

Workshop Session 2:

Parallel run functioning, In-depth analysis of daily results, discussion on interpretation of parallel run results, presentation of utility tool

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Workshop 2

Agenda



- I. Introduction: the parallel run in practice
- II. Publication during the parallel run: quick demonstration of Utility Tool & market coupling report
- III. Explanation of parallel run results: practical cases
 1. “Normal” day and non-intuitive situation
 2. Less Welfare in FB than in ATC
 3. Negative prices (Christmas and Boxing days)
 4. Block orders effect

Practical advise:

- ▶ This workshop is meant to be **interactive** and to give room for discussions
- ▶ Please feel free to **ask your questions** or to **comment** after each section
- ▶ Questions that go beyond the scope of this workshop will be collected and answered via the Q&A Forum afterwards





Introduction

- ▶ During the weekly/daily publication process, the published data concerns the previous week/day
- ▶ All data will be published in a report including the following information resulting from current ATC based operation and from Flow Based simulation: hourly prices and volumes for all CWE market areas, net positions, graphs on price convergence/divergence and welfare calculations
- ▶ Traders will also have at their disposal an **Utility tool** displaying the relevant Flow-Based parameters which will be helpful for their simulations



Principles of the parallel run

- ▶ During the parallel run, TSOs follow a **true operational daily process** in computing FB parameters
- ▶ The process is performed in **real time**, by operators in shift. The process is neither performed nor corrected ex-post by FB experts
- ▶ This process encompasses the following main steps :
 - Data gathering : local inputs (CB, GSK) & D2CF merge
 - 1st FB computation, as described in workshop 1
 - Local assessment and coordination between TSOs, possibly leading to an update of some CBs
 - 2nd FB computation with updated CB and adjustment to LT nominations
- ▶ At the end of each week, FB experts perform an **assessment of the FB parameters on the basis of quality criteria and detailed operational reports**, and validate the days relevant for transfer to PXs for market coupling simulations based on ATC OBKs. The objective of this assessment is to ensure that the published data is fully representative
- ▶ If for any reason (either in the common process or in one of the local TSO process), there is a doubt on data representativeness, then the corresponding day will not be transferred to PXs, and therefore will not be published
- ▶ Despite the weekly publication, as TSOs follow an operational daily process, the ex-post computation of FB parameters is not possible, as one cannot reproduce truly an operational process



Market coupling reports: access

- Results provided by the Simulation Facility, which couples the Flow Based Parameters with the ATC order books

Access FTP for Market Coupling results

Authentication Required

The server ftp://ftp.cwe-sf2.com:21 requires a username and password.

User Name:

Password:

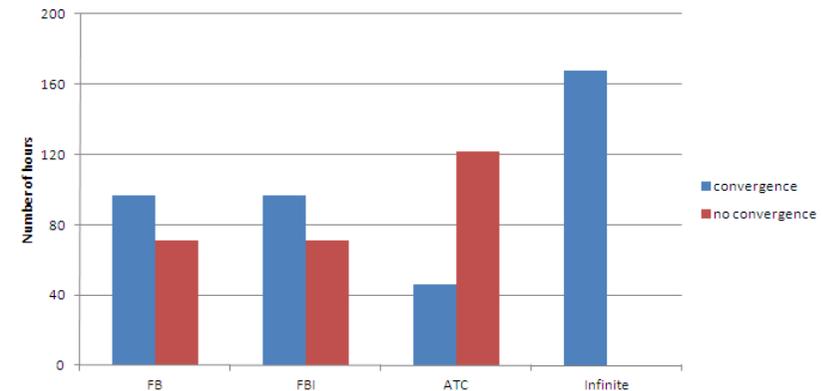
Market Coupling Results

Index of /

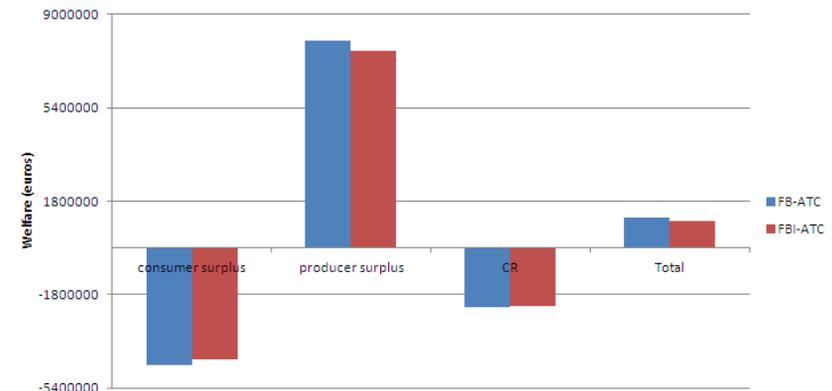
Name	Size	Date Modified
<input type="checkbox"/> report_wk06.xlsx	65.2 kB	2/14/13 10:20:00 AM
<input type="checkbox"/> report_wk5.xlsx	43.1 kB	2/7/13 12:47:00 PM

- Typical displays:

Price convergence



Global welfare distribution



<http://www.casc.eu/en/Resource-center/CWE-Flow-Based-MC/Parallel-Run-Results>



Utility tool: access

- The Utility Tool provides energy traders the possibility to determine the feasibility of different trades of transmission capacity within the CWE region under Flow Based

Utility tool access

Utility tool (excel based tool)XML files

```

<?xml version='1.0' encoding='utf-16' ?>
<TradingData xmlns:xsd='http://www.w3.org/2001
<MaxExchanges>
  <MaxExchange>
    <Date>2013-02-02T00:00:00</Date>
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    <Max_BE_to_NL>4796.5715</Max_BE_to_NL>
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  </MaxExchange>
</MaxExchanges>

```

<http://www.casc.eu/en/Resource-center/CWE-Flow-Based-MC/Utility-Tool>



Utility tool: front page

- This interface allows to check different simultaneous execution of trading volumes



CWE Flow Based Utility Tool

Reference time:
 date:
 2013-02-19
 hour:
 1

1) Check volume (interactive module)
 Here you can check the simultaneous execution of trading volumes of the markets involved in the CWE Market Coupling

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.

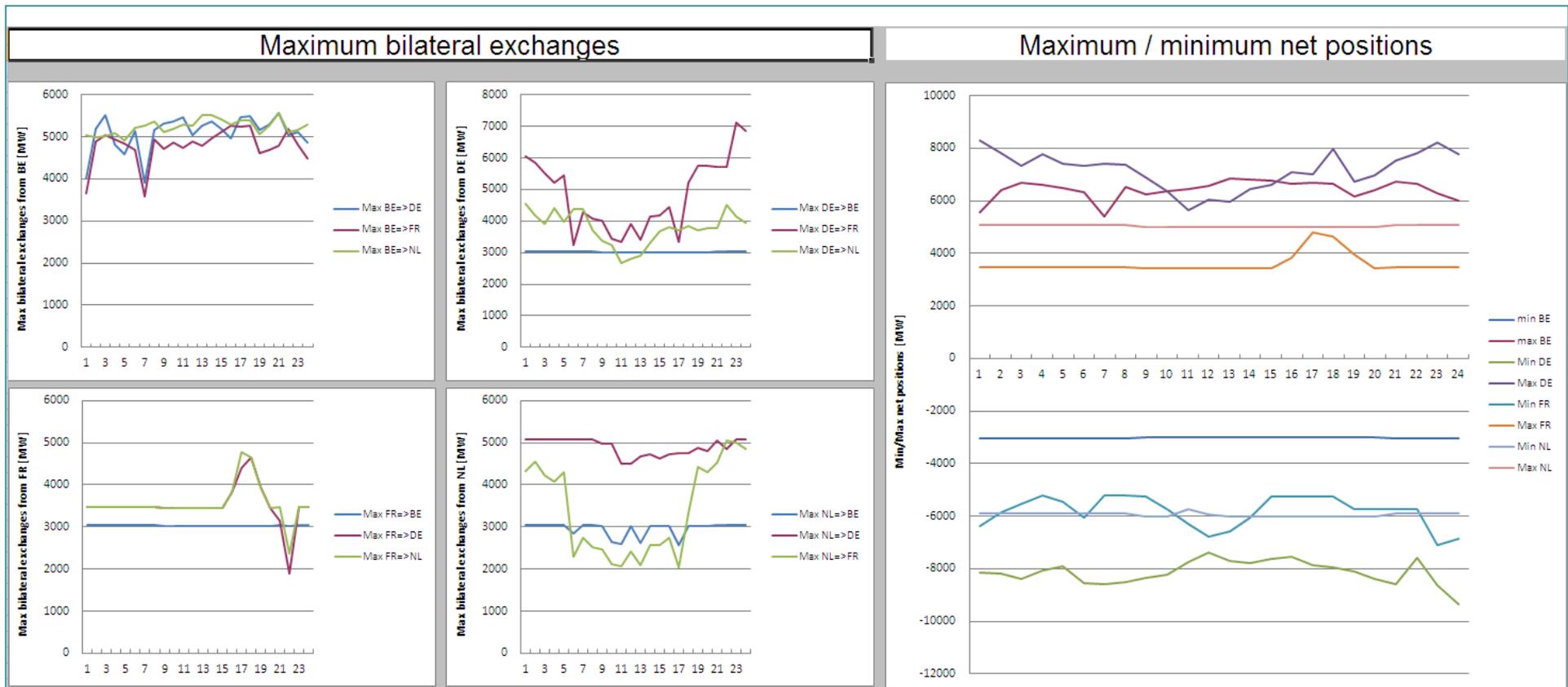
	Hub-to-Hub trade in MWh/h (please insert values)	Test 1: hub to hub inside FB space		direction -->	direction <--
HUB TO HUB EXCHANGES	DE=>BE	0	Trades feasible	DE=>BE	3047
	DE=>NL	0		DE=>NL	4531
	DE=>FR	0		DE=>FR	6057
	NL=>BE	0		NL=>BE	3047
	NL=>FR	0		NL=>FR	4313
	BE=>FR	0		BE=>FR	3666

	Hub Positions trade in MWh/h (please insert values)	Test 1: sum hub positions = 0	Test 2: hub positions inside FB space	export	import
HUB POSITION	DE	-2000	OK	DE	8296
	BE	5000		BE	-3047
	FR	-3000		FR	-6391
	NL	0		NL	-5915



Utility tool: capacity indicators (1)

