

# value

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A satellite night view of Europe, showing the continent's outline against a dark background. The landmasses are covered with a dense network of yellow and white lights, representing city lights and urban areas. The surrounding oceans are dark, with some lighter patches indicating ice or lower light density. The overall image has a high-contrast, grainy texture typical of satellite imagery.

# CORE FBMC

Focus on the East of Europe

# Agenda

- FBMC and the Social Welfare maximization
- CORE PTDF matrix
- Insight's analysis - observations
- JAO's parallel run - observations

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# Flow Based Market Coupling

FBMC (Flow Based Market Coupling) is a methodology to optimize cross-border flows within a macro area.

In CWE the Flow Based Market Coupling (FBMC) has been in place since 2015, substituting ATC coupling. Most of Europe is now part of the Single Day Ahead Coupling (SDAC): the Nominated Energy Market Operators (NEMOs) run the Euphemia algorithm which optimizes implicitly the XB flows while maximizing the social welfare:

$$\text{Social Welfare} = \text{Consumers Surplus} + \text{Producers Surplus} + \text{Congestion Rent}$$

Since November 2020 in CWE the FB is plain or Evolved (EFB):

- non-intuitive: it allows flows from higher to lower price area if this increases the overall welfare
- two virtual zones (ALDE and ALBE) representing the two substations of the DC cable ALEGrO (DE-BE)

# Social Welfare = Consumers Surplus + Producers Surplus + Congestion Rent

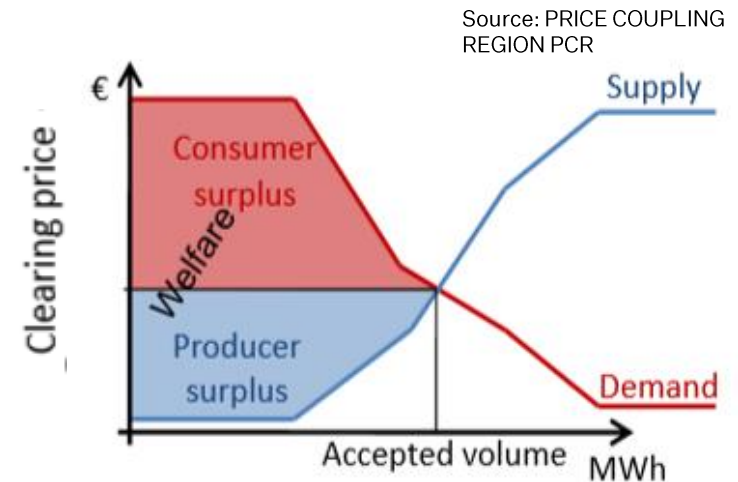
**Consumer surplus** in the Day-Ahead auction is the saving made by the buyers:

it is the savings made by the buyer between the price he was ready to pay and the price he finally paid, for each MWh bought.

**Producer surplus** in the Day-Ahead auction is the gain made by the sellers:

it is the gains made by the seller between the price he wanted to receive and the price he finally received, for each MWh sold.

**Congestion rent** in the Day-Ahead auction is TSOs' retribution for the transmission of electricity between adjacent markets (taking into account the presence Tariffs and Losses when applicable):



Congestion Income under FBMC

$$CI = \sum_{i=1}^{NC} AAF_i \times SP_i + \sum_{i=1}^{NDC} ATC_i \times SP_i$$

Where:

SP: shadow price associated to constraint  $i$

NC: total number of network constraints

ATC: corresponding ATC-limit of DC link  $i$  (hourly operational limit on the energy flow over the DC link, which is adjustable independent from the AC-grid situation)

NDC: total number of ATC constraints due to modelling DC links in Evolved Flow-Based approach

$$AAF_i = \sum_{j=1}^{NH} PTDF_{ij} \times \text{netPOS}_j$$

Where:

AAF <sub>$i$</sub> : additional aggregated flow associated to network constraint  $i$

PTDF <sub>$ij$</sub> : power transfer distribution factor of hub  $j$  on critical branch  $i$

netPOS <sub>$j$</sub> : net position of hub  $j$

The bid-ask curves and complex orders (blocks) inputs into Euphemia as well as the XB availabilities (ATC or FB domain) define the social welfare.



# The Power Transfer Distribution Factor - PTDF

Under FBMC the limitations of bilateral exchanges between different bidding zones are not set at border level, as is the case under the ATC methodology, but rather described by a set of inequalities, which is translated in a matrix called Power Transfer Distribution Factor (PTDF): the PTDF is part of the Single Day Ahead Coupling (SDAC) optimization performed by the NEMOs with the algorithm Euphemia.

