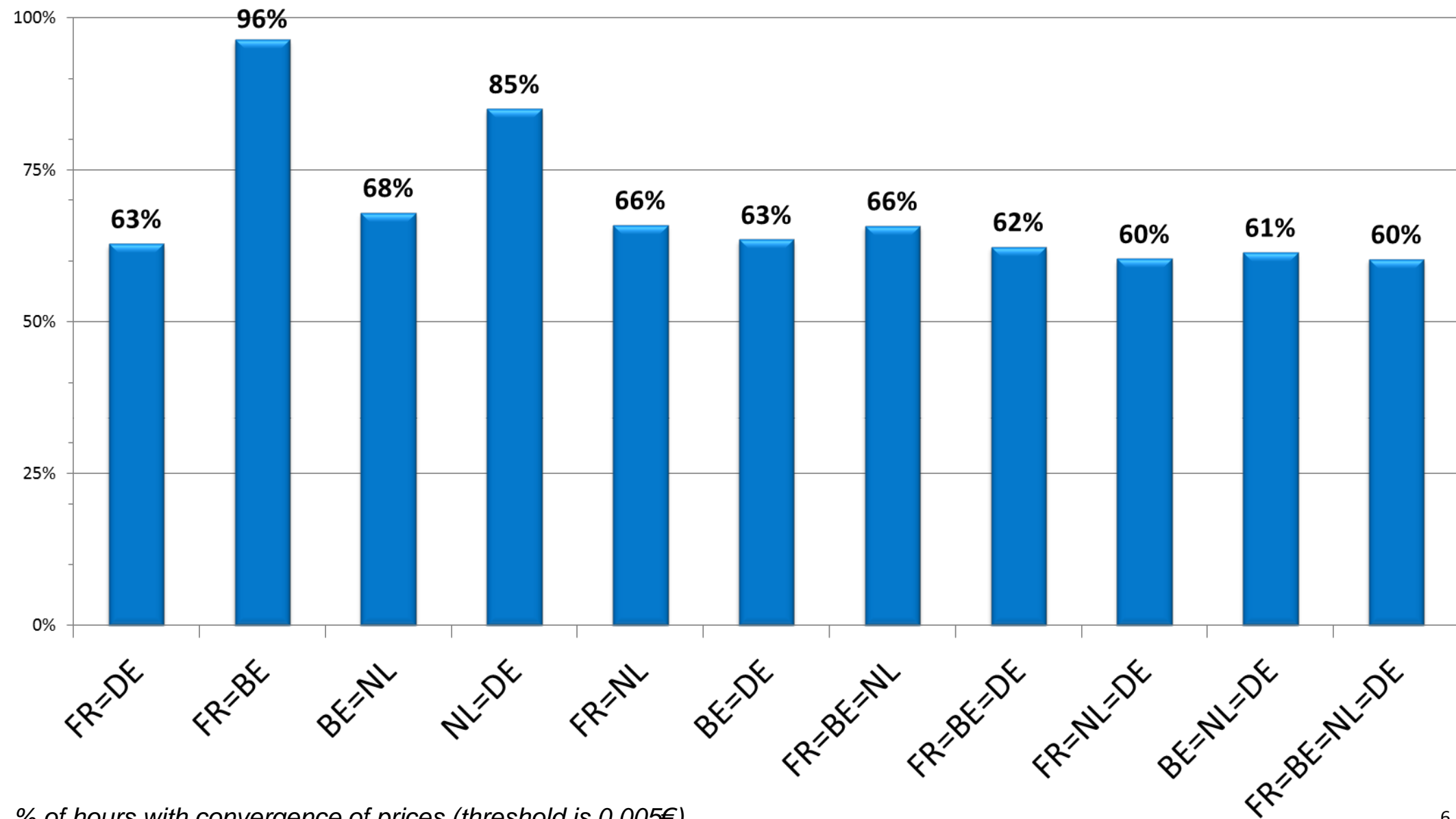
CWE Prices (daily baseload)

October 2011 to February 2012



CWE Price Convergence

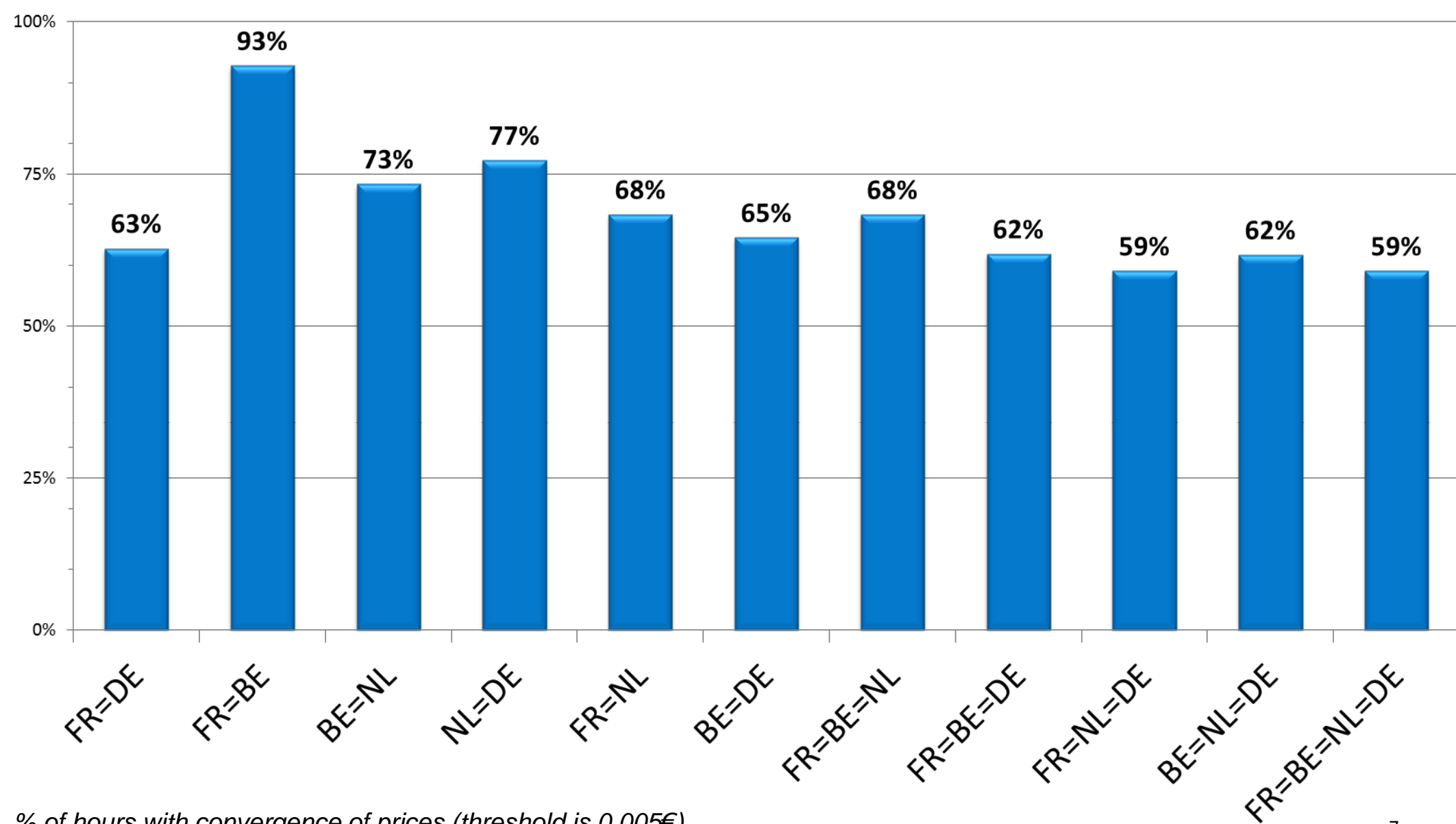
Average: February 2011 to February 2012



% of hours with convergence of prices (threshold is 0,005€)