- The graphs indicate the maximum bilateral exchanges and net positions



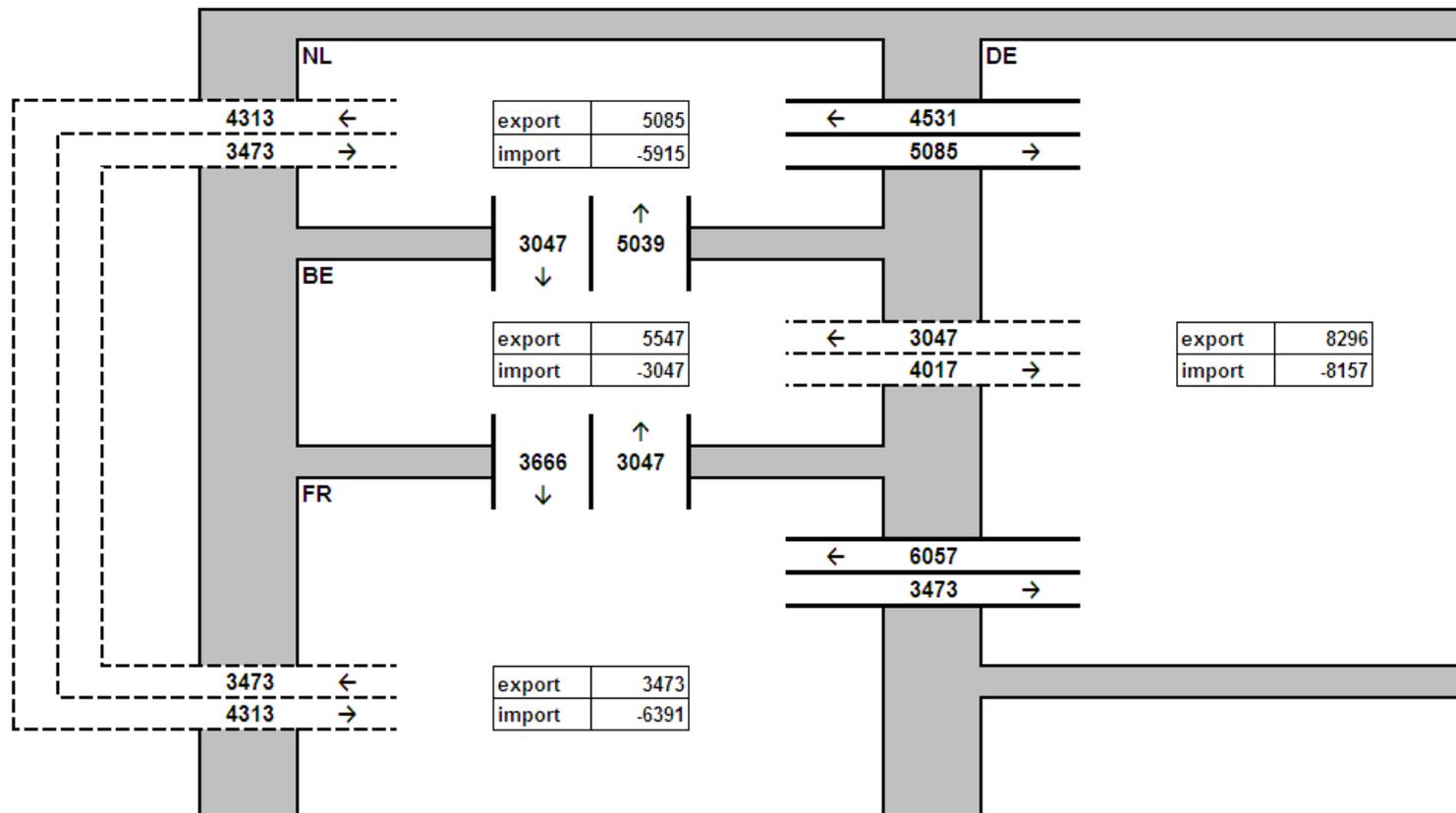


Utility tool: capacity indicators (2)

- The graphs indicate the maximum bilateral exchanges and net positions with a geographical representation

data shown for hour:
1

CWE max net positions and bilateral exchanges





Utility tool: FB parameters matrix

- Access to detailed PTDF matrix allowing the identification of limiting constraints

		BE-hub (MW)	DE-hub (MW)	FR-hub (MW)	NL-hub (MW)	Sum			
	Test Hub to Hub	0	0	0	0	0			
	Test Hub Positions	5000	-2000	-3000	0	0			
	ID	BE-hub	DE-hub	FR-hub	NL-hub	RAM (MW)	Test Hub to Hub	# of constraints violated	Test Hub positions
							0		8
hour 1	CB1	0,0964	0,2878	0,1676	0,4691	1554,5103	0		0
hour 1	CB2	-0,0384	0,1549	0,0605	0,2335	1045,0837	0		0
hour 1	CB3	-0,0539	0,1443	0,0544	0,1853	915,7149	0		0
hour 1	CB4	0,0400	-0,0470	-0,0467	-0,0303	386,8818	0		1
hour 1	CB5	-0,0964	-0,2878	-0,1676	-0,4691	1877,6497	0		0
hour 1	CB6	0,0447	-0,0491	-0,0580	-0,0216	376,6219	0		1
hour 1	CB7	-0,0040	-0,0408	-0,0181	0,0768	656,2237	0		0
hour 1	CB8	0,0219	0,1373	0,0717	-0,0166	697,1234	0		0
hour 1	CB9	-0,0037	0,0314	-0,0169	0,0509	292,2549	0		0
hour 1	CB10	0,0264	-0,1397	0,0558	-0,0912	844,4923	0		0
hour 1	CB11	0,0000	0,0000	1,0000	0,0000	3473,0000	0		0
hour 1	CB12	0,0000	0,0000	-1,0000	0,0000	6391,0000	0		0
hour 1	CB13	-1,0000	0,0000	0,0000	0,0000	3047,0000	0		0
hour 1	CB14	0,0000	0,0000	0,0000	-1,0000	5915,0000	0		0
hour 1	CB15	0,0000	0,0000	0,0000	1,0000	5085,0000	0		0

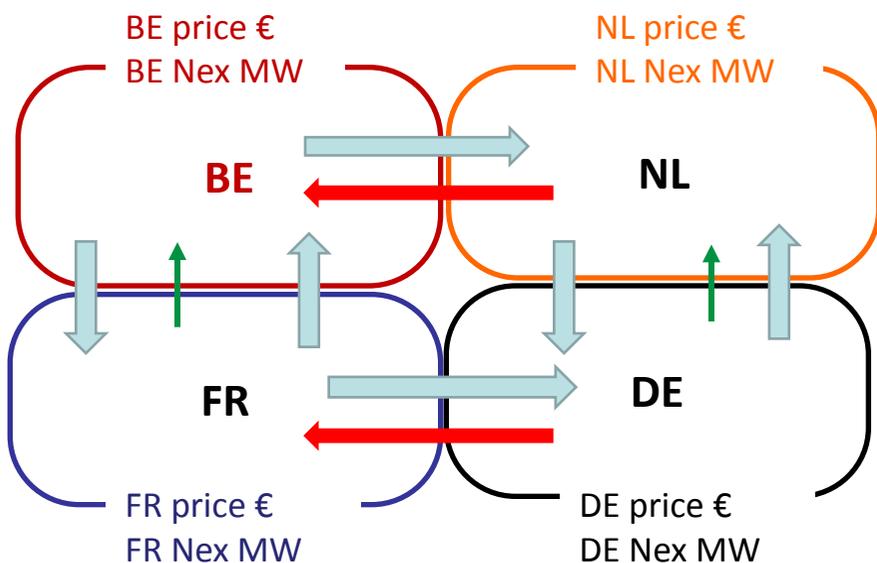
Focus on parallel run results

Introduction



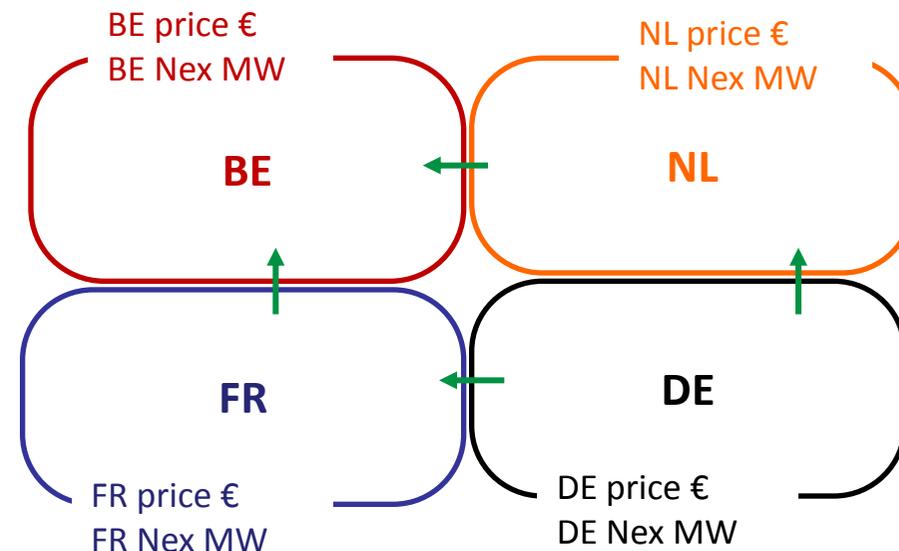
- For our study of practical outcomes of the parallel run, we take the following conventions:

ATC market coupling



FB market coupling

(Congested situation will be indicated by **red exchanges** and different prices)



Legend:



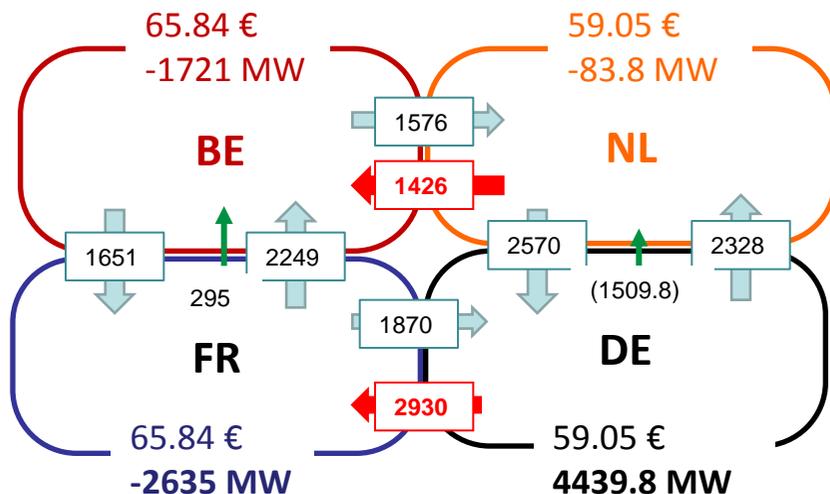
Focus on parallel run results

Focus Case n°1 : "normal" day (1)