In D-2 the TSOs prepare (using a load flow calculation) the list of the elements of the grid that in case of a specific outage will be limiting the XB flows within the macro area.

$$\sum (NEX\ hub * PTDF\ hub) < RAM$$

CNECs (Critical Network Elements) or CBCOs (Critical Branche-Critical Outage)

Remaining Available Margin

ID	Critical Branch name	EIC code	Critical Outage name	EIC code	ALBE-hub	ALDE-hub	AT-hub	BE-hub	DE-hub	FR-hub	NL-hub	RAM (MW)
5177	[AT-AT] Westtirol Transformer WTRHU41 [DIR] LTA	14T-38220-WT041O	[D7-AT] Y - Westtirol (- Kempten - Voehringen) Fuessen W 411	10T1001C-00037Y	0,01239		0	-0,99338	0,01968	-0,11074	0,01968	4651
5178	[D2-AT] Y - St. Peter (- Altheim - Simbach) 233/230	10T-AT-DE-00001B	[D2-AT] Y - St. Peter (- Altheim - Simbach) 234/230	10T-AT-DE-00004S	-0,01211		0	0,9981	0	-0,00189	0,06035	5000
5179	[AT-AT] Y - Thaur (- Silz - Vill) 273C-THA [DIR] [AT]	14T-220-0-0273CM	[AT-AT] Y - Thaur (- Silz - Vill) 274C-THA	14T-220-0-0274CJ	-0,00499		0	-0,99996	-0,00499	0	-0,00499	4826

N-1 principle : "The branch can become critical in case of outage of"

Power Transfer Distribution Factors

# Agenda

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- **CORE PTDF matrix**
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# CORE PTFD

Moving toward CORE FB we need to grasp into our algorithms the new CORE PTFD. 14 factors vs. 7 factors in CWE: **both PTFD's and power prices forecasts need to cover the whole CORE area.**

JAO

JAO Publication Tool

DATE

2022-01-07

HOUR

00:00 - 01:00

HUB

None available

BORDER

None available

Core

Core MarketView

Core MarketGraphs

Core Map

Border Data Overview

D2CF

Relprog

Reference Net Position

Initial Comp. (VirginDomain)

Remedial Action Preventive

Remedial Action Curative

Validation Reductions

Pre-Final (EarlyPub)

LTN

Final Computation

Max Net Pos

Max Exchanges (MaxBex)

Allocation Constraints

Final Bilateral Exchange Restr...

ATCs

ShadowPrices

ShadowAuction ATC

Spanning/DFP

LTA

Pre-Final Computation (Early Publication)

SEARCH

Date	Information on the CNE										Information on the Contingency					
	TSO	CNE_Name	EIC_Code	Direction	Hub From	Hub To	Substation From	Substation To	ElementType	FmaxType	TSO	Contingency Name	BranchName	EIC_Code	Hub From	Hub To
2022-01-07 00:00:00	APG	Tauern - Weissenbach 222	14T-220-0-002221	OPPOSITE	AT	AT	Tauern	Weissenbach	Line	SEASONAL	APG	Tauern - Weissenbach 221	Tauern - Weissenbach 221	14T-220-0-002213	AT	AT
2022-01-07 00:00:00	APG	Wien Suedost - Gyoer 245	10T-AT-HU-00002U	DIRECT	AT	HU	Wien Suedost	Gyoer 245	Tieline	SEASONAL	APG	Neusiedl - Wien Suedost 246A	Neusiedl - Wien Suedost 246A	14T-220-0-0246AT	AT	AT
2022-01-07 00:00:00	APG	Wien Suedost - Gyoer 245	10T-AT-HU-00002U	DIRECT	AT	HU	Wien Suedost	Gyoer 245	Tieline	SEASONAL	MAVIR	Gyor - Neusiedl Neusiedl - Gyoer 246B	Gyor - Neusiedl	10T-AT-HU-00001W	HU	AT
											Additional branch #2: Gyor - Wien Wien		Neusiedl - Gyoer 246B	10T-AT-HU-00001W	AT	HU
2022-01-07 00:00:00	APG	Neusiedl - Gyoer 246B	10T-AT-HU-00001W	DIRECT	AT	HU	Neusiedl	Gyoer 246B	Tieline	SEASONAL	APG	Neusiedl - Gyoer 246B	Neusiedl - Gyoer 246B	10T-AT-HU-00001W	HU	AT
2022-01-07 00:00:00	APG	St. Peter 2 - Pleinting 258	10T-AT-HU-00002U	DIRECT	AT	HU	St. Peter 2	Pleinting 258	Tieline	SEASONAL	APG	St. Peter 2 - Pleinting 258	St. Peter 2 - Pleinting 258	10T-AT-HU-00002U	HU	AT
2022-01-07 00:00:00	APG	Rosegg - Villach Sued 267B	10T-AT-HU-00002U	DIRECT	AT	HU	Rosegg	Villach Sued 267B	Tieline	SEASONAL	APG	Rosegg - Villach Sued 267B	Rosegg - Villach Sued 267B	10T-AT-HU-00002U	HU	AT
2022-01-07 00:00:00	APG	Strass - Thaur 273B	10T-AT-HU-00002U	DIRECT	AT	HU	Strass	Thaur 273B	Tieline	SEASONAL	APG	Strass - Thaur 273B	Strass - Thaur 273B	10T-AT-HU-00002U	HU	AT
2022-01-07 00:00:00	APG	Villach Sued 267B	10T-AT-HU-00002U	DIRECT	AT	HU	Villach Sued 267B	Villach Sued 267B	Tieline	SEASONAL	APG	Villach Sued 267B	Villach Sued 267B	10T-AT-HU-00002U	HU	AT