CWE Price Convergence

Average: October 2011 to February 2012

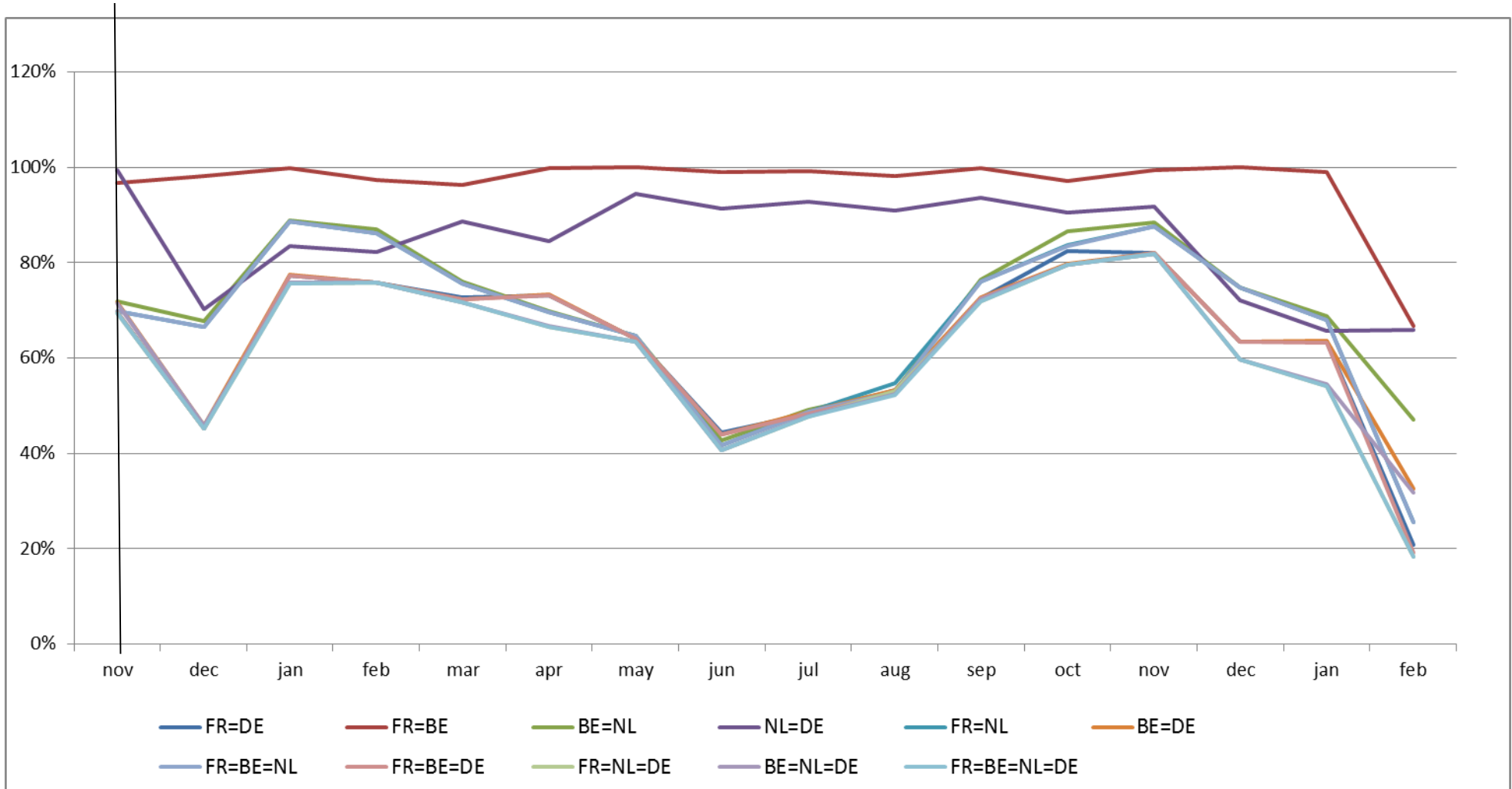


CWE Price convergence since CWE ATC MC go live



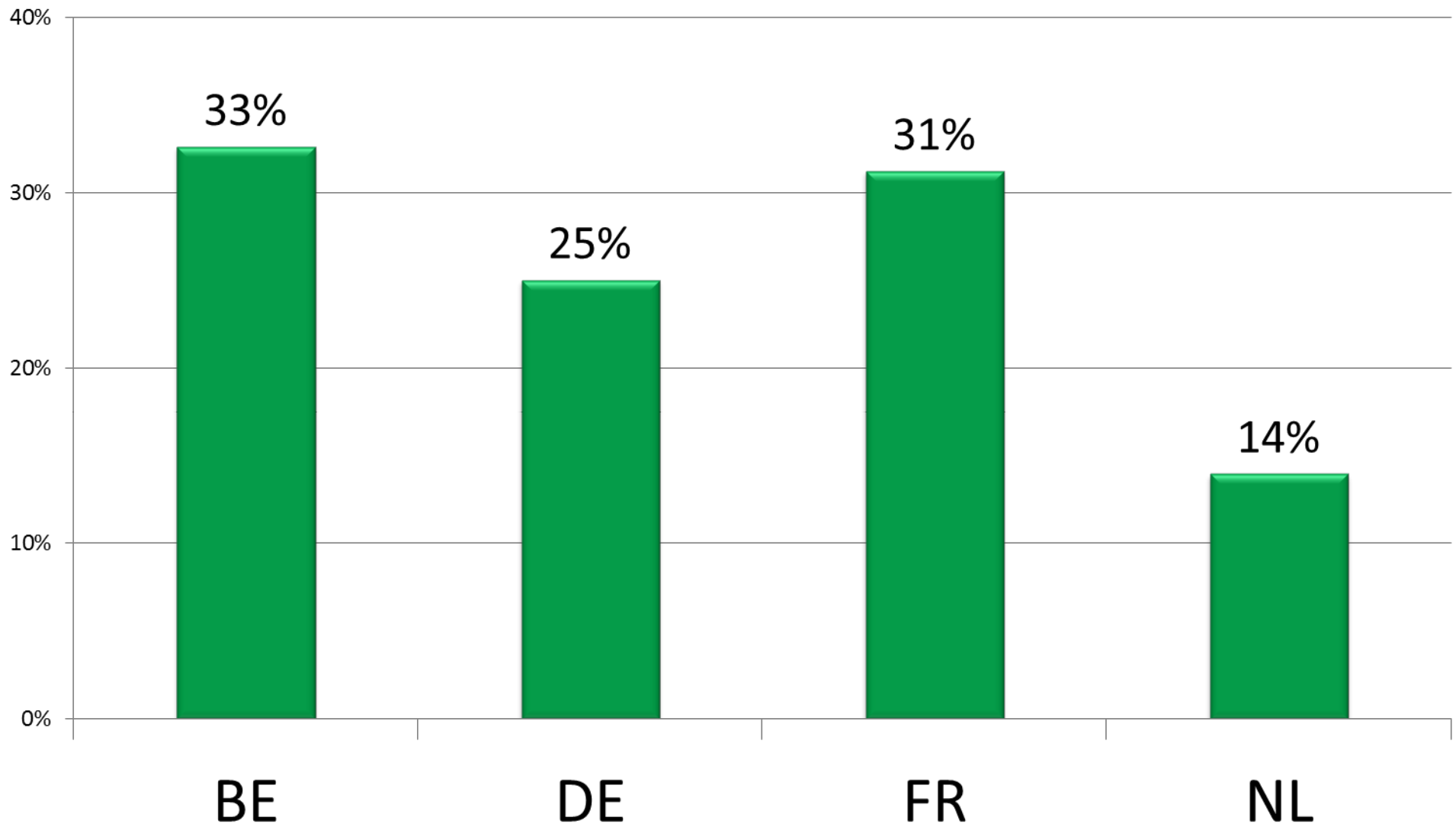
Launch of ATC MC

Today



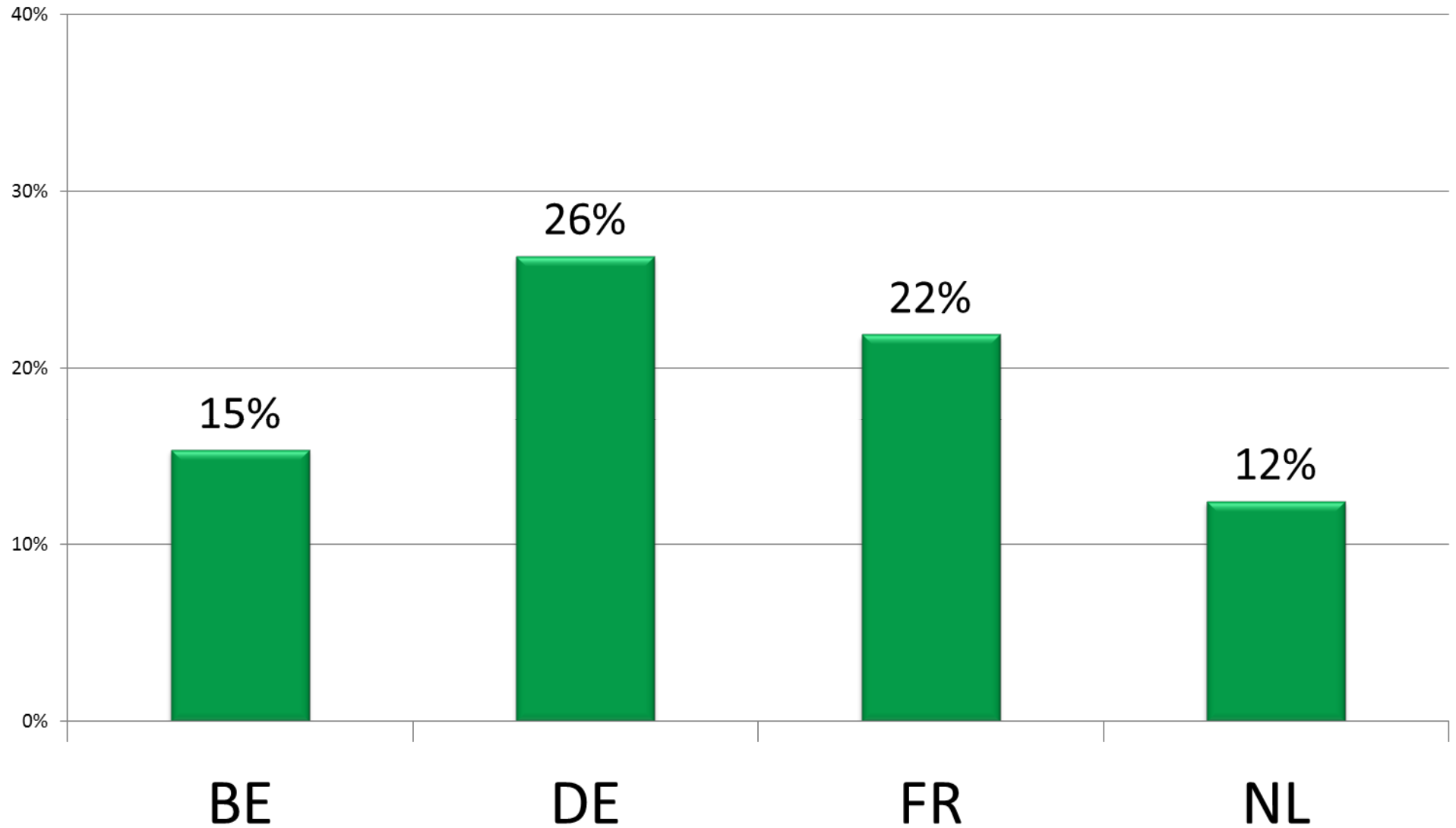
CWE: Base Load Price Volatility

Average: February 2011 to February 2012



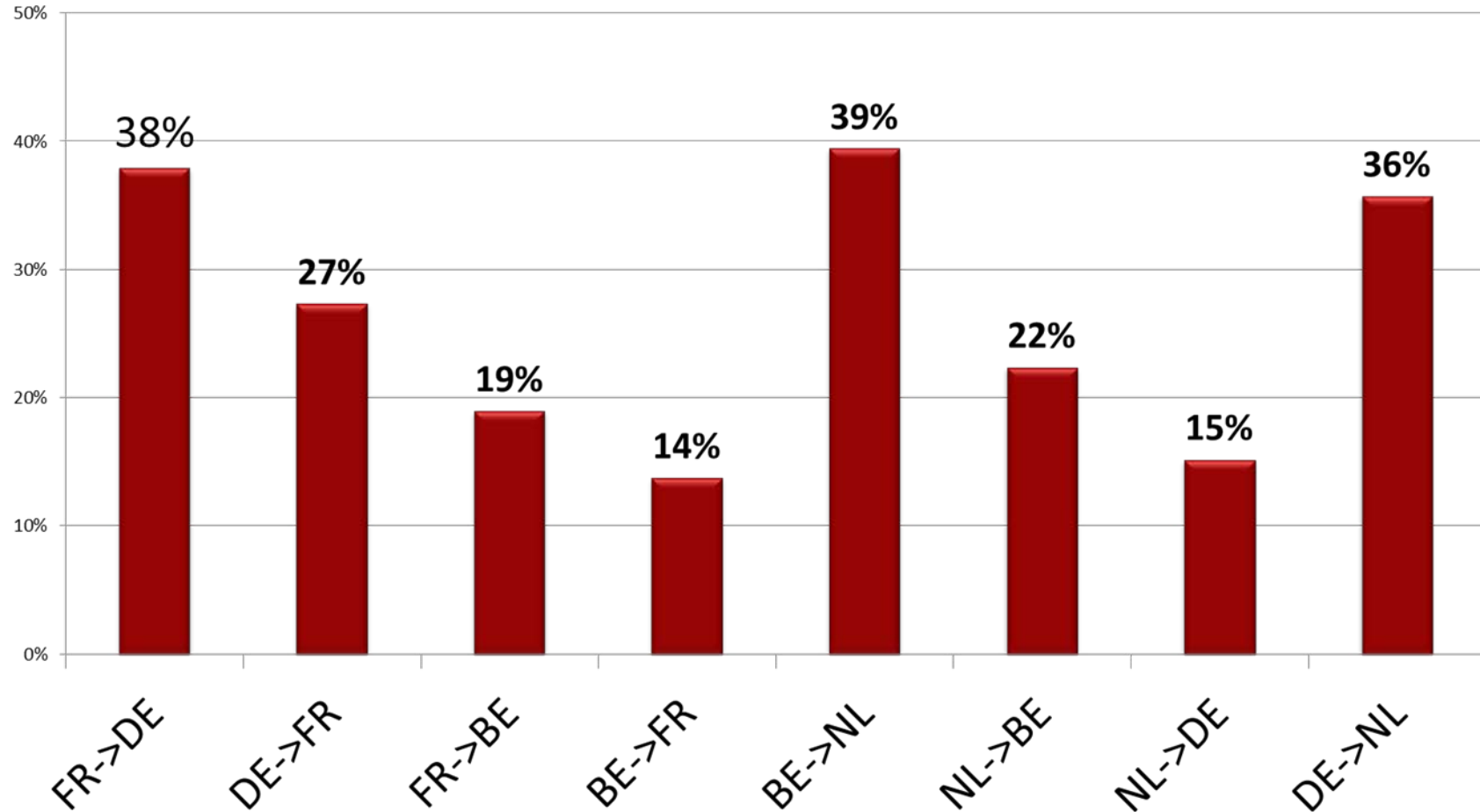
CWE: Base Load Price Volatility

Average: October 2011 to February 2012



CWE: ATC Utilization Rate

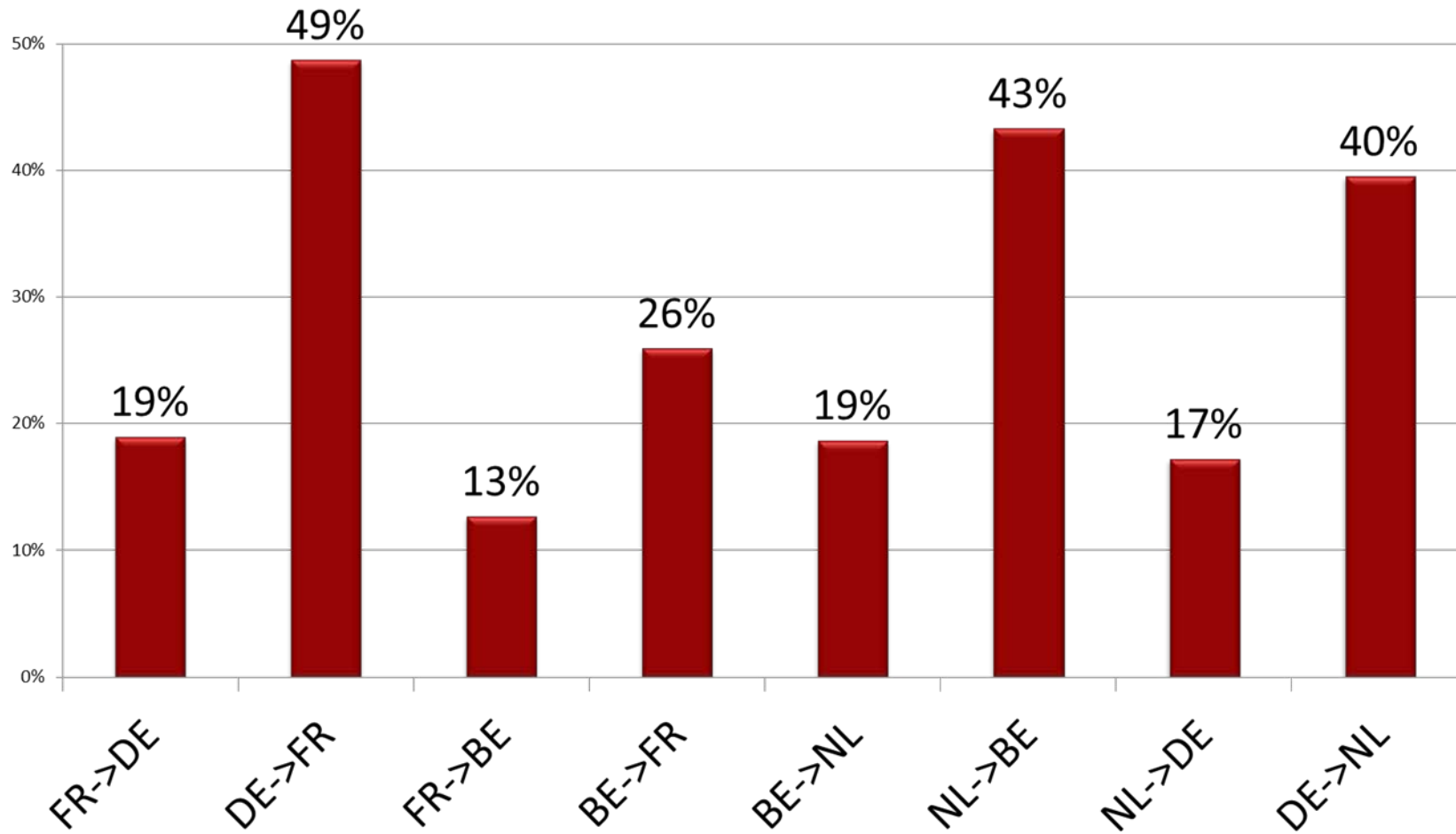
Average: February 2011 to February 2012



Average utilization of CWE Interconnectors = Cross Border Flow / Daily ATC on interconnector
If ATC on interconnector = 0 → Utilization rate = 0%

CWE: ATC Utilization Rate

Average: October 2011 to February 2012



Average utilization of CWE Interconnectors = Cross Border Flow / Daily ATC on interconnector