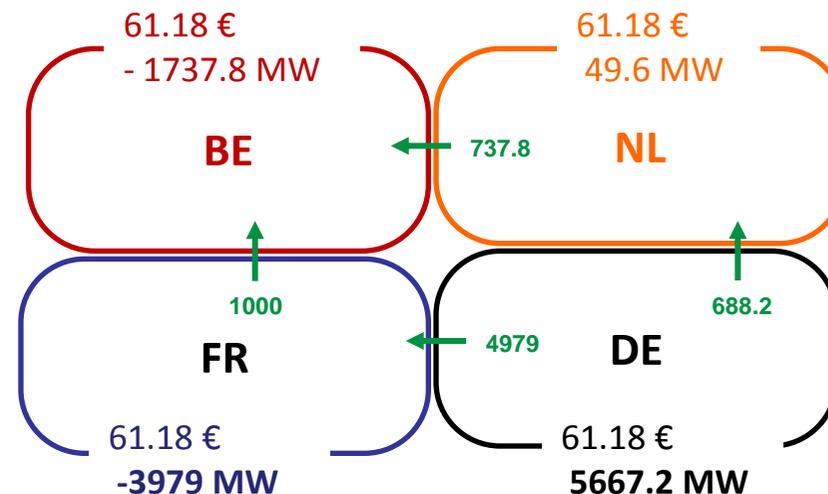
Situation: 25th of January, at 6 – 7 pm

ATC market coupling



FB market coupling

Note : the decomposition of FB Nex into bilateral exchanges is completely arbitrary



- ▶ Congested situation in ATC
- ▶ Limiting ATC from Germany to France, and from the Netherlands to Belgium
- ▶ Welfare

Producer	Consumer	Congestion Rent
78 583 092.64	88 374 116.77	29577.24

- ▶ Unconstrained situation in FB or FBI
- ▶ Germany is more able to export, France is more able to import. Prices converge in CWE
- ▶ Welfare increase relative to ATC: € 4630.10:

Producer	Consumer	Congestion Rent
78 609 497.83	88 381 918.94	0

- ▶ **Welfare gain from ATC to FB may seem relatively low, but in fact is more a redistribution from TSOs to market parties**

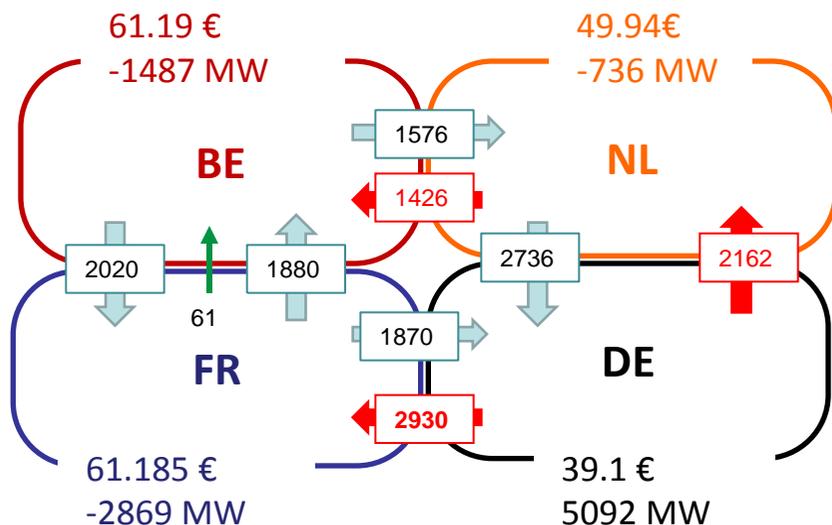
Focus on parallel run results

Focus Case n°1 : “normal” day (2)

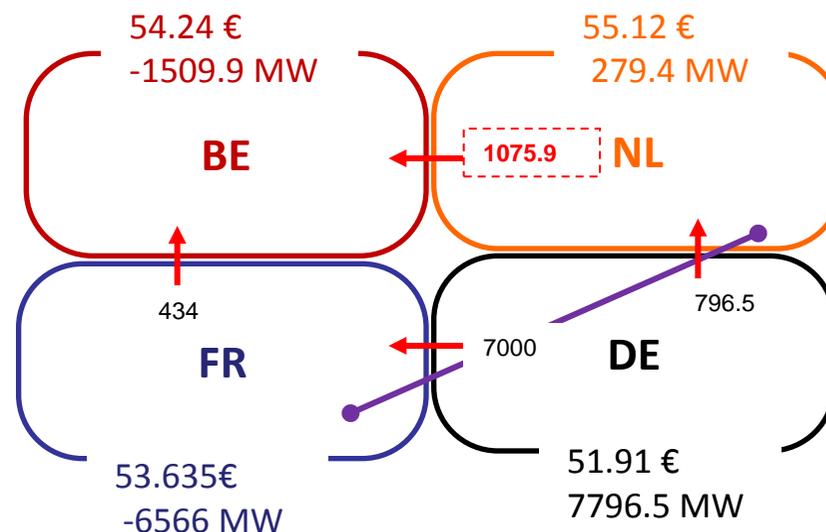


Situation: 25th of January, at 22 – 23

ATC market coupling



FB market coupling



Counter-intuitive situations

- ▶ Congested situation in ATC
- ▶ Limiting ATC from Germany to France and the Netherlands, from Netherlands to Belgium

- ▶ Constrained situation in FB
- ▶ Somewhere in CWE an “**active CB**” is **limiting the market** (in purple, arbitrarily located)
- ▶ However there are **more exchanges and more convergence** (especially from DE to FR), the FB outcome generates more welfare for market parties, less congestion rent
- ▶ The situation is **non-intuitive**. NL is exporting while the most expensive, FR and BE are importing while cheaper than NL

Focus on parallel run results

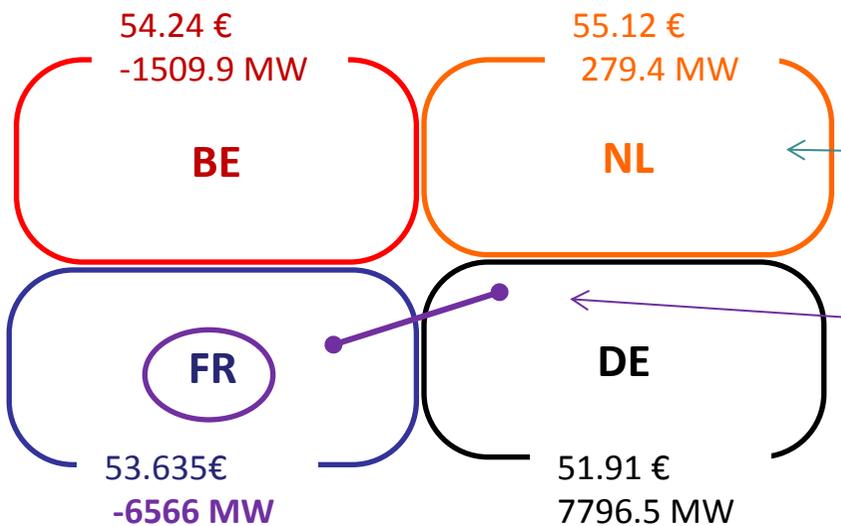
Focus Case n°1 : "normal" day (2)



Situation: 25th of January, at 22 – 23

► Identification of the active CB in Utility Tool

HUB POSITION	Hub Positions trade in MWh/h (please insert values)			Test 1: sum hub positions = 0	Test 2: hub positions inside FB space	export		import	
	DE	7796,6			OK	Constrained Transmission System	DE	7867	
BE	-1509,9					BE	4806		-2905
FR	-6566,1					FR	3751		-6566
NL	279,4					NL	5212		-5788



This screenshot from the utility tool actually displays the constrained situation under FB, when slightly higher (0.1 MW) Nex than the ones resulting from the market coupling are put in

This screenshot from the utility tool actually displays the constraining CBS within CWE grid: CBS 14 (location on the sketch is arbitrary) & 17

- Constrained situation in FB
- Somewhere in CWE an "active CB" is limiting the market
- However there are more exchanges
- One can also note that the situation is non-intuitive

	BE-hub (MW)	DE-hub (MW)	FR-hub (MW)	NL-hub (MW)	Sum	Test Hub to Hub	# of constraints violated	Test Hub positions
Test Hub to Hub	0	0	0	0	0			
Test Hub Positions	-1510	7797	-6566	279	0			
ID	BE-hub	DE-hub	FR-hub	NL-hub	RAM (MW)	Test Hub to Hub	# of constraints violated	Test Hub positions
hour 23 CB1	0.1186	0.2637	0.1649	0.4005	1271.2055	0	0	0
hour 23 CB2	-0.0328	-0.1917	-0.3262	-0.1154	1470.7568	0	0	0
hour 23 CB3	0.1319	0.3379	0.2111	0.4825	1527.0102	0	0	0
hour 23 CB4	0.02137539	0.20702682	0.12182745	0.21157866	898.9133	0	0	0
hour 23 CB5	0.0422795	-0.04742679	-0.04672917	-0.03080733	332.7545	0	0	0
hour 23 CB6	0.14277594	0.00896701	-0.07050466	0.06065213	992.1739	0	0	0
hour 23 CB7	-0.12648636	-0.15727979	-0.25451902	-0.09440915	965.8733	0	0	0
hour 23 CB8	0.04812244	-0.04885248	-0.05769536	-0.02334858	371.7152	0	0	0
hour 23 CB9	0.02809332	-0.15070142	0.06144959	-0.10196891	937.3234	0	0	0
hour 23 CB10	0.01485024	0.23570469	0.14790371	-0.01217669	1052.471	0	0	0
hour 23 CB11	0.05789386	-0.15438622	-0.05990004	-0.1873654	1311.0017	0	0	0
hour 23 CB12	0.0223322	0.12716031	0.06516544	0.32416989	1399.668	0	0	0
hour 23 CB13	0.0223322	0.12716031	0.06516544	0.32416989	1630.3319	0	0	0
hour 23 CB14	0.02085058	0.12897177	0.06468859	-0.0202761	543.605	0	1	1
hour 23 CB15	0.00170987	0.02096274	0.04528866	0.00971805	337.8455	0	0	0
hour 23 CB16	0	0	0	0	3751	0	0	0
hour 23 CB17	0	0	-1	0	6566	0	1	1
hour 23 CB18	0	0	0	0	2905	0	0	0
hour 23 CB19	0	0	0	-1	5788	0	0	0
hour 23 CB20	0	0	0	1	5212	0	0	0