dateTimeUtc	ptdf_albe	ptdf_alde	ptdf_at	ptdf_be	ptdf_cz	ptdf_de	ptdf_fr	ptdf_hr	ptdf_hu	ptdf_nl	ptdf_pl	ptdf_ro	ptdf_si	ptdf_sk	ram	id	cneName
2022-01-07 00:00:00+00:00	0.03161	0.0316	0.03934	0.03162	0.03131	0.03164	0.03165	0.01246	-0.01662	0.03154	0.01994	-0.00138	0.02821	0.01101	181.0	90783629	Wien Suedost - Gyoer 245
2022-01-07 00:00:00+00:00	-0.03153	-0.03149	-0.03948	-0.03154	-0.03088	-0.03151	-0.03162	-0.01297	0.01701	-0.03144	-0.01957	0.00144	-0.0296	-0.01063	225.0	90783630	Neusiedl - Gyoer 246B
2022-01-07 00:00:00+00:00	0.08013	0.08097	-0.00442	0.07991	0.03543	0.08068	0.07773	0.00119	-0.00185	0.08037	0.02856	1E-05	-0.00073	0.00619	850.0	90783631	St. Peter 2 - Pleinting 258
2022-01-07 00:00:00+00:00	-0.05125	-0.05045	-0.12961	-0.05148	-0.02383	-0.05109	-0.05319	0.00663	-0.00381	-0.0503	-0.02115	-0.00085	0.02339	-0.01032	619.0	90783632	Rosegg - Villach Sued 267B
2022-01-07 00:00:00+00:00	-0.03951	-0.03905	0.07828	-0.03964	-0.01359	-0.04259	-0.04024	0.00226	-0.00106	-0.03876	-0.01329	-0.00032	0.00819	-0.00488	91.0	90783633	Strass - Thaur 273B
2022-01-07 00:00:00+00:00	0.03817	0.03773	-0.07563	0.0383	0.01313	0.04114	0.03888	-0.00219	0.00102	0.03745	0.01284	0.00031	-0.00791	0.00472	802.0	90783634	Villach Sued 267B
2022-01-07 00:00:00+00:00	-0.02023	-0.01	0.05038	-0.02311	0.01455	0.01397	-0.04763	-0.00876	0.00537	-0.01285	0.00959	0.0011	-0.01115	0.00827	419.0	90783635	Westtirol 1 - Pradella 427
2022-01-07 00:00:00+00:00	-0.20393	-0.20396	-0.25907	-0.20395	-0.20586	-0.20434	-0.20379	-0.05776	0.03767	-0.20353	-0.1161	0.00516	-0.1752	-0.02286	1280.0	90783636	Sarasdorf - Zurndorf 439A
2022-01-07 00:00:00+00:00	-0.07085	-0.07342	-0.13999	-0.0701	-0.10244	-0.07744	-0.06346	0.08262	-0.05433	-0.07294	-0.08407	-0.00986	0.24324	-0.07855	987.0	90783637	Kainachtal - Maribor 473
2022-01-07 00:00:00+00:00	0.00783	0.01064	-0.04498	0.00699	0.06262	0.0133	4E-05	-0.06599	0.0434	0.01043	0.05015	0.00776	-0.18405	0.05742	1488.0	90783638	Oststeiermark - Wien Suedost 477
2022-01-07 00:00:00+00:00	0.00877	0.0115	-0.04085	0.00796	0.06205	0.01407	0.00123	-0.06329	0.04109	0.01129	0.04937	0.00744	-0.17697	0.05619	1439.0	90783639	Suedburgenland - Wien Suedost 478
2022-01-07 00:00:00+00:00	-0.00715	-0.00555	-0.09386	-0.00762	0.01168	-0.00656	-0.01121	-0.00669	0.0042	-0.00566	0.00665	0.00081	-0.01545	0.00688	640.0	90783640	Tauern - Tauern TAPST
2022-01-07 00:00:00+00:00	0.00715	0.00555	0.09386	0.00762	-0.01168	0.00656	0.01121	0.00669	-0.0042	0.00566	-0.00665	-0.00081	0.01545	-0.00688	404.0	90783641	Tauern - Tauern TAPST
2022-01-07 00:00:00+00:00	0.00103	0.00234	-0.09412	0.00065	0.01349	-0.0003	-0.00229	0.00651	0.00401	0.00221	0.00864	0.0008	-0.01577	0.00726	680.0	90783642	Tauern - Tauern TAPST
2022-01-07 00:00:00+00:00	-0.00103	-0.00234	0.09412	-0.00065	-0.01349	0.0003	0.00229	0.00651	-0.00401	-0.00221	-0.00864	-0.0008	0.01577	-0.00726	364.0	90783643	Tauern - Tauern TAPST
2022-01-07 00:00:00+00:00	0.07368	0.07081	-0.16213	0.07454	0.01512	0.04207	0.08062	-0.00063	-0.00014	0.07049	0.01791	0.00014	-0.00838	0.00477	1570.0	90783644	Westtirol 1 - Westtirol 2 WTRHU41