If ATC on interconnector = 0 → Utilization rate = 0%

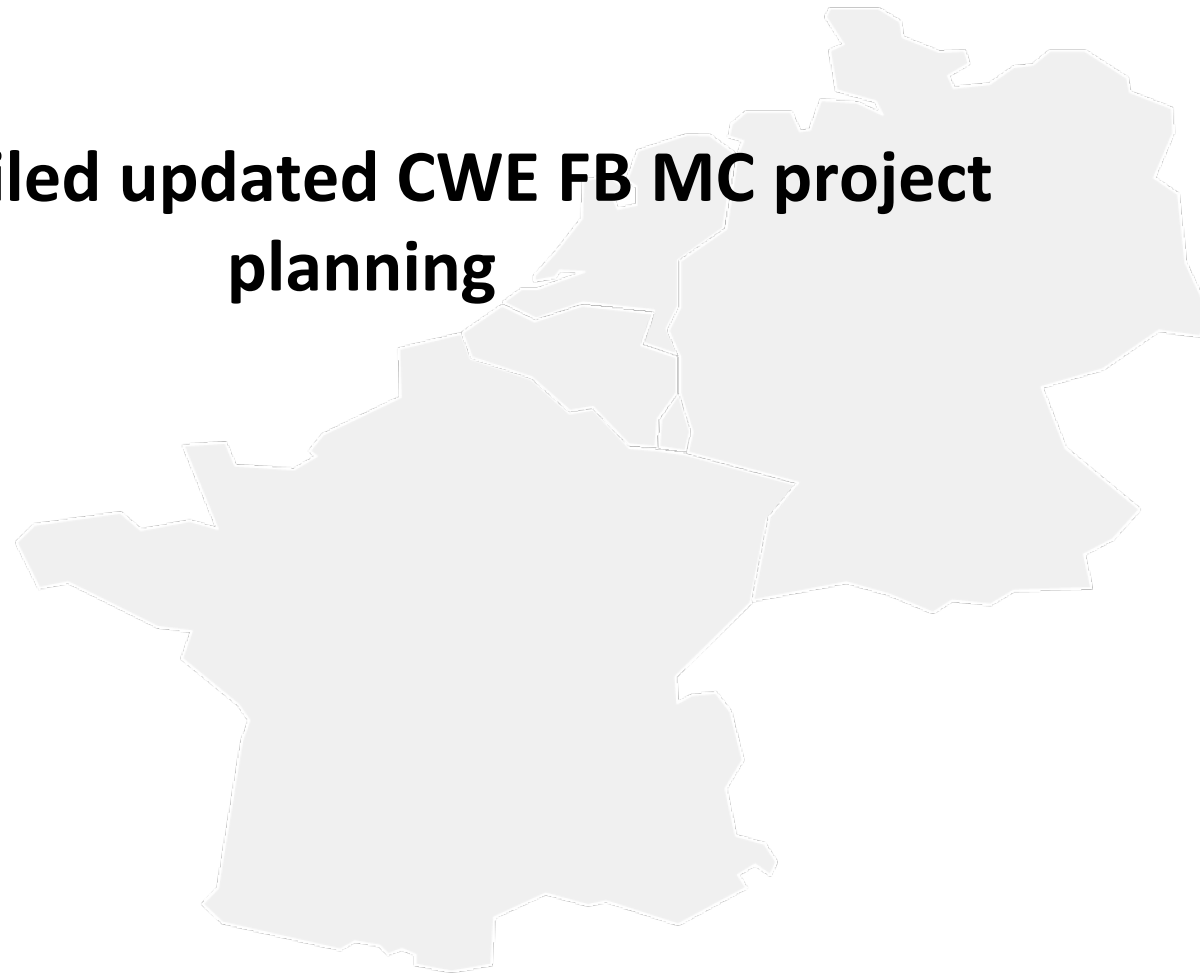
Conclusions



- ▶ Confirmation of previous positive market results of ATC MC
 - High level of price convergence, still potential for the Flow based approach
- ▶ We have witnessed a decrease of the convergence since the beginning of 2012. However despite the German moratorium and the extreme weather conditions in February, the average CWE price convergence since February 2011 is good.



2 – Detailed updated CWE FB MC project planning



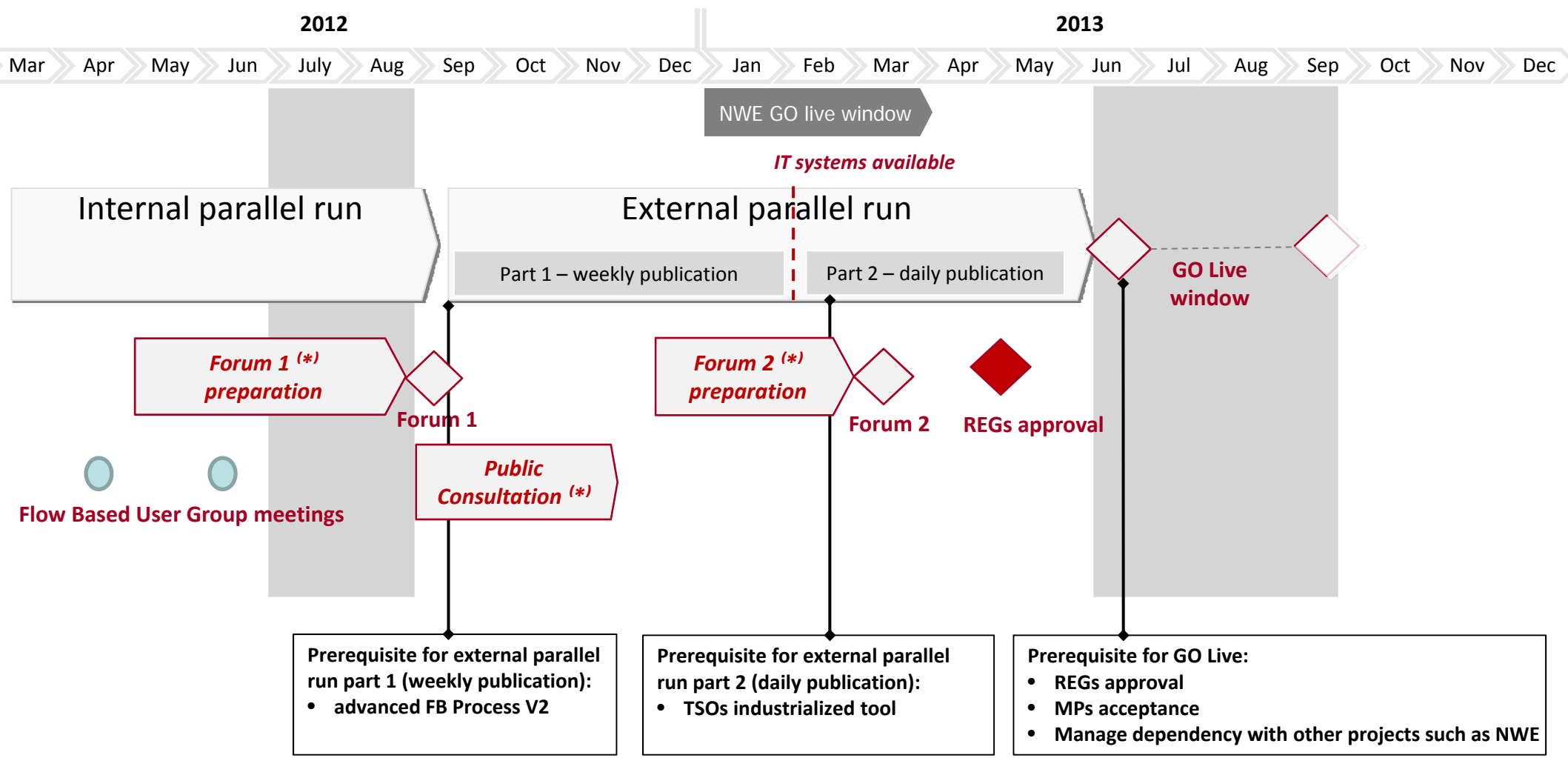
Detailed updated CWE FB MC project planning



CWE TSOs and PXs reconfirm the target Flow Based GO LIVE in Summer 2013, exact date is subject to the second forum in March/April 2013, other projects (NWE) and CWE FB project progress.