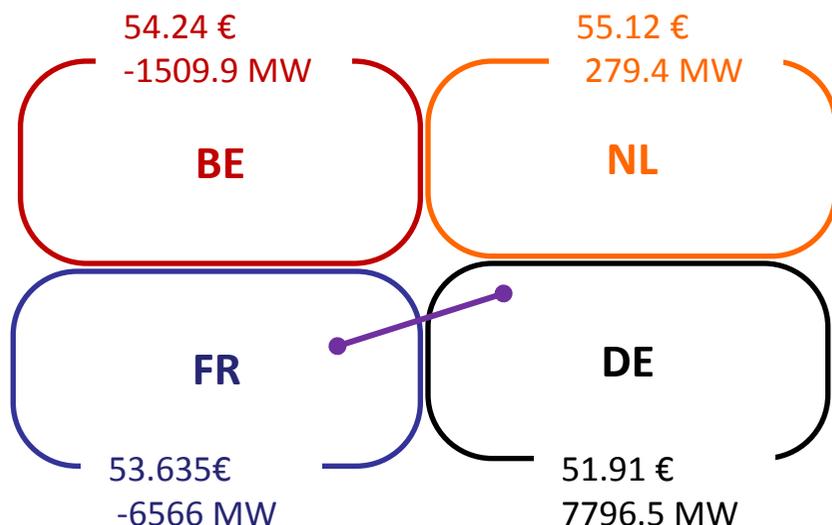
Focus on parallel run results

Focus Case n°1 : “normal” day (2)



Situation: 25th of January, at 22 – 23

Price formation in FB



*One should use the unrounded prices to get this result:

- BE = 54.23602702747
- DE=51.91229355337
- FR=53.63523903896
- NL=55.12

Two constraints are active:

- Constraint 1: FR import is restricted to -6566MW
- Constraint 2 has the following parameters :
 - RAM (exhausted) = 543.605 MW
 - PTDF (BE) = 0.02085
 - PTDF (DE) = 0.12897
 - PTDF (FR) = 0.06469
 - PTDF (NL) = -0.02028

▶ The load on the constraint therefore is:

▶ $(-1509.9) * 0.02085 + 7796.5 * 0.12897 + (-6566) * 0.06469 + 279.4 * 0.02028 = 543.61$ (i.e. RAM exhausted)

▶ **Note that NL is most expensive, yet it is exporting. Why?**

▶ DE is the cheapest market and wants to export. Imagine the prices are static and we increase RAM by 1MW. Where will DE export its power to? NL or BE?

▶ DE→BE: $1 / (.12897 - .02085) = 9.249\text{MW}$, valued $(€54.24 - €51.91) * 9.249 = € 21.49^*$

▶ DE→NL: $1 / (.12897 - (-.02028)) = 6.700\text{MW}$, valued $(€55.12 - €51.91) * 6.700 = € 21.49^*$

▶ I.e. there is an equilibrium which only is met at this price level

▶ NL exports, since it relieves some congestion and allows for this equilibrium to be found

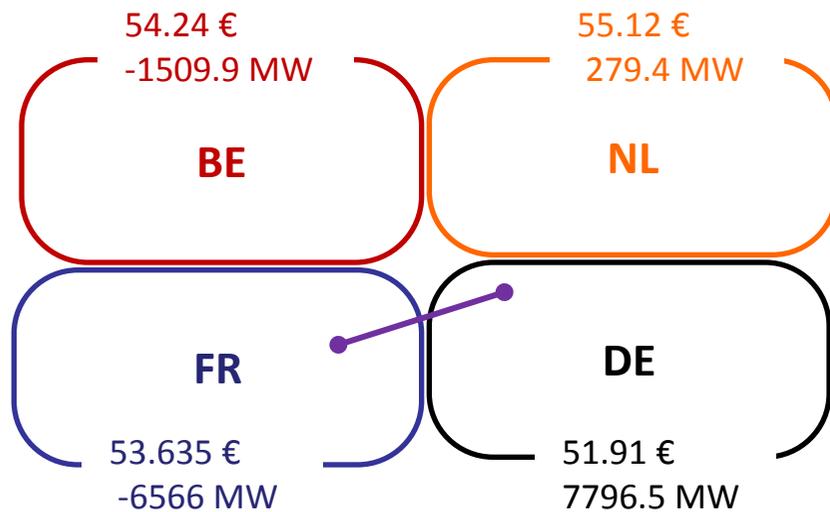
Focus on parallel run results

Focus Case n°1 : “normal” day (2’), effect of the intuitive patch



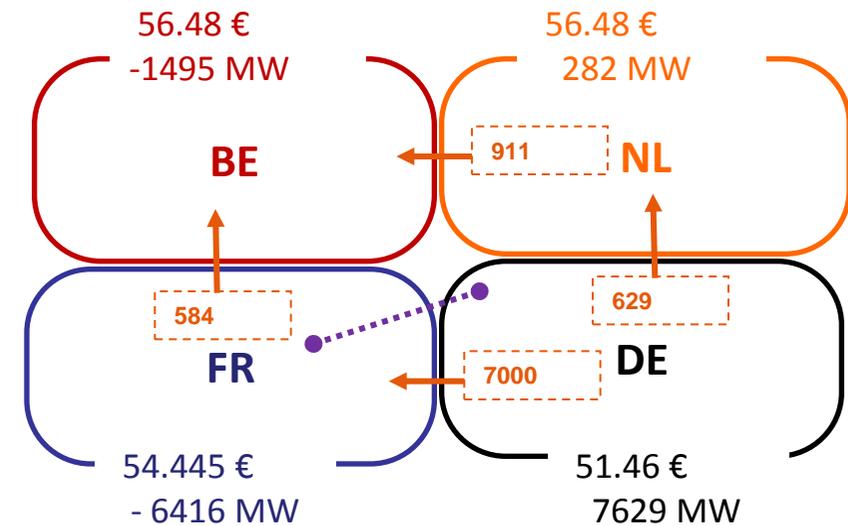
Situation: 25th of January, at 22 – 23

FB market coupling



- ▶ The situation is **non-intuitive**
- ▶ NL is exporting while the most expensive, FR and BE are importing while cheaper than NL

FBI market coupling



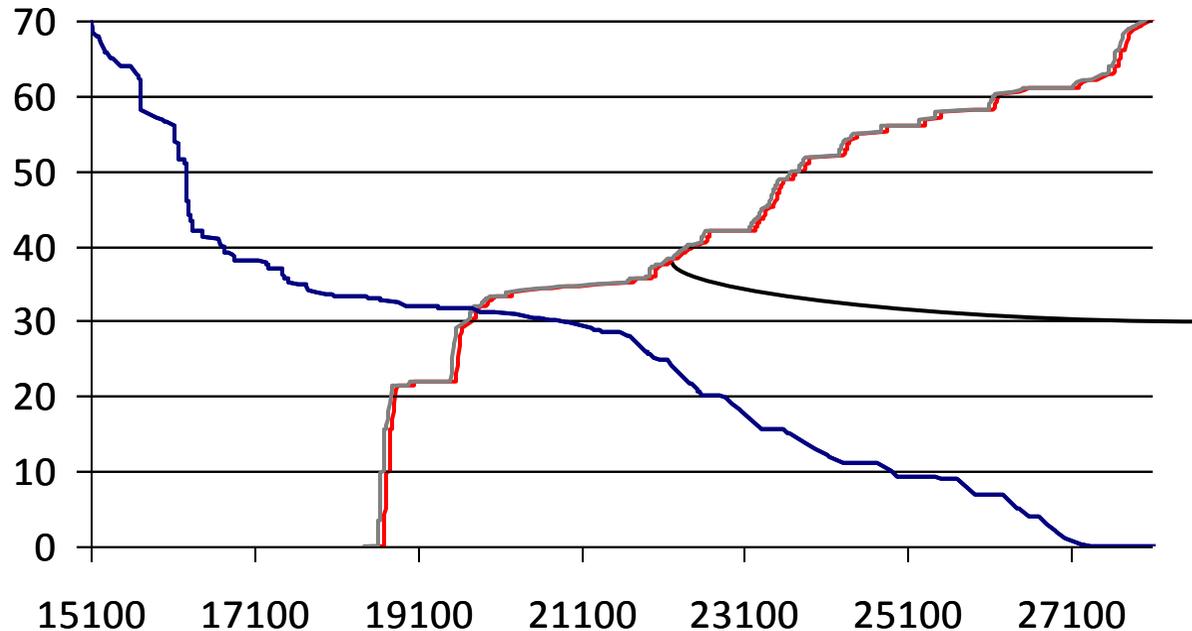
- ▶ A situation of **partial convergence** between NL and BE has been created by reducing the import into BE
- ▶ A decomposition into bilateral exchanges (arbitrary on the sketch above) from low price to high price is now possible on all borders
- ▶ The active CB is “overcome” by an additional intuitiveness limitation