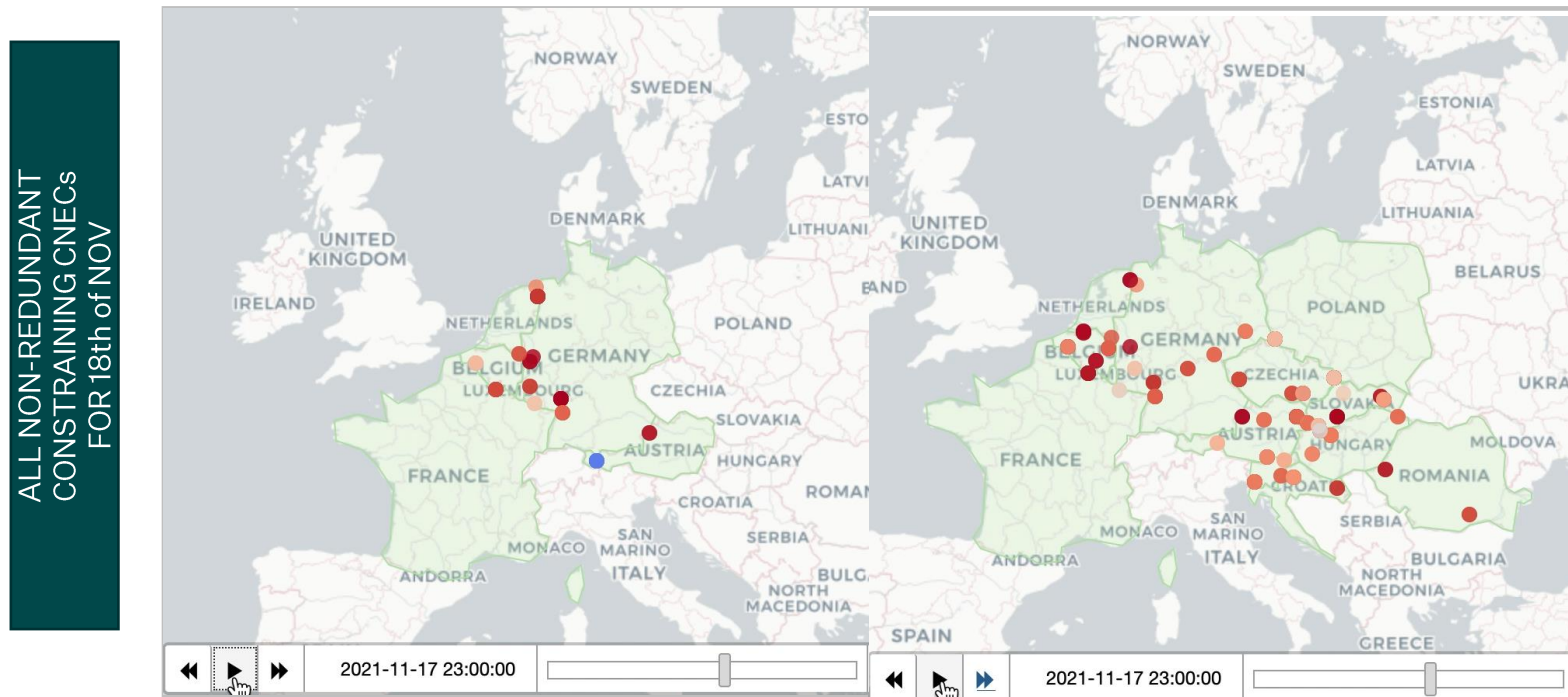
Source: JAO

# CORE PTDF analysis

The data of the PTDF crossed with the net exchanges (NEX) output of Euphemia enable us to recognize the mostly constraining elements of the grid in each single hour.

The maps show for one hour the location of the CNEs limiting the XB exchanges: the darker the dot, the more constraining.

We integrated the fundamentals of the former 4MMC, Southpool and Poland into our PTDF's forecast.



Disclaimer: Shown geolocations of CNECs are estimated

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# CORE FBMC – Insight’s analysis

We published two blogs on the analysis conducted so far by Insight by Volue

- JAO’s parallel run [Observations of the CORE Flow Based Parallel Run \(valueinsight.com\)](#)
- SPOTEX back cast [CORE Flow Based Optimization: Insight’s Short-Term Model Spotex Backcast \(valueinsight.com\)](#)

SPOTEX back cast and JAO show comparable results despite the different methodologies and inputs utilized

The back-casts run ALL bidding zones that Spotex model covers

Two back-casts for each month were performed:

- **CWE** > using the JAO’s PTDF published at 8.00 am (used in Euphemia in D-1)
- **CORE** > using the JAO’s PTDF published on JAO’s CORE parallel run

	SPOTEX backcast	JAO's parallel run	implication
optimization area	all bidding zones in Spotex	CORE	spotex dynamically optimizes the NON-CORE borders; spotex sees impact on each bidding zone in Europe