- The initial start of the internal parallel run has shifted from January 2012 to March 2012 for the following reasons:
 - the combined methodological and organizational complexity of the FB method lead to a longer experimental phase,
 - which is linked to the high level of harmonization (CBCO selection, Remedial actions, FRM calculation method) and heavy operational change management,
 - the winter period was not favorable for knowledge transfer from FB experts to operators due to heavy workload.
- A Forum and a Public Consultation are still scheduled this year and will take place before the start of the external parallel run.
- In March / April 2013 a second forum will be organized based on 6 months experience and results of external // run (including part 2 daily results)
- In March 2013, CWE FB project will refine the GO Live date based on:
 - the outcomes of this second Forum,
 - the status of other European projects, especially the progress of the NWE project,
 - CWE regulators' and Market parties' confidence in the FB model (including remaining period for external parallel run).

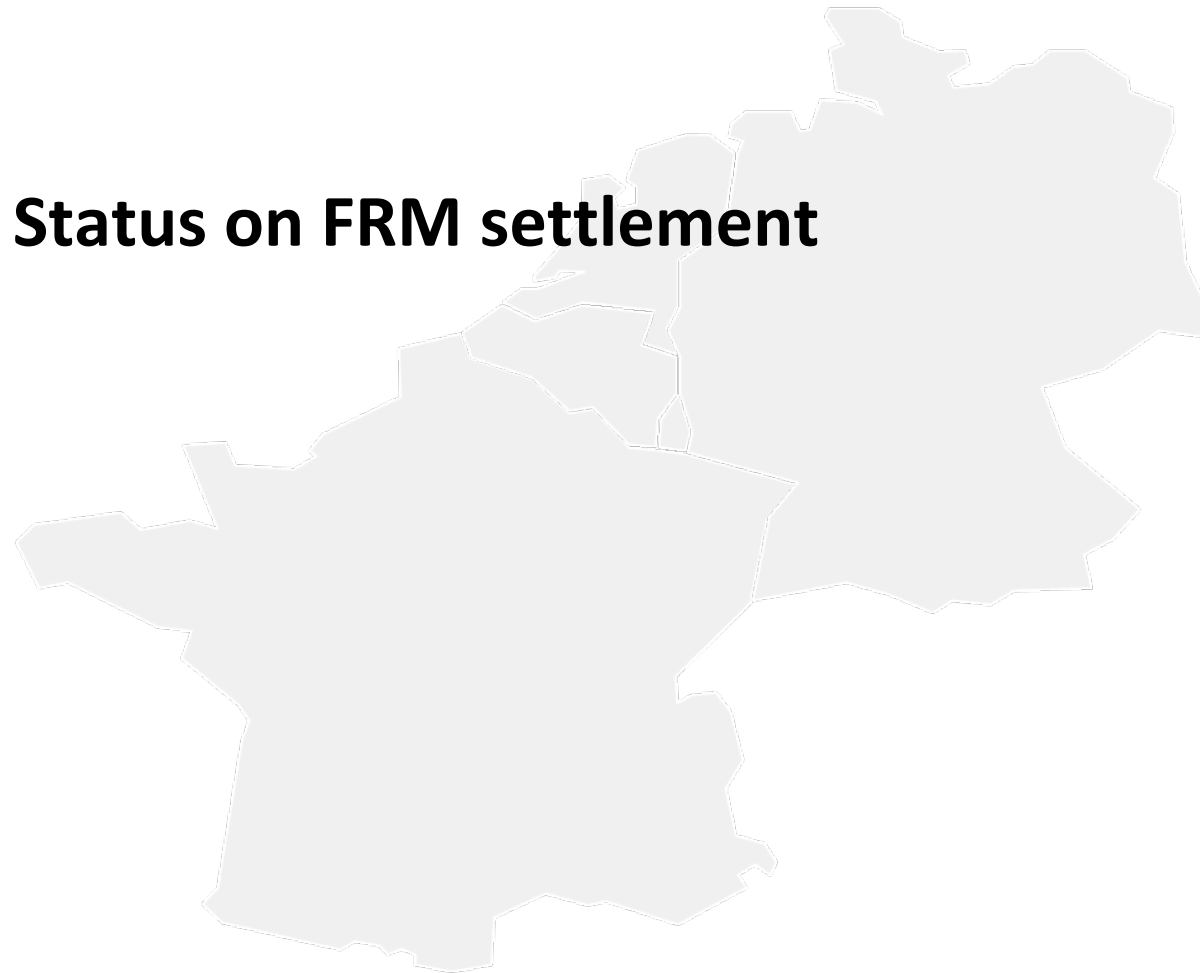
Detailed updated CWE FB MC project planning



(*) : The exact content of the Forum and the Public Consultation still need to be fine tuned



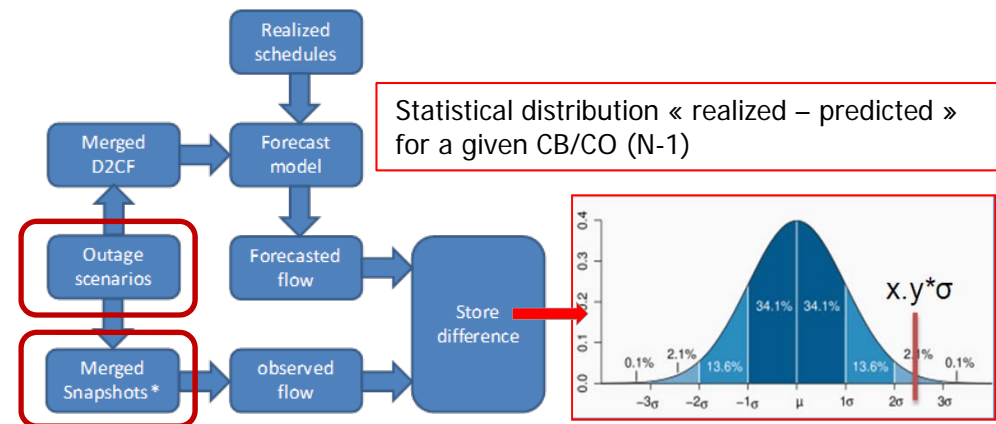
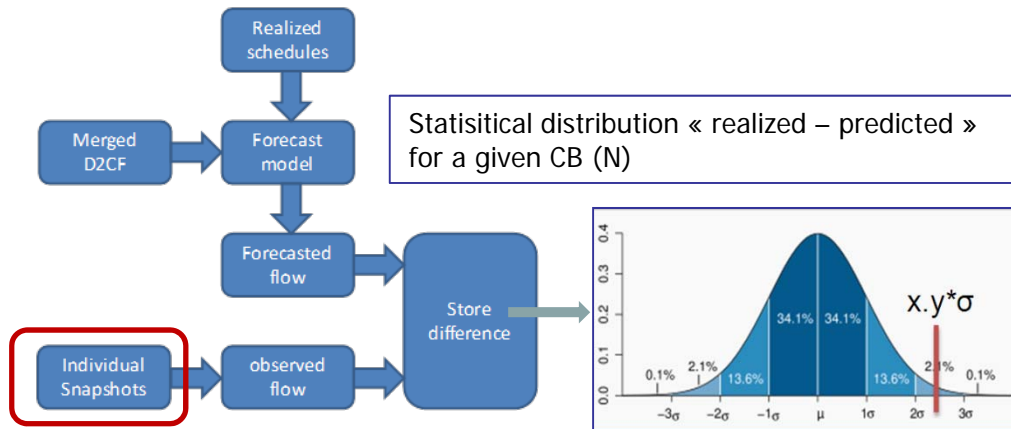
3 – Status on FRM settlement



Status on FRM settlement: phase 1 (data generation)



- ▶ CWE TSO committed in 2011 to run an assessment of the so-called “FRM” or “Flow Reliability Margins” (FRM). The role of FRM is threefold :
 - To hedge against the uncertainties linked to capacity calculation methods (forecast errors, model approximations...)
 - To hedge against the uncertainties linked to non CWE exchanges.
 - To hedge against the variability of exchanges linked to load-frequency adjustments.
- ▶ FRM settlement analysis’ first phase is composed of :
 - the comparison between flows predicted by the model and actually observed flows. This phase, which encompasses the treatment of thousands of data points, leads to the production of statistical distributions for each Critical Branch (so-called “N situations”) and each relevant combination of “Critical Branch + Critical Outage” (so called “N-1 situations”).
 - The “N-1 analysis” requires to run additional load flow computations in order to actually simulate and compare a set of relevant outage scenarios



* The SNs are merged together with DACF files of non-CWE TSOs

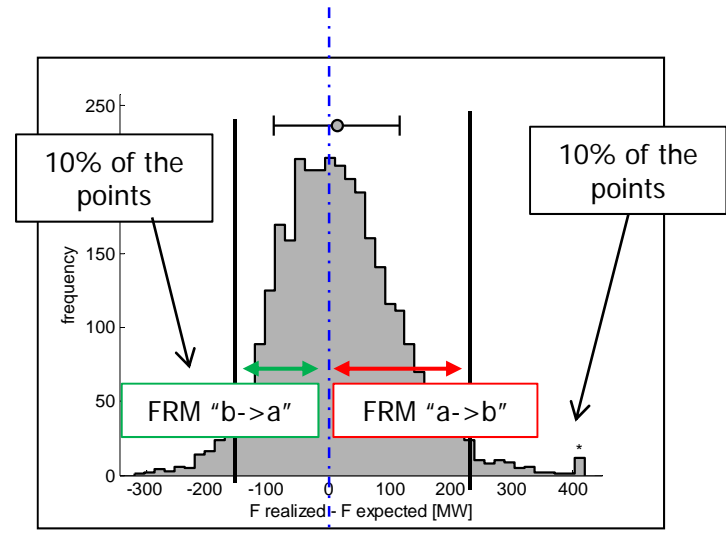
- Since last PLEF meeting, raw statistical densities have been produced for all CWE TSOs critical branches, in N and N-1 situations, based on nearly 6 month of data.