Focus on parallel run results

Focus Case n°1 : "normal" day (2'), effect of the intuitive patch



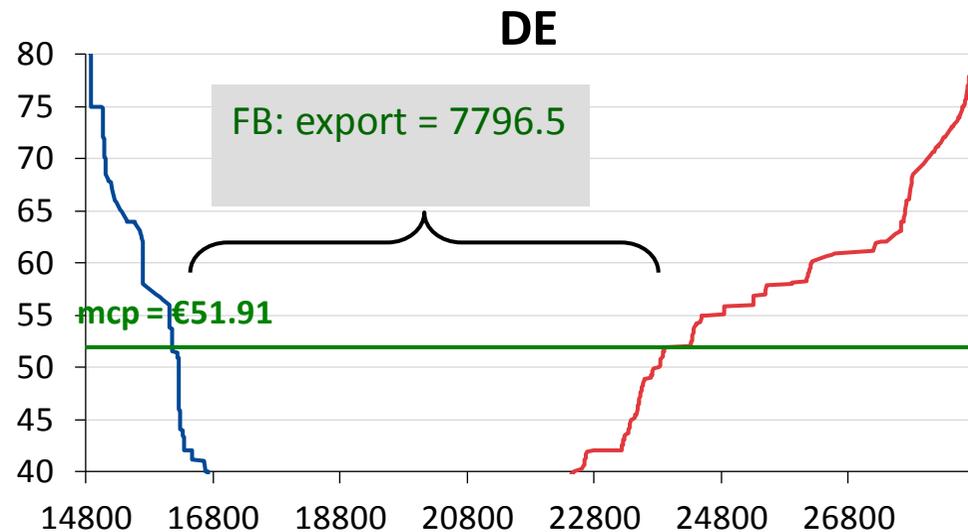
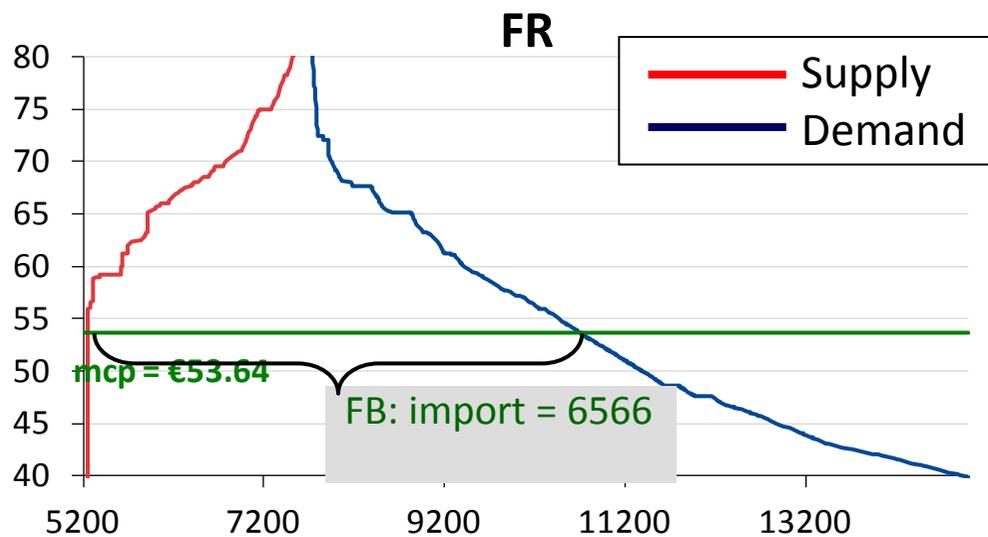
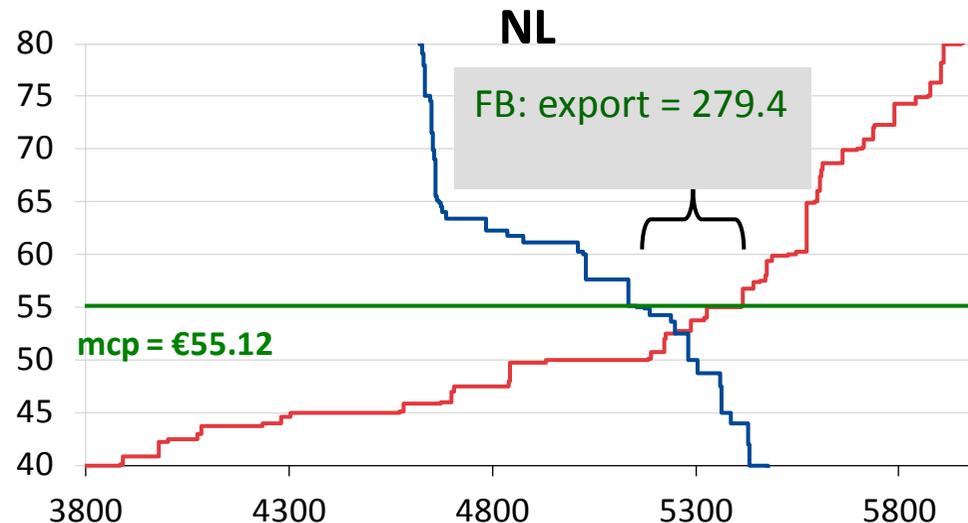
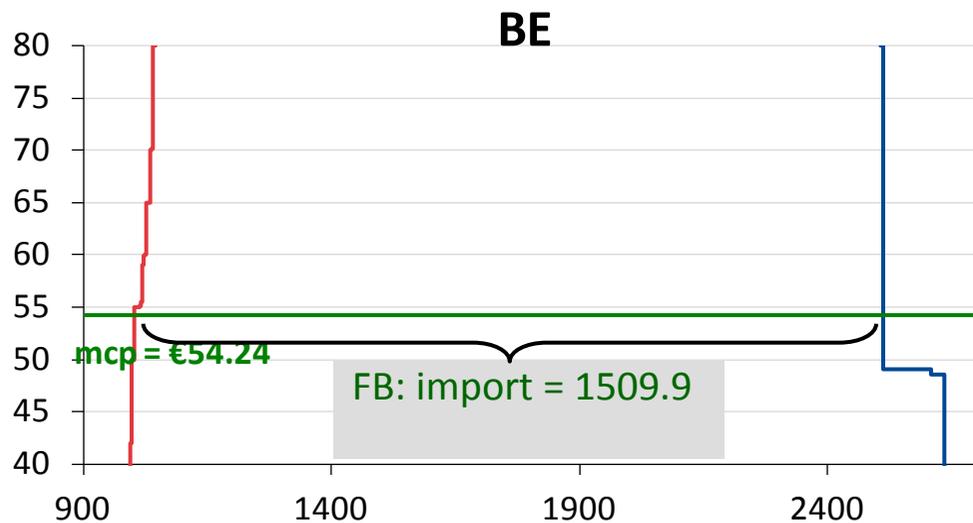
DE



- ▶ **Note:** In intuitive FB 70MWh less sell block volume was accepted for DE market. Hence the curve is shifted to the left by 70MWh (i.e. the grey curve)
- ▶ Since the effect on prices is very small, in the following slides we will ignore this effect
- ▶ For other markets the block volume was identical between the FB and FBI runs

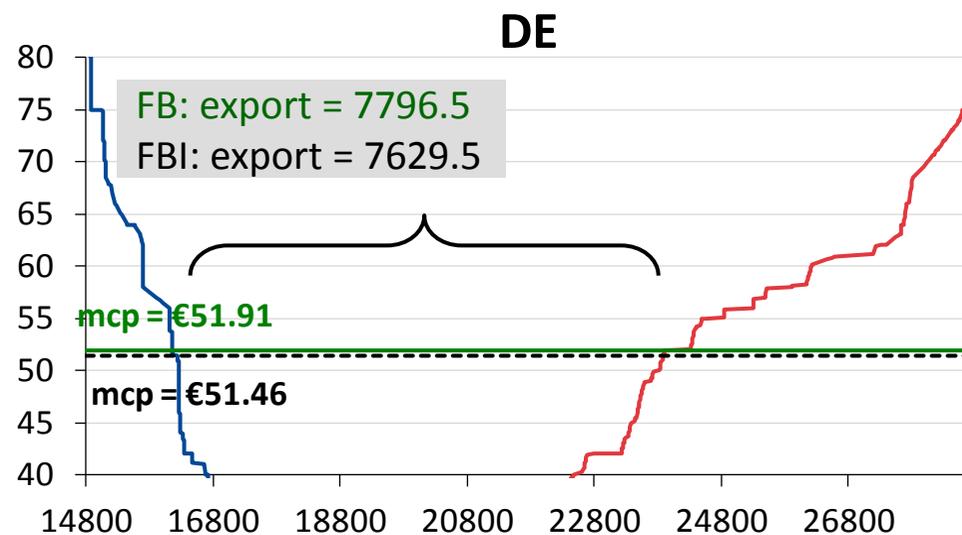
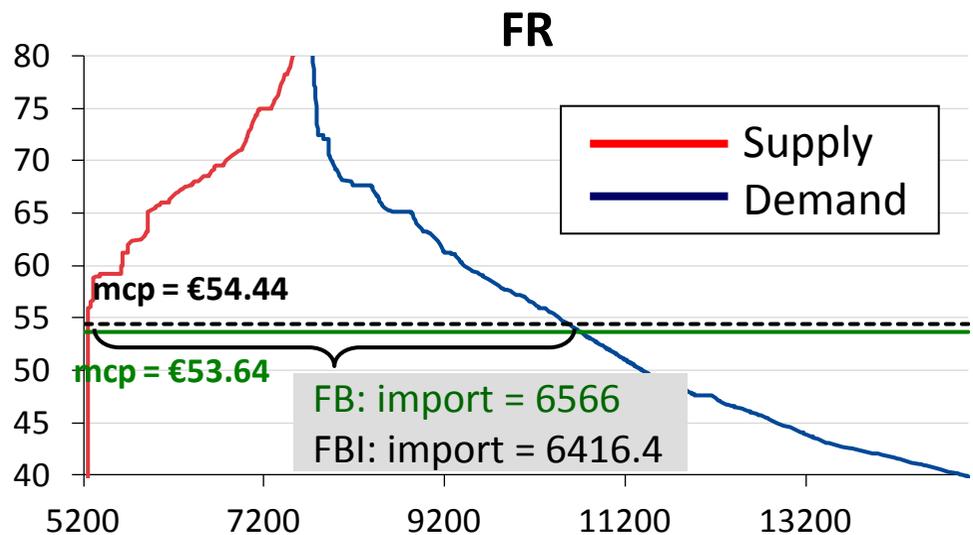
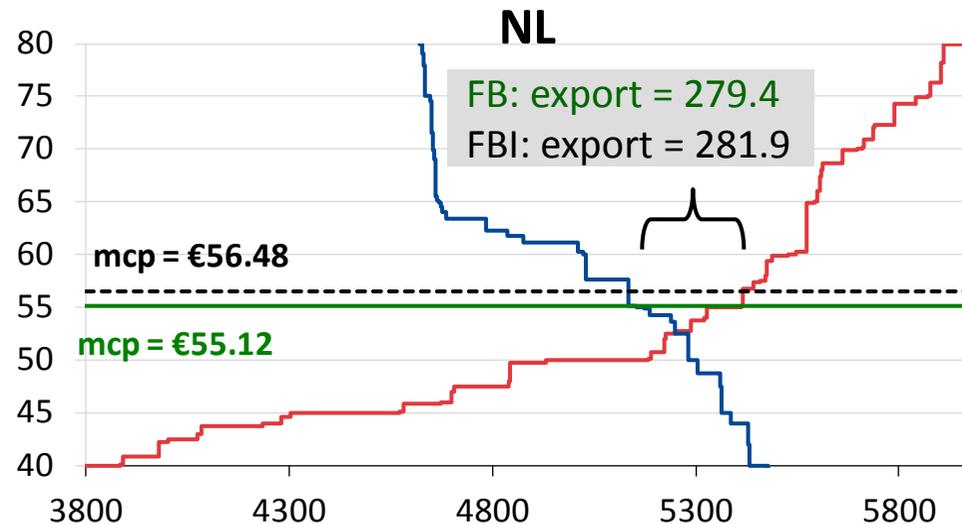
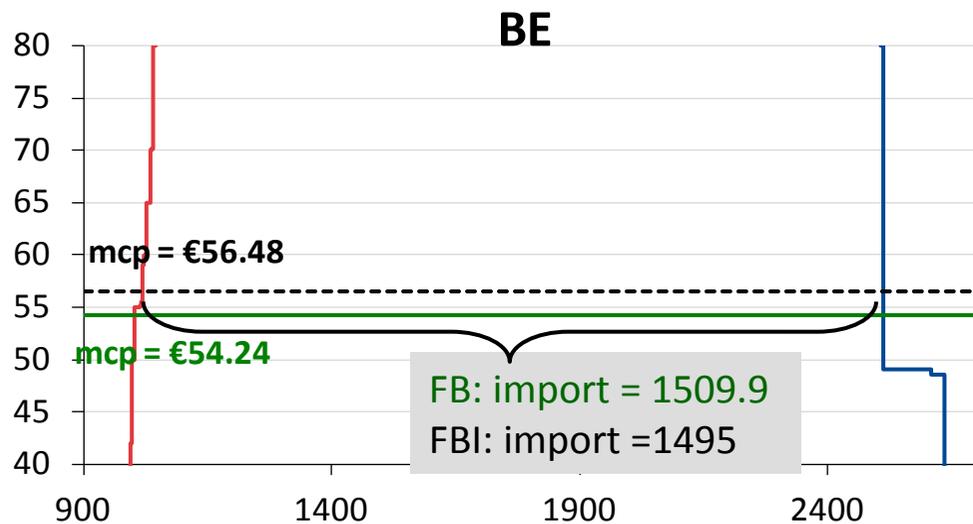


Focus on parallel run results





Focus on parallel run results

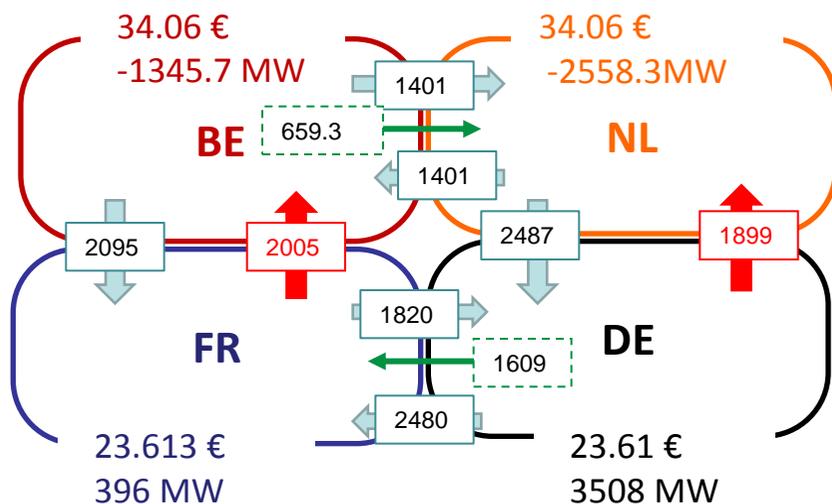


Focus on parallel run results

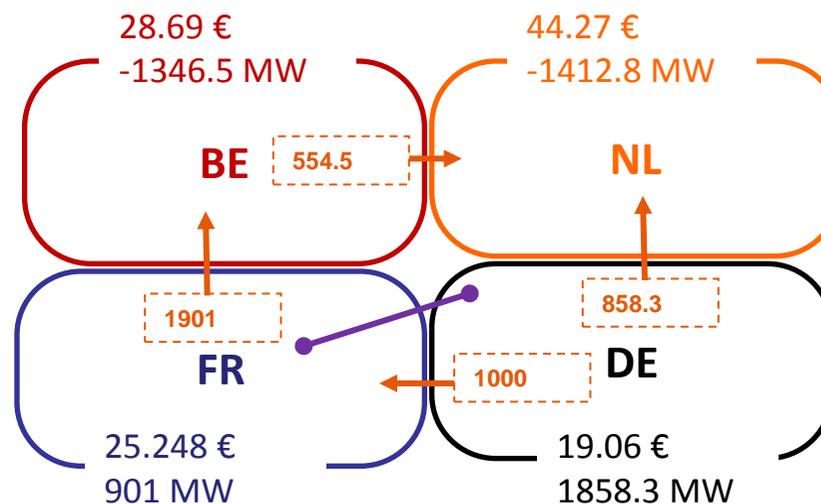
Focus Case n°2 : "less FB welfare" day

Situation: 2nd of January, at 0 – 1 am

ATC market coupling



FB market coupling



Decomposition of Nex in bilat exchanges is arbitrary on this sketch

- ▶ Congested situation in ATC
- ▶ Limiting ATC from Germany to Netherlands, and from France to Belgium
- ▶ Welfare breakdown :

Producer	Consumer	Congestion Rent
76553006.53 €	74878461.23 €	29084.8 €

- ▶ **More Constrained situation in FB or FBI**, less exchanges are happening, prices diverge even more than in ATC (no partial convergence FR-DE and BE-NL)
- ▶ Welfare breakdown :

Producer	Consumer	Congestion Rent
76468692.72€	74936173.4 €	42 979.05€

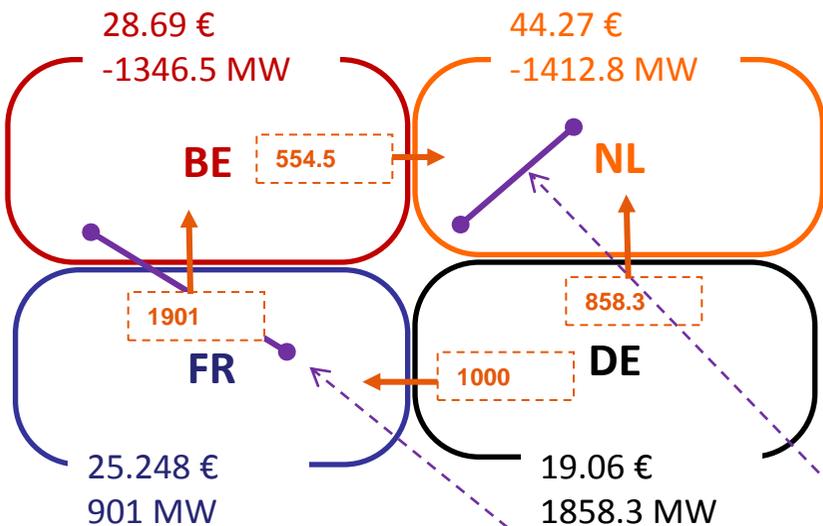
Focus on parallel run results

Focus Case n°2 : "less FB welfare" day (2)



Situation: 2nd of January, at 0 – 1 am

- Identification of the active CB(s) in Utility Tool



- Constrained situation in FB
- Somewhere in CWE, at least one "active CB" is limiting the market
- The CBs on the sketch above are located for illustration only

Reference time:
date: 2013-01-02
hour: 1

When implementing the outcome of ATC market coupling, one can see that FB constraints are violated

involved in the CWE Market Coupling

HUB TO HUB EXCHANGES	Hub-to-Hub trade in MWh/h (please insert values)	Test 1: hub to hub inside FB space
DE=>BE	0	Constrained Transmission System
DE=>NL	1899	
DE=>FR	1609	
NL=>BE	-659,3	
NL=>FR	0	
BE=>FR	-2005	

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	3508	OK	Constrained Transmission System
BE	-1345,7		
FR	396		
NL	-2558,3		

	BE-hub (MW)	DE-hub (MW)	FR-hub (MW)	NL-hub (MW)	Sum	Test Hub to Hub	# of constraints violated	Test Hub positions
Test Hub to Hub	-1346	3508	396	-2558	0			
Test Hub Positions	-1346	3508	396	-2558	0			
ID	BE-hub	DE-hub	FR-hub	NL-hub	RAM (MW)	Test Hub to Hub	# of constraints violated	Test Hub positions
hour 1 CB1	-0.0302	-0.1883	-0.3232	-0.1153	1487.1362	75	0	15
hour 1 CB2	0.1002	-0.1253	-0.0728	-0.1344	1178.6491	0	0	0
hour 1 CB3	-0.0528	0.1589	0.0630	0.2080	1197.5819	0	0	0
hour 1 CB4	0.0441	-0.0463	-0.0469	-0.0307	478.3745	0	0	0
hour 1 CB5	-0.0388	0.0467	0.0574	0.0229	326.9354	0	0	0
hour 1 CB6	0.0493	0.0927	0.0707	0.0805	904.9530	0	0	0
hour 1 CB7	0,0077	0,0796	0,0338	-0,1178	334,3580	1	1	1
hour 1 CB8	0.0417	-0.2304	-0.1492	0.0425	1577.4757	0	0	0
hour 1 CB9	0.0656	-0.1575	-0.0613	-0.1882	1275.1738	0	0	0
hour 1 CB10	-0.0041	0.0699	-0.0144	0.0258	488.4168	0	0	0
hour 1 CB11	-0.0640	-0.0217	-0.0132	0.0790	341.0408	0	0	0
hour 1 CB12	0,0039	0,0585	0,0213	-0,0437	184,3026	1	1	1
hour 1 CB13	0.0000	0.0000	1.0000	0.0000	4571.0000	0	0	0
hour 1 CB14	0.0000	0.0000	0.0000	0.0000	0.0000	0	0	0
hour 1 CB15	-1.0000	0.0000	0.0000	0.0000	0.0000	0	0	0

These constraints can be identified thanks to the "PTDF" sheet of the utility tool.