Status on FRM settlement: phase 2, FRM assessment



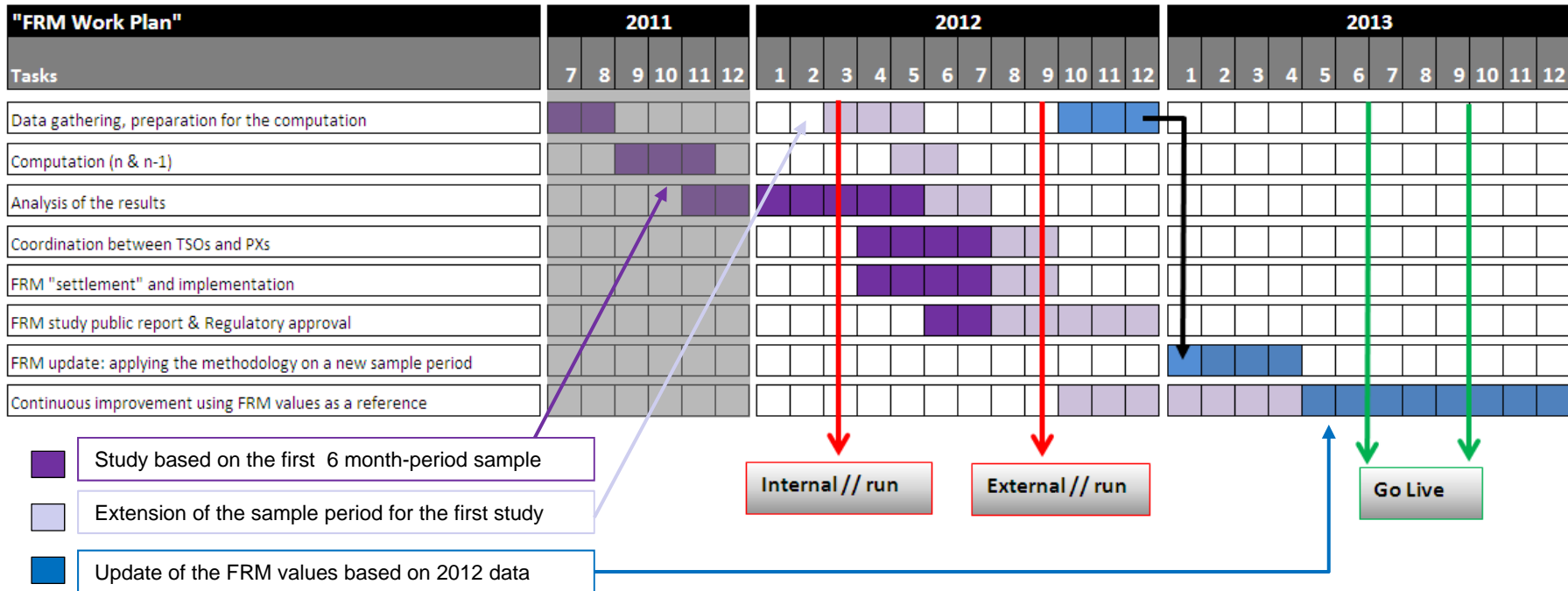
- FRM settlement analysis' second phase consists in a thorough study which will lead to the implementation of operational FRM values within TSO FB processes.
 - Practically, the challenge for TSOs is to extract operational FRM values from the statistical data set in application of local risk policies. This implies a thorough analysis of the statistics themselves.

Example of FRM assessment by considering a 10% risk level (90th percentile) in each direction of a critical branch



- This might also bring about operational adjustments so as to guarantee the consistency between the uncertainties covered by FRM and the risks assumed by TSOs in their capacity calculation process (in order to avoid under/over-estimated hedging).
- This phase thus deeply involves the contribution not only of FB experts but also of shift engineers in order to size consistent, operational, FRM values. To this respect, CWE TSOs take advantage of the internal parallel run which has already started.
- Taking into account both FB and operational expertise, CWE TSO are now designing the “FRM implementation methodology” which enables to transform statistical raw results into operational FRM security margins.**

Status on FRM settlement: way forward

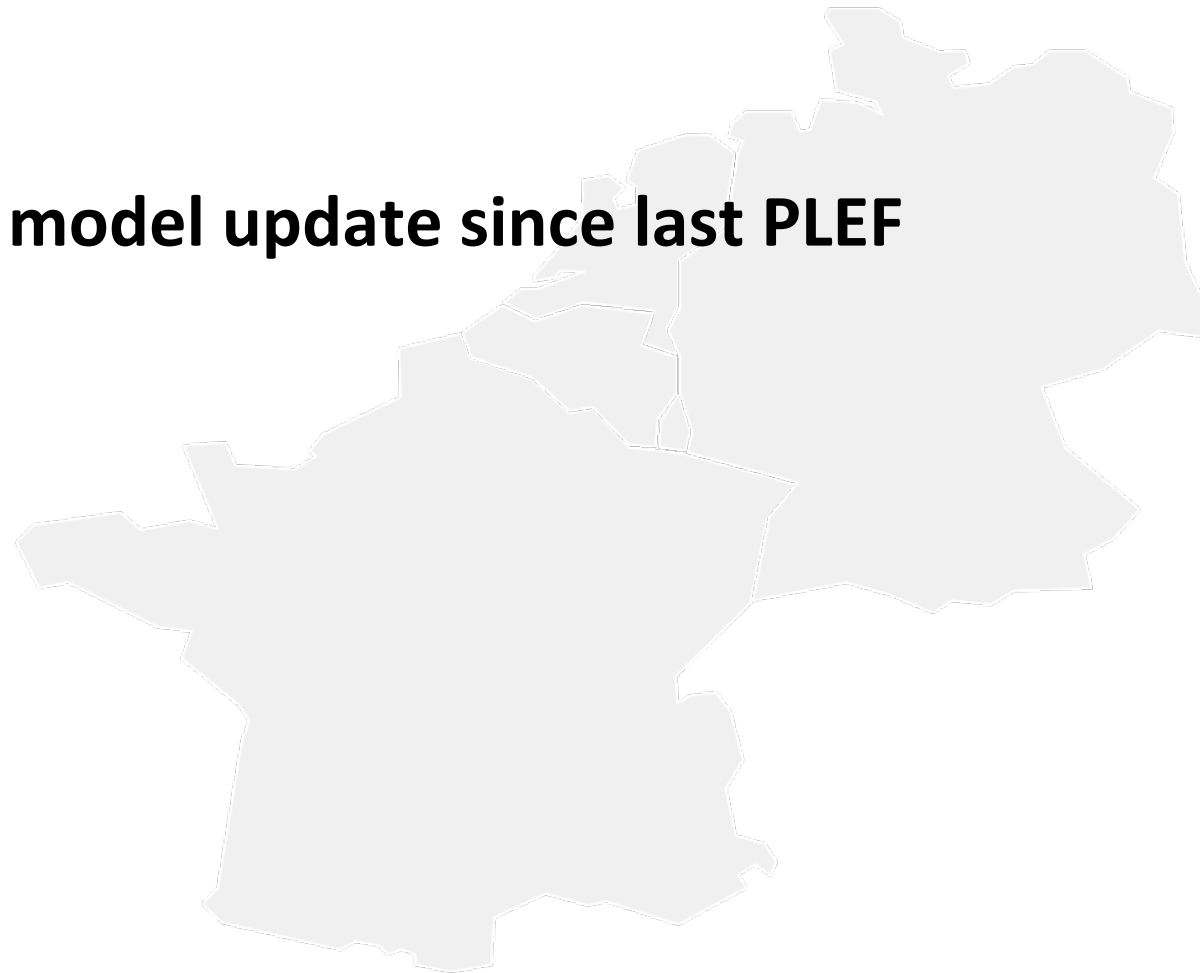


▶ The main features of this workplan are the following:

- The target for updated operational FRM values is September 2012, that is the launch of the external parallel run.
- FRM definition and implementation will be carried out by TSOs, but in transparency towards Power Exchanges within dedicated working groups of the CWE FB project.
- The FRM implementation methodology is a part of the complete FB approach, and to this respect will be described :
 - In the FB public consultation package
 - In the FB capacity calculation document to be approved by NRAs.
- Following the approved methodology, CWE TSOs plan to regularly update the computation of their FRMs. To this respect, CWE TSOs are already gathering additional data in order to extend the sample period from which the statistical distributions are produced.



4 - FB model update since last PLEF



4 - FB model update since last PLEF - Content



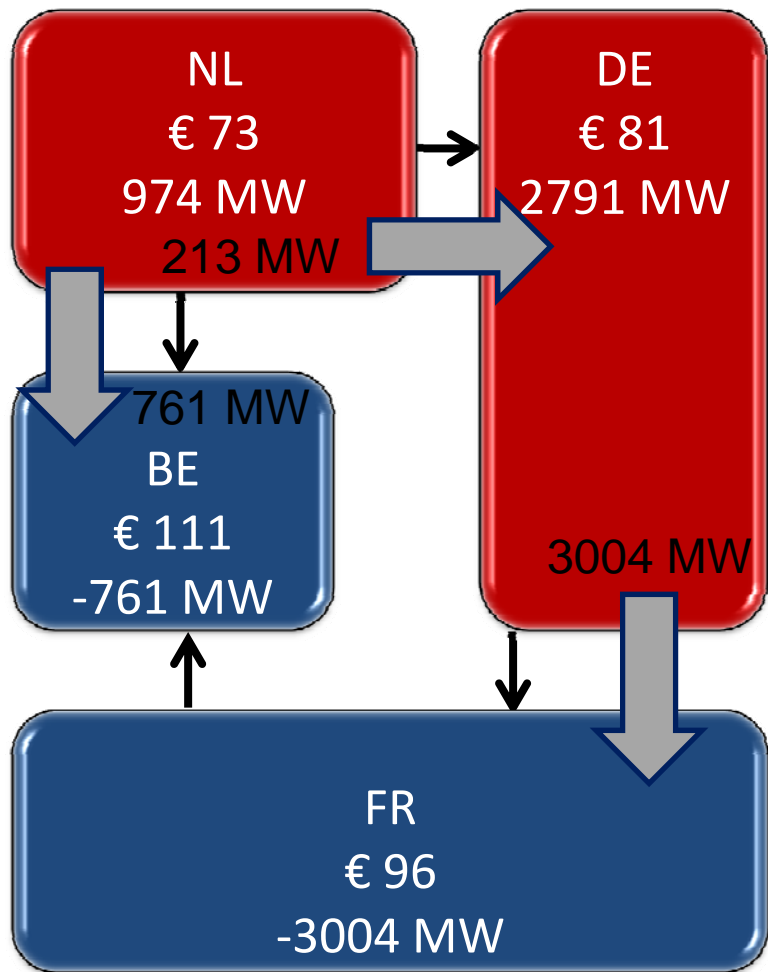
- ▶ If FB intuitive chosen over plain FB, Bilateral intuitiveness preferred to source to sink intuitiveness.
- ▶ Launch of CWE FB with standard hybrid coupling.
- ▶ External parallel run

Intuitive vs. non intuitive situation

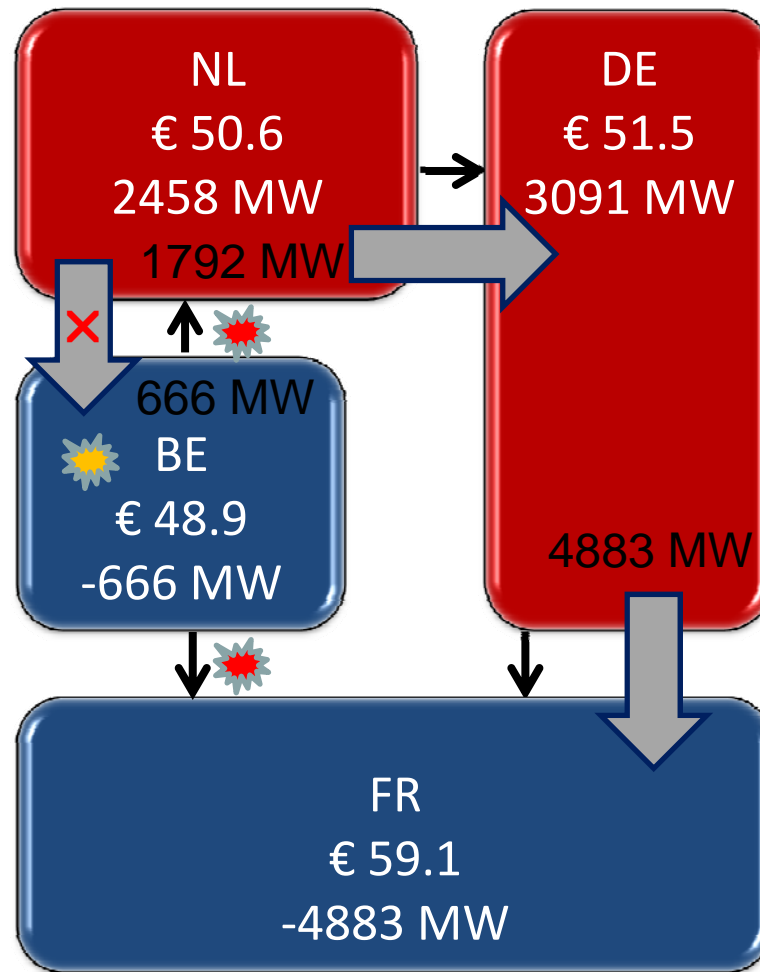


- ➔ : Possible intuitive exchange
- ➡ : Bilateral commercial exchange

- ☀ : Area importing with the lowest price.
- ☀ : Area unable to exchange intuitively.



An intuitive situation



A non-intuitive situation

The welfare is optimized but BE imports with the lowest price!

Therefore, it is impossible to find exchanges from low to high prices, i.e. the situation is non-intuitive.

Summary / CWE project recommendation



- ▶ Project parties have studied two flavours of intuitiveness:
 - Source-to-sink intuitiveness: there exists a decomposition of the net exchange positions into a set of commercial exchanges from areas with low prices to areas with high prices.
 - Bilateral intuitiveness: same as source-to-sink intuitiveness plus the fact that exchanges are allowed only if an interconnector exists.
- ▶ The CWE project has a strong preference to rule out FB source-to-sink intuitive MC i.e. to start with either FB plain MC or with FB bilateral intuitive MC. Indeed:
 - Source-to-sink intuitiveness is more difficult to understand than bilateral intuitiveness.
 - Bilateral intuitiveness is more robust than source-to-sink intuitiveness to the extension of the geographic scope of flow-based allocation.
 - At the CWE level, the impact on the welfare is very low.
- ▶ Therefore source-to-sink intuitive MC will not be simulated during the parallel run.
 - The CWE project has started to implement FB bilateral intuitive MC inside COSMOS. It is expected to be ready for the start of the external parallel run

Hybrid coupling: context

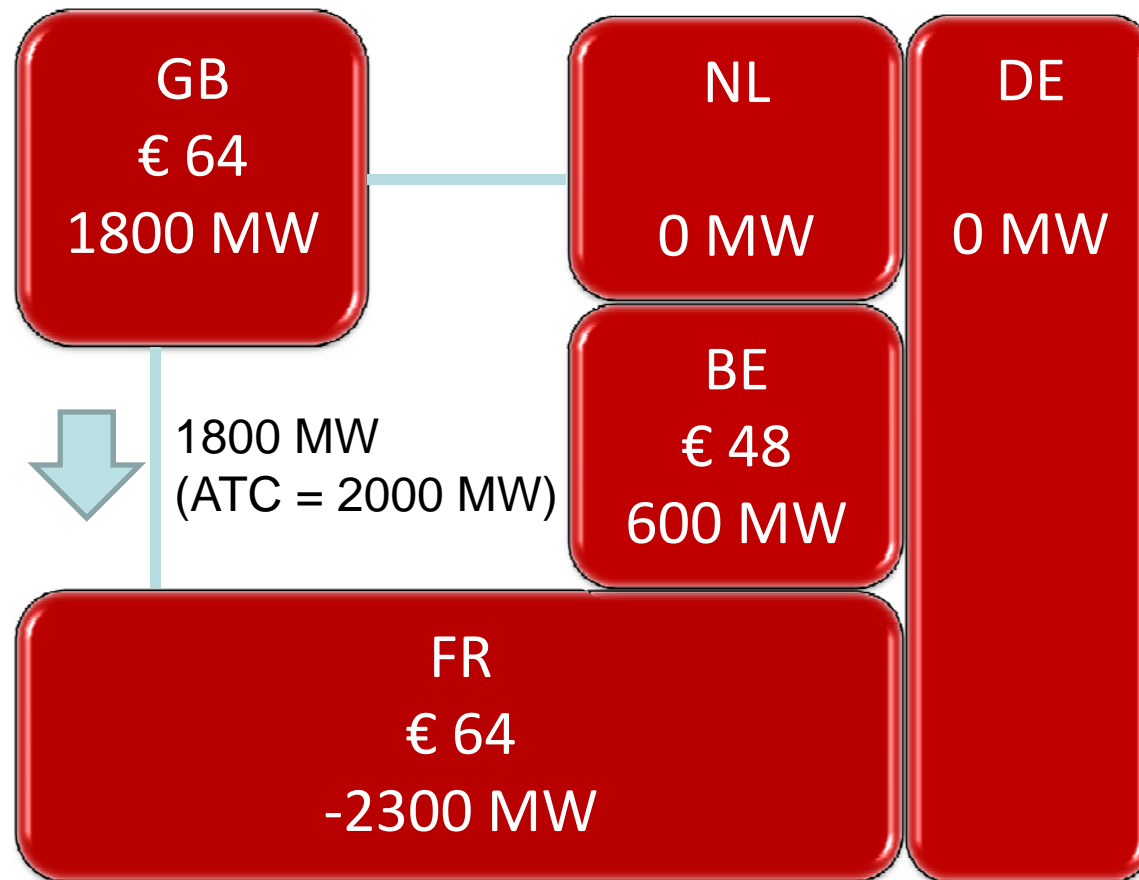


- ▶ When CWE FB will go live, there will not be a single FB capacity calculation process with neighbouring regions.
- ⇒ Consequently, a single market coupling method that handles different capacity calculation methods and processes in different regions is needed. It is called a hybrid market coupling method. Two methods have been studied: “standard ” (previously called “rough”) and “advanced” hybrid coupling.

“Standard” hybrid coupling example



Definition: CWE grid capacity reserved ex-ante for exchanges with other regions.



-In this example, the exchange on IFA is purposefully limited by GB-FR price convergence¹.

-As the capacity for a 2000 MW exchange on IFA was booked on the CWE grid whereas only 1800 MW are used, price differences in CWE occur while no CWE grid element is saturated².

⇒ The wasted capacity could have been used for additional BE-FR exchanges!
⇒ Lost DA market welfare and increased price divergence.

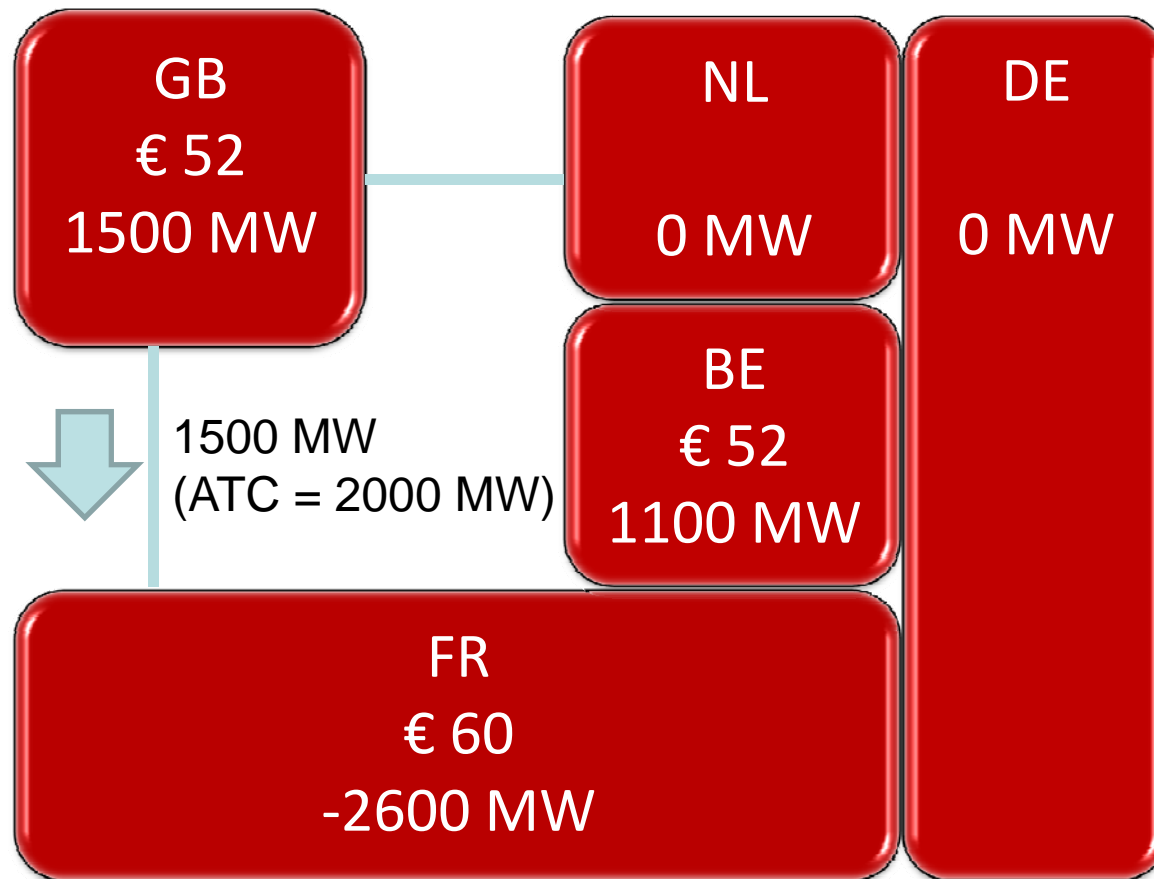
¹ The choice of countries is disconnected from the Market Coupling implementation projects roadmap. IFA was chosen for illustrative purposes only.

² The congested CB equation is: $NEX(BE) \leq 2600 - \max(\text{Exchange}(IFA \Rightarrow FR)) = 600 \text{ MW}$. Therefore, the flow on the CB is below maximum possible flow : $600 + 1800 = 2400 \leq 2600 \text{ MW}$

“Advanced” hybrid example



Definition: Exchanges with other regions compete with CWE exchanges to access CWE grid capacity.



- No capacity is booked for the exchange on IFA¹.

- As a result, no capacity is wasted within the CWE region: BE exports to FR are increased.