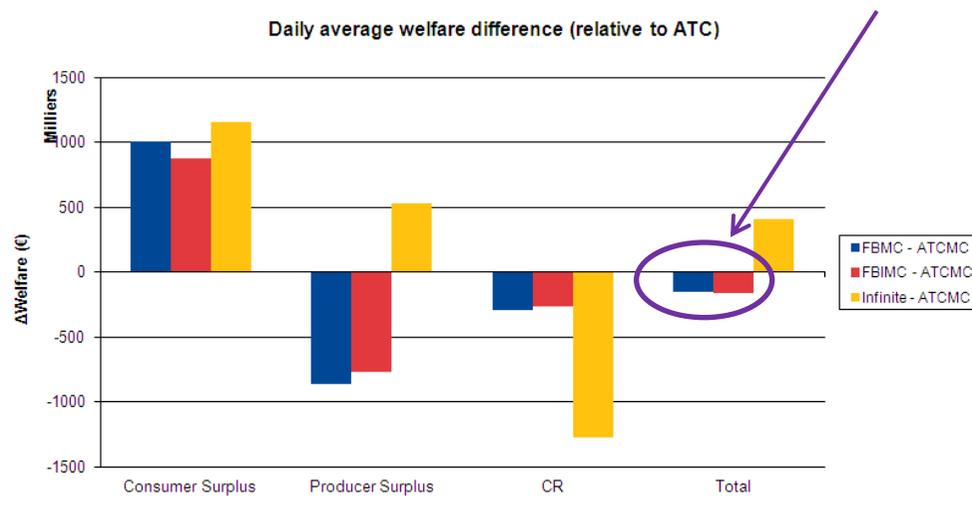
Focus on parallel run results

Focus Case n°2 : “less FB welfare” day (2)



Situation: 2nd of January

- ▶ This situation has been reproduced several times during the day
- ▶ As a consequence, **the daily total welfare is lower in FB than in ATC : - 155 k€**



- ▶ Social welfare in FB is supposed to be higher, isn't it ?... **What happened ?**
- ▶ Either in ATC or FB, TSOs apply the same risk policy when optimizing their capacities...on the basis of the information they have. And the FB methods is much closer to the physics of the grid. This enhanced knowledge can in some occasions (like the one described above) lead TSOs to decrease the capacity, in some market directions, below the levels granted in ATC
- ▶ On the other hand, this knowledge facilitates the optimization as TSO have a finer understanding about how to reach the maximum capacity of the grid. We will see in the next example how a better modeling of the grid's constraints eventually leads to a much higher level of provided capacity

Focus on parallel run results

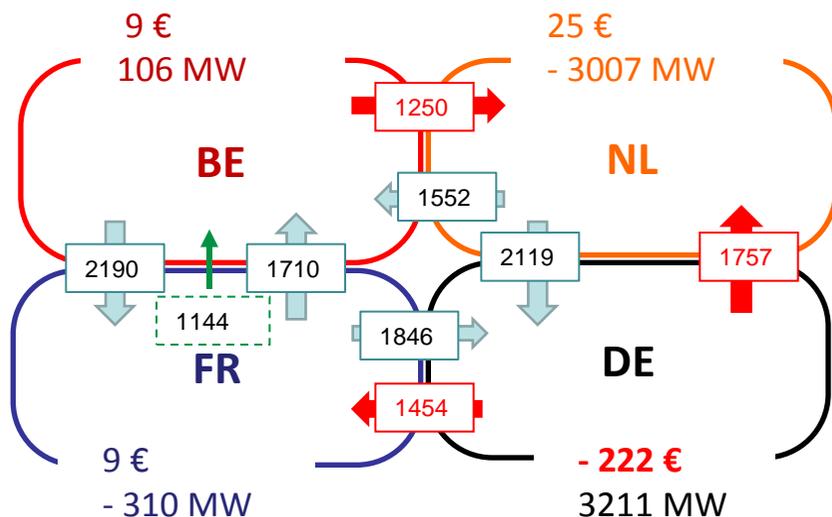
Focus Case n°3 : "Christmas & Boxing" days



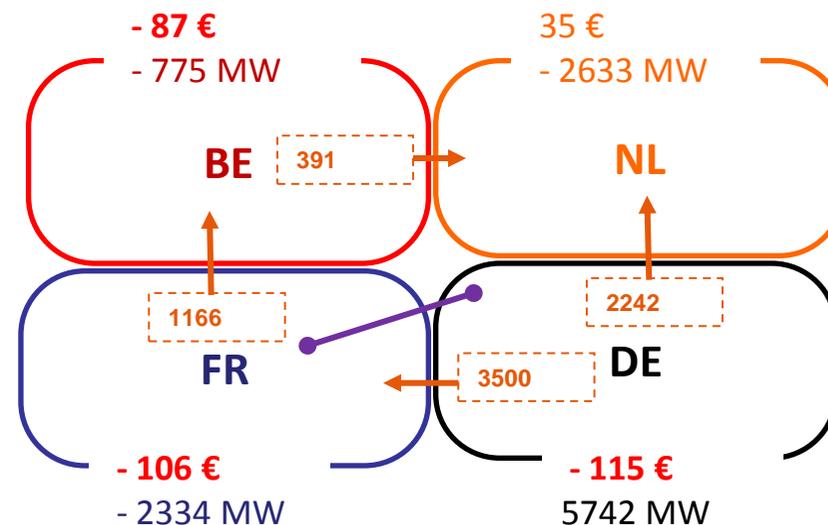
Situation: Christmas day, at 2 – 3 am

- The situation was remarkable with strongly negative prices in Germany, linked to high wind infeed

ATC market coupling



FB market coupling



- Congested situation in ATC
- Limiting ATC from Germany to Netherlands and France, and from Belgium to Netherlands
- Negative prices in Germany only as export capability is limited
- Constrained situation in FB
- Somewhere in CWE, at least an "active CB" is limiting the market (in purple, arbitrarily located)
- However there are more exchanges (especially from DE), and more convergence, the FB outcome generates more welfare for market parties, less congestion rent. Prices are less divergent, and become negative in FR and BE as well

- Note:** the external // run had not started at this stage, however CWE partners were finalizing the preparation to be ready for the 1st of January. Consequently, the PTDFs computed this day are representative

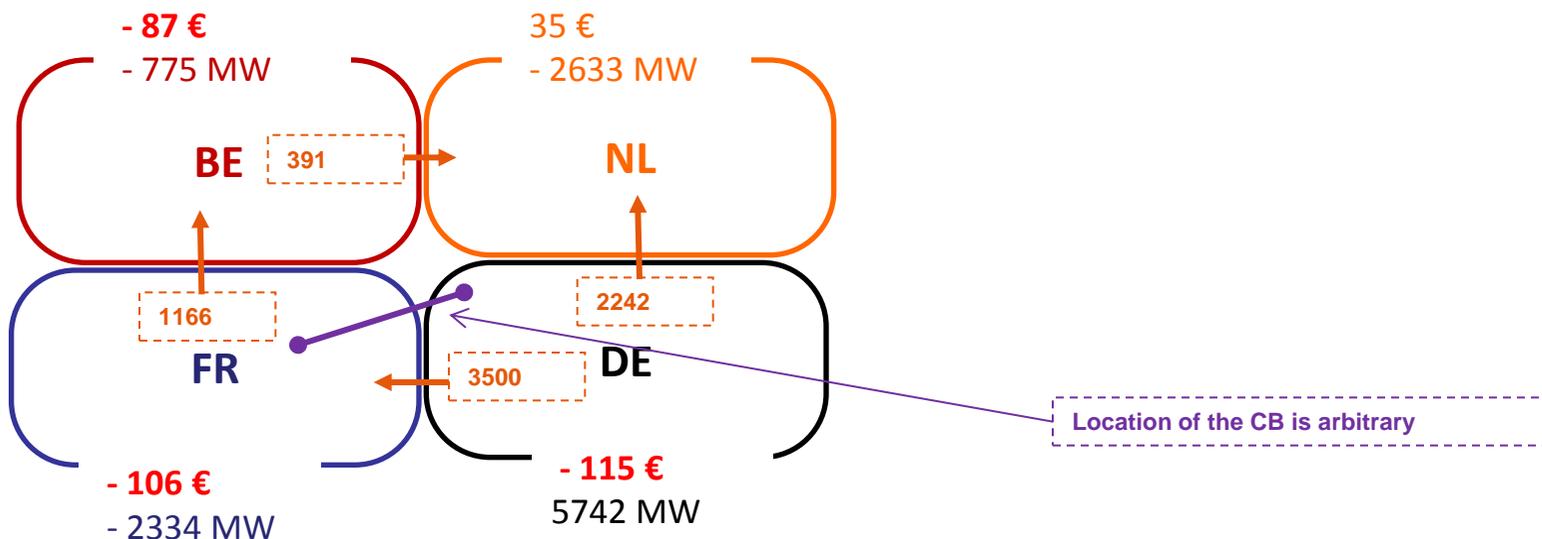
Focus on parallel run results

Focus Case n°3 : "Christmas & Boxing" days



Situation: Christmas day, at 2 – 3 am

- Utility tool is not available on Xmas day, however an active CB in FB has been identified by TSOs



Dashed box: Decomposition of Nex in bilat exchanges is arbitrary on this sketch

day	TS	BE-hub	DE-hub	FR-hub	NL-hub	RAM
25/12/2012	3	0,0059	0,0762	0,0346	-0,1172	660,5587

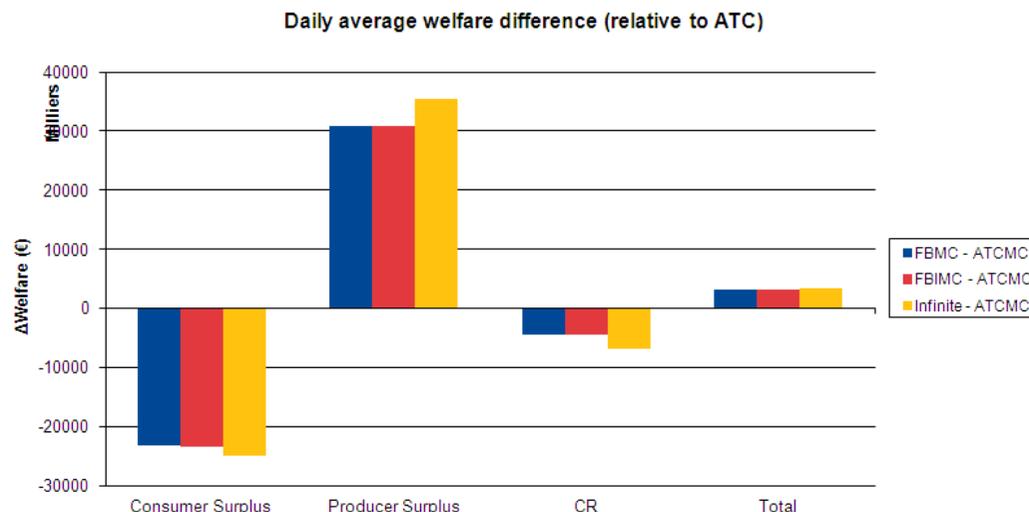
Focus on parallel run results

Focus Case n°3 : “Christmas & Boxing” days



Situation: Christmas day

- ▶ **The gain of welfare is remarkable : about 3 M€** over the day, essentially benefiting to German producers in this case, an increase due to the enhanced export capability of Germany.
- ▶ A comparable situation was observed on the morrow (boxing day)



- ▶ This is a direct illustration of the notion introduced in the previous case, but working the other way around. Thanks to a better description of the grid, TSOs have been able to maximize the offered capacity closer to the physical limit, increasing significantly trading opportunities and generating much welfare along the way. This phenomenon is all the more apparent that the operational situation is constrained for TSOs