- IFA itself is not saturated whereas there is a price difference between FR and GB²! This price difference is triggered by a saturation of the grid within the CWE region. This cannot happen with ATC MC or “standard” Hybrid Coupling.

¹ The congested CB equation is the “true” one, different from the “standard” hybrid coupling equation:

$$\text{NEX}(\text{BE}) + \text{Exchange}(\text{IFA} \Rightarrow \text{FR}) \leq 2600 \text{ MW}$$

² The choice of countries is disconnected from the Market Coupling implementation projects roadmap. IFA was chosen for illustrative purposes only.

Summary



Hybrid coupling methodology:	Standard	Advanced
Definition	CWE grid capacity reserved ex-ante for exchanges with other regions.	Exchanges with other regions compete with CWE exchanges to access CWE grid capacity.
Capacity given to the market	-	+
Day-ahead market welfare	-	+
Price differences triggered by saturations of physical elements only.	No	Yes
“No price difference without saturation on ATC interconnector” / “Full priority to exchanges with neighbour regions over CWE exchanges”.	Yes	No

CWE project recommendation



- ▶ The CWE project plans to start CWE FB with standard hybrid coupling:
 - Starting with advanced hybrid coupling would imply a delay of several months because:
 - The FB capacity calculation should be adapted (additional experimental cycles...).
 - Discussions with non-CWE partners would be needed.
 - Discussions could imply the simulation of other hybrid coupling methods that have not been studied nor been implemented.

- ▶ The standard hybrid coupling does not change the working hypothesis compared to the present working method regarding capacity coordination on interconnectors on the borders of CWE

- ▶ Other hybrid coupling methods will continue to be studied with a broader scope (NWE) potentially on an interconnector by interconnector basis.
 - The planning of studies is to be established in collaboration with the NWE Day-Ahead project.

External parallel run - details





- ▶ From September 2012 to mid 2013, simulation results of FB Market Coupling will be published ex-post:
 - on a weekly basis from September to February (part 1) and on a daily basis afterwards (part 2).
 - based on:
 - FB parameters produced in parallel to ATC by TSOs.
 - Real order books of the operational ATC market coupling.
 - Published data:
 - FB parameters will be publicly available¹. A Utility Tool, specified in collaboration with the market parties, will be available to analyze them online.
 - Simulated FB plain MC and FB bilateral intuitive MC net positions and clearing prices accessible to all.

- ▶ For the first part of the external parallel run prototypes will be used, for the second part industrialized tools will be used.

¹Anonymous non-redundant FB constraints, represented by their PTDF factors and RAM (Remaining Available Margin).

External parallel run - Publication of data



- FB parameters  CASC website, through the Utility Tool opened to all.
- FB parameters and FB MC net positions and clearing prices  PXs FTP server, opened to all.
- A link on PXs websites will lead to the FTP server.

External parallel run – Utility Tool



- ▶ **How to make sure that the FB domain is given to the market in a useable and transparent way ?**
 - **By providing the Market with a Utility Tool**

- ▶ **Why ?**
 - Because FB parameters are more complex (around 20 equations with 5 parameters each vs 8 ATC values).
- ▶ **Where ?**
 - It will be available on the CASC website.
- ▶ **When ?**
 - For the start of the external parallel run in September and after GO Live.
- ▶ **Basic usage of the tool**
 - Flow Based constraints
 - Precomputed numbers (domain indicators)
 - Exchange scenario feasibility simulation based on Net Positions
 - Exchange scenario feasibility simulation based on bilateral exchanges

A demo of the Utility Tool will be made at the Forum in September. In the mean time, here are a few snapshots to show you a few features.



CWE Flow Based Utility Tool

Reference time:

07.09.2011
hour:

13

1) Check volume (*interactive module*)

Here you can check the simultaneous execution of trading volumes of the markets involved in the CWE Market Coupling

	Hub-to-Hub trade in MWh/h (please insert values)	Test 1: hub to hub inside FB space
DE=>BE	0	Trades feasible
DE=>NL	0	
DE=>FR	0	
NL=>BE	0	
NL=>FR	0	
BE=>FR	0	

HUB TO HUB
EXCHANGES

2) Max volume (*information module*)

Here you can find the maximal trade volumes (MWh/h) which can be physically transported between two Hubs under the condition that no other trade is executed between other Hubs.

	direction -->	direction <--
DE=>BE	4407	4318
DE=>NL	4028	5306
DE=>FR	3384	3426
NL=>BE	4407	3755
NL=>FR	5238	4253
BE=>FR	4366	4295

HUB
POSITION

	Hub Positions trade in MWh/h (please insert values)	Test 1: sum hub positions = 0	Test 2: hub positions inside FB space
DE	4000	OK	Trades feasible
BE	-1000		
FR	-1000		
NL	-2000		

	export	import
DE	5448	-8121
BE	6179	-4407
FR	6281	-5521
NL	6781	-6199

Values entered by the user are checked on the FB constraints of all 24 hours

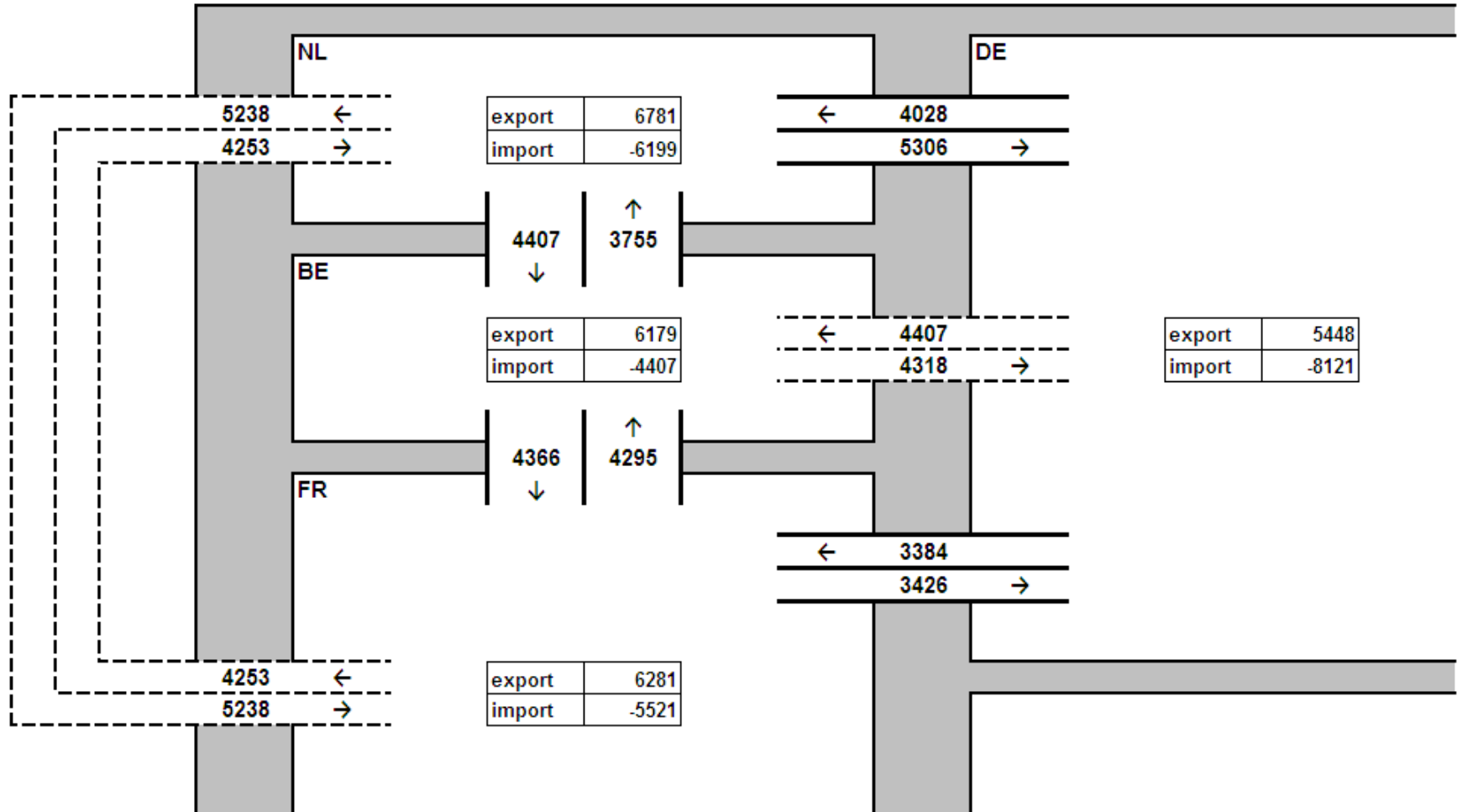
(non-simultaneous) indicators for the hour selected



CWE map showing the (non-simultaneous) indicators for the selected hour

data shown for hour:
13

CWE max net positions and bilateral exchanges

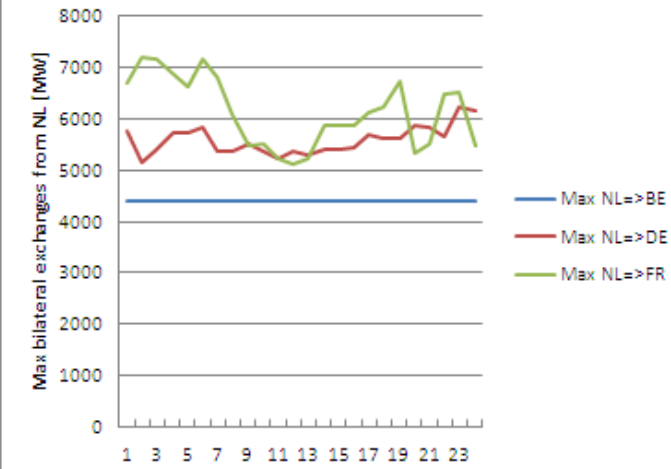
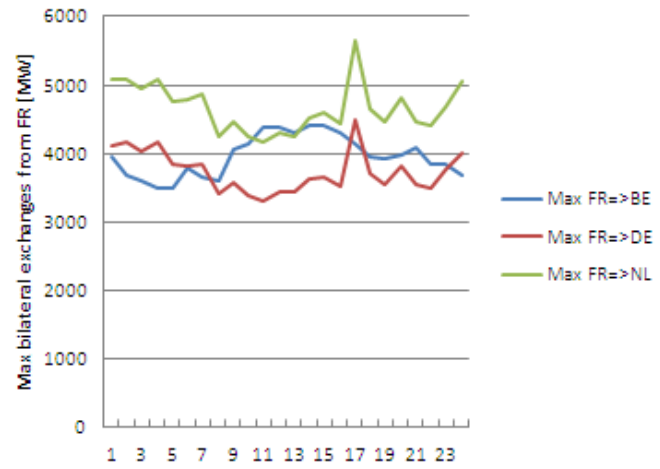
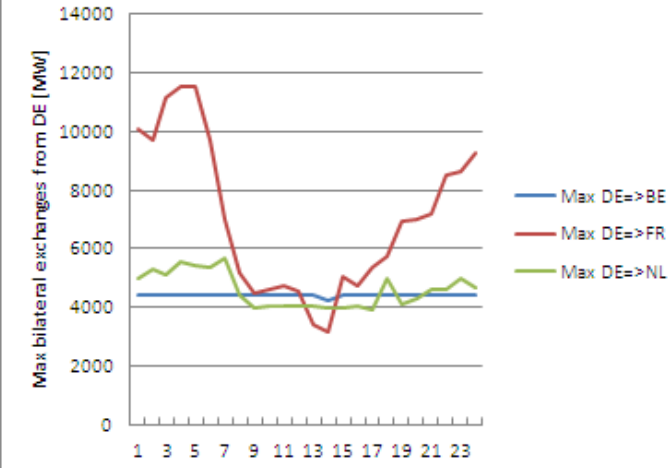
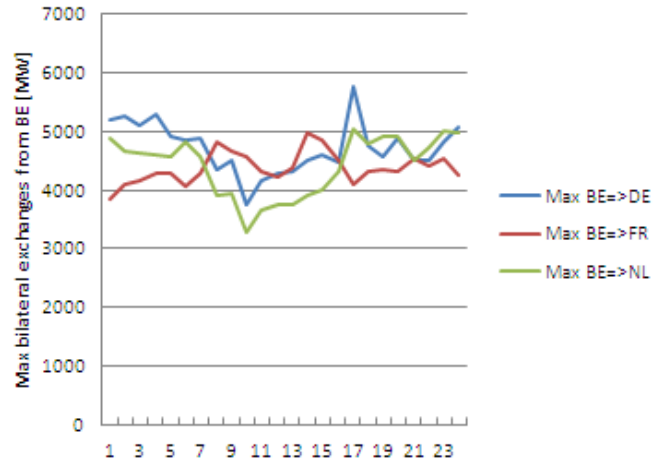


External parallel run – Utility Tool snapshots

24 hour overview graphs of the (non-simultaneous) indicators

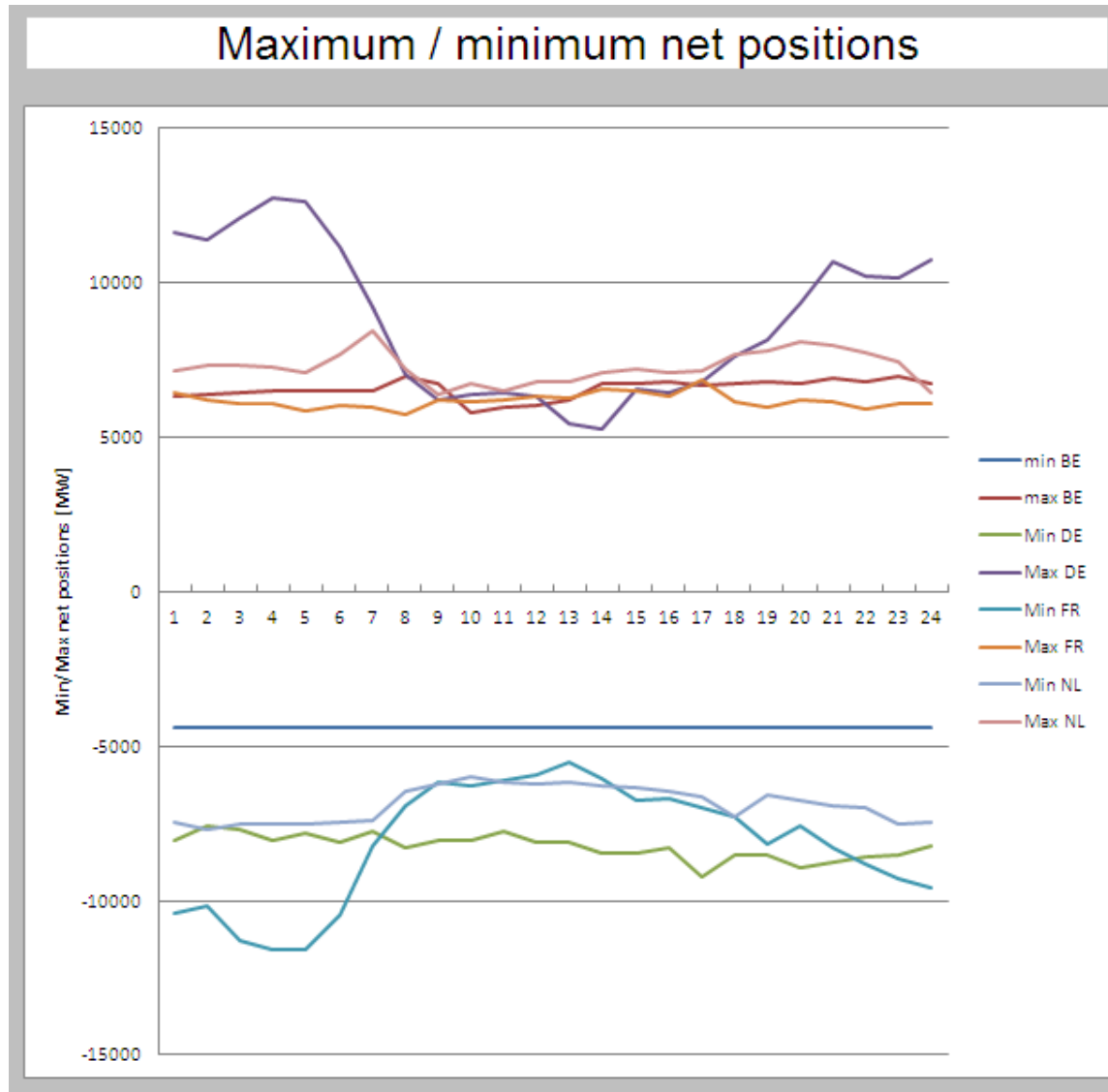


Maximum bilateral exchanges



External parallel run – Utility Tool snapshots

24 hour overview graphs of the (non-simultaneous) indicators





5 - CWE Common Website for data Publication



5 - CWE Common Website for data Publication




- ▶ **To publish all data related to ATC Market Coupling (and FB MC next year), CWE FB MC Project has worked on the implementation of a common website.**
- ▶ **As of before summer 2012, a single web page will be available with:**
 - daily results of CWE region only (no history)
 - Inter-area flows
 - ATC values
 - Area prices
 - joint Communication describing the status in case of a critical incident impacting the Market

5 - CWE Common Website for data Publication




DISCLAIMER: Please note that this is a draft version


CENTRAL WESTERN EUROPE PROJECT

AMPRION
APX-ENDEX
BELPEX
CREOS
ELIA
EPEX SPOT
RTE
TENNET
TRANSNET BW

GENERAL INFORMATION
Market coupling on the electricity market quis eatiis et lia quident ulpa rumque culparu tiat quis si omnient dolupti doluptassi tem omnisquid que volor siat venda velecte mporion pro cone vollut volutatis sinctur. Ur sapid ullor ad que volupta tiatur, illacea voluptaquia que nihil iden busdae inulpa pro blautaqui ut voluptatem es dus dolor eate exceattem.

LATEST ANNOUNCEMENTS
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THE NETHERLANDS ×

PRICES:

FLOWS:

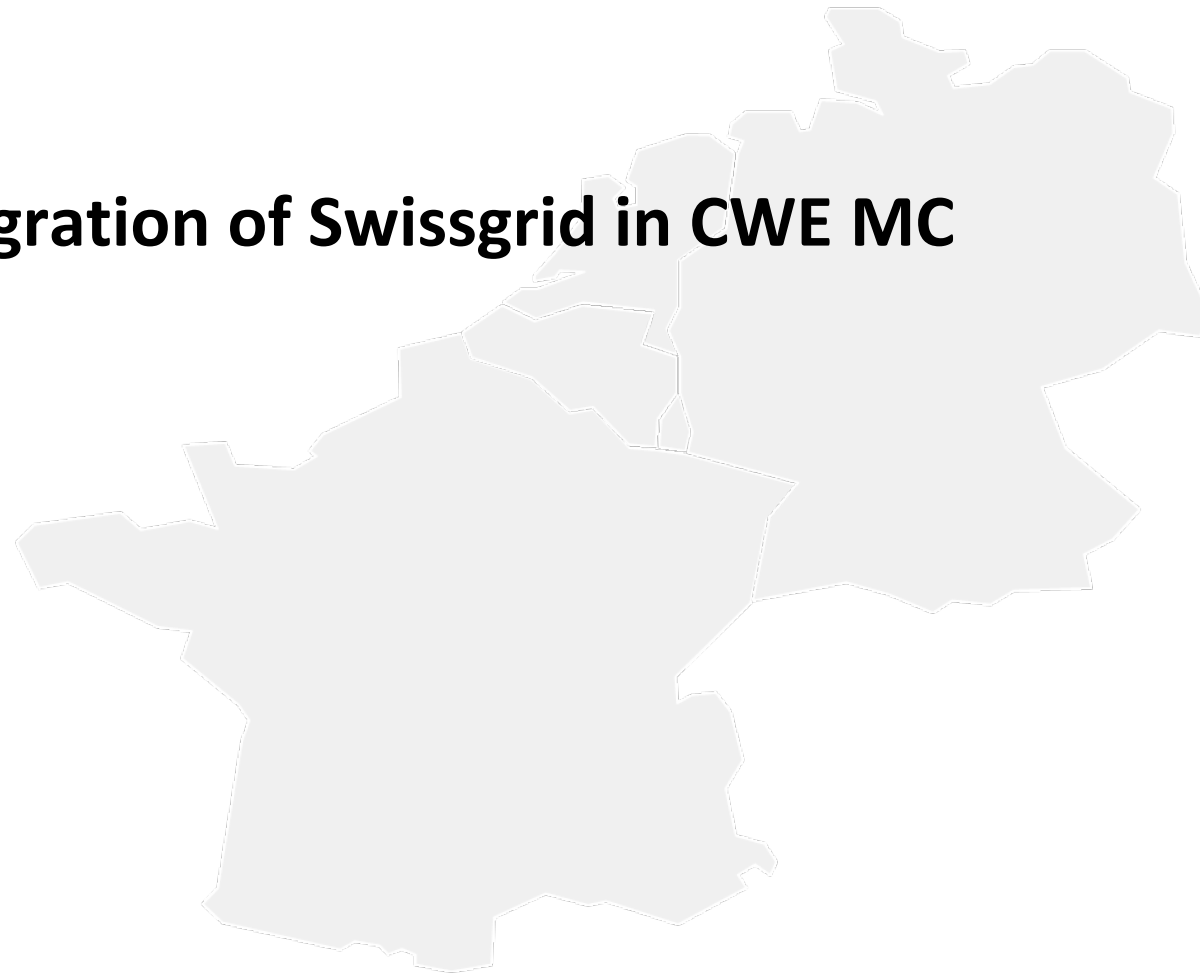
PRICES: 21 MARCH 2012				
HRS	BE	DE	FR	NL

FLOWS: 21 MARCH 2012				
HRS	NL - BE	DE - NL	FR - DE	FR - BE

NB: This prototype screenshot describes the general look and feel of the website. Please note that the ATCs table will also be published



6 - Integration of Swissgrid in CWE MC



6 - Integration of Swissgrid in CWE MC



- ▶ ATC Market Coupling was implemented on November 9th, 2010 in the Central Western Europe (CWE) . The main objective for the CWE TSOs and CWE PXs is now Flow Based Market Coupling (FB MC), which is scheduled to Go live in the summer of 2013.
- ▶ On October 28th, 2011 during the Pentalateral Energy Forum in Paris, Swissgrid was granted an observer status as a first step towards coordination. CWE Joint Steering Committee has also committed to start an impact assessment of integration of Swissgrid in CWE MC.
- ▶ **CWE FB MC project has worked on the way such a task could be lead by drafting a Letter of Intent. It contains an organization, a high-level planning, an estimation of the resources needed (both internal and external) and the budget.**