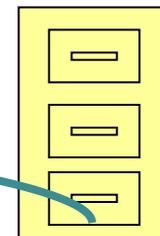
Focus on parallel run results

Focus Case n°4 : effect of block orders



report_wk04.xlsx

ftp.cwe-sf2.com



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			FB				FBI				ATC			
2	date	period	BE	DE	FR	NL	BE	DE	FR	NL	BE	DE	FR	NL
123	2013-01-28	1	-1356.1	3722.9	-1743	-623.8	-1356.1	3722.9	-1743	-623.8	-1362	4338	-1557	-1418.6
124	2013-01-28	2	-1341	4022.8	-1745	-936.7	-1341	4022.8	-1745	-936.7	-1344.6	4338	-1419	-1574.6
125	2013-01-28	3	-754.2	3821.3	-1058	-2009.1	-754.2	3821.3	-1058	-2009.1	-754.2	4338	-1198	-2385.6
126	2013-01-28	4	-1668.5	3094.7	857	-2283	-1668.5	3094.7	857	-2283	-1578.5	3011.9	721	-2154.5
127	2013-01-28	5	-1748.5	2905	890	-2046.7	-1749	2904.6	891	-2046.7	-1657.6	3007.9	725	-2075.4

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	tolerance	0.01	FB				FBI				ATC			
2	date	period	BE	DE	FR	NL	BE	DE	FR	NL	BE	DE	FR	NL
123	2013-01-28	1	41.56	29.7	36.56	44.9	41.56	29.7	36.56	44.9	37.27	30.63	37.271	37.27
124	2013-01-28	2	39.3	30.92	35.773	41.66	39.3	30.92	35.773	41.66	37.46	31.05	37.465	37.46
125	2013-01-28	3	34.3	30.38	32.65	35.41	34.3	30.38	32.65	35.41	32	30.96	32	32
126	2013-01-28	4	31.25	31.25	31.25	31.25	31.25	31.25	31.25	31.25	33.52	30.74	30.738	33.52
127	2013-01-28	5	29.99	29.35	29.721	30.17	29.99	29.35	29.721	30.17	31.88	29.09	29.09	31.88

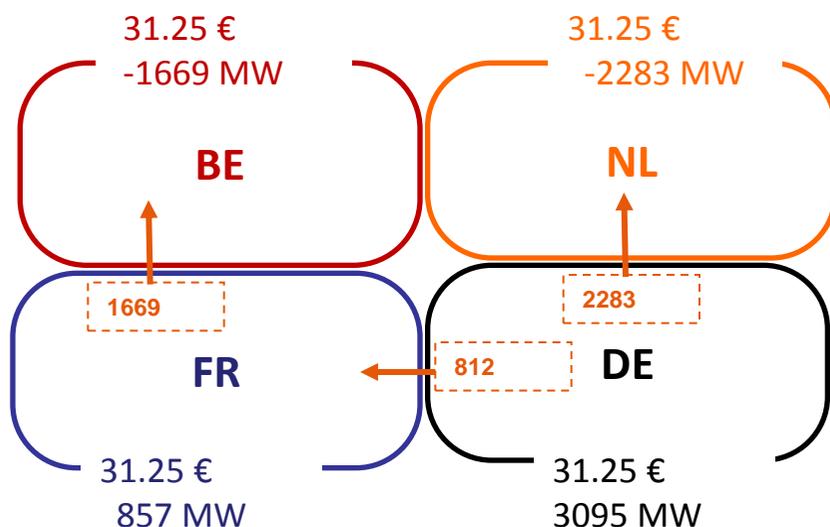
Focus on parallel run results

Focus Case n°4 : effect of block orders

Situation: 28th of January, at 4 – 5 am



▶ Example FB result – full convergence



- ▶ FBI result is identical to FB result
- ▶ MCP = € 31.25
- ▶ **As expected:** if FB domain is sufficiently large, CWE behaves as single area. No issue with intuitiveness, so we expect both FB and FBI to provide identical solutions

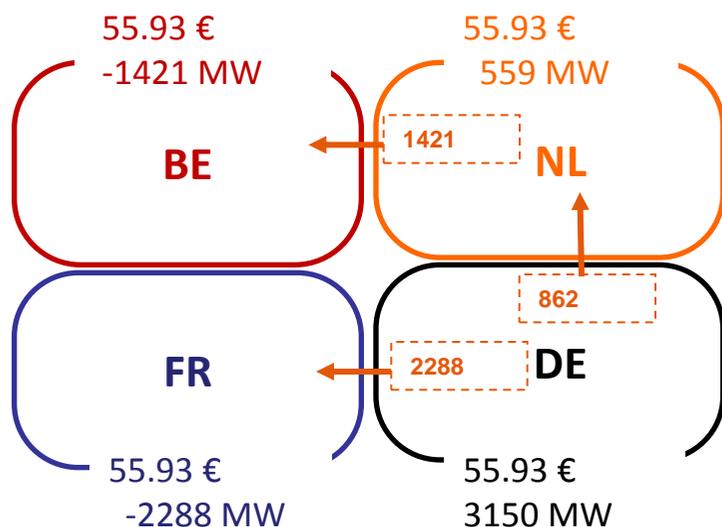
Focus on parallel run results

Focus Case n°4 : effect of block orders

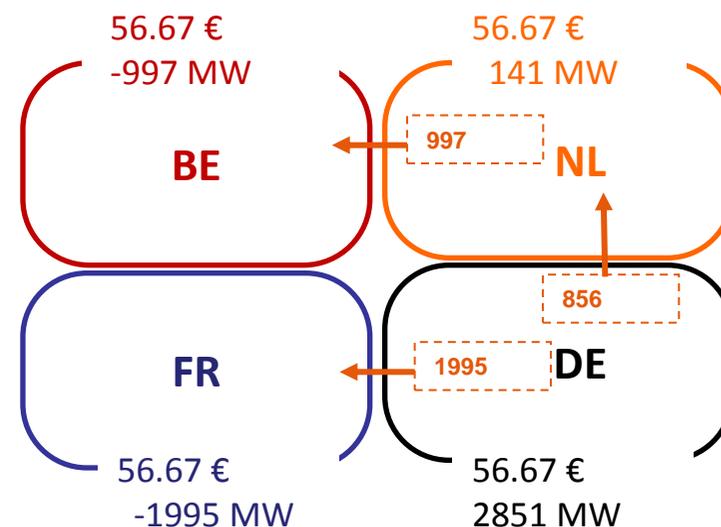


Situation: 28th of January, at 10 – 11 am

FB results



FBI results



- ▶ Neither result congested, i.e. again single CWE price
- ▶ MCPs are:
 - FB: € 55.93
 - FBI: € 56.67
- ▶ This effect is not a FB effect, but rather a block effect

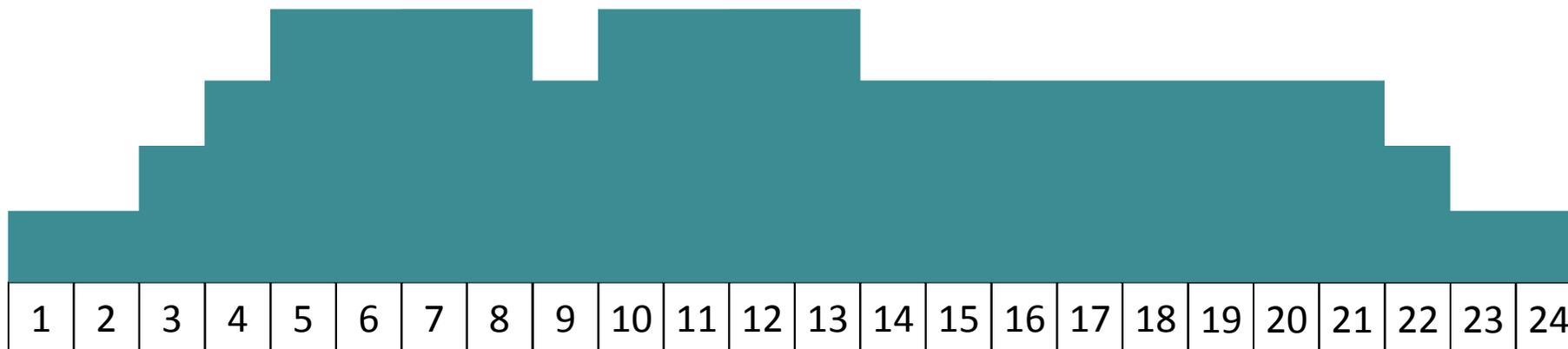
- ▶ Contrary to the intuition of the previous slide there now is a difference. Somehow results from adjacent hours affect the result for this hour: **block orders**

Focus on parallel run results

Focus Case n°4 : effect of block orders



- ▶ Imagine the following set of blocks is accepted (across the different areas)
- ▶ The following profile results:

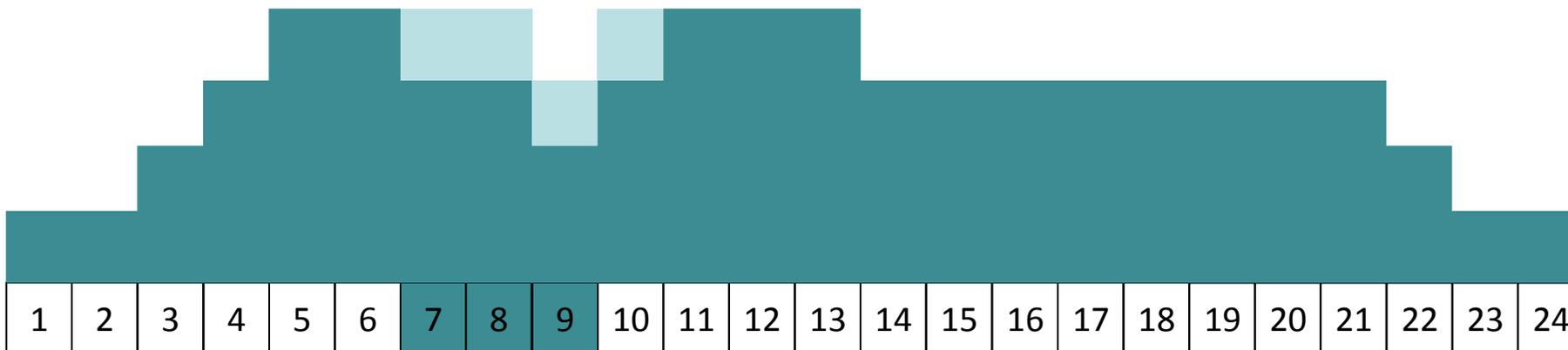


Focus on parallel run results

Focus Case n°4 : effect of block orders



- ▶ Imagine the prices for hours 7, 8 and 9 change dramatically between FB and FBI
- ▶ Under the new prices, block A no longer meets its execution condition
- ▶ Consequently the block profile changes:



- ▶ This new profile also implies a change for hour 10. Consequently the price of hour changes via the blocks, even though no network constraints were limiting for hour 10 in either FB or FBI

Q&A Session



**CWE Project Partners would like to
thank you for your attention and
participation!**