inputs	all actuals ( fuels, carbon, nuclear, thermal avail, W2F,..)	bid-ask + blocks as in Euphemia	fuels and carbon and W2F are not equivalent

# SPOTEX back-cast CORE-CWE

The table below summarizes the results of the SPOTEX back cast for the period October 21 to May 22. We show the differences in terms of monthly average baseload prices.

Prices: Positive number indicates that the SPOTEX back-cast for CORE is higher in absolute value than the forecast calculated based on CWE PTDFs

CORE - CWE backcast spread in euro/MWh BL

		AT	BE	CZ	DE	DK1	ES	FR	HR	HU	IT_N	NL	NO2	PL	RO	SE4	SI	SK	UK
WINTER	Oct_21	15.2	-0.8	6.2	-2.9	-0.1	-0.2	0.4	-6.3	-1.5	0.8	-2.2	-0.3	0.1	0.7	0.1	-6.4	19.6	-0.4
	Nov_21	9.1	-1.5	-6.1	-4.1	-0.9	-0.4	0.2	-0.8	4.7	0.9	-1.3	-0.3	0.8	5.2	-0.4	-2.7	20.5	-1.0
	Dec_21	9.4	2.2	-4.8	-6.0	-2.8	0.7	-0.5	-2.1	1.0	0.5	-2.6	-0.4	-0.2	7.7	0.8	1.7	17.5	0.8
	Jan_22	10.5	0.3	-1.4	-6.4	-0.5	0.3	1.2	-4.9	2.8	0.5	-2.2	-0.4	2.6	4.4	-0.9	-4.8	8.8	0.1
	Feb_22	12.4	2.3	-4.1	-5.5	-3.0	-0.3	1.3	-3.8	5.8	-0.5	-4.6	-0.4	1.0	6.4	-1.4	-6.9	23.3	-0.2
	Mar_22	6.4	1.6	-8.8	-3.3	-2.6	-0.1	0.5	-1.9	-0.6	0.7	-2.7	-0.4	1.4	11.3	-0.3	-1.5	2.3	-0.4
	Apr_22	10.9	4.6	-1.3	-1.2	-0.1	0.9	0.1	1.3	1.4	1.0	0.3	0.6	1.6	6.8	1.2	2.4	-0.6	1.0
	May_22	8.6	1.8	2.0	-2.9	-1.5	-0.1	-0.7	0.2	0.6	0.1	-0.5	-1.0	0.7	3.0	0.3	0.9	12.5	-0.2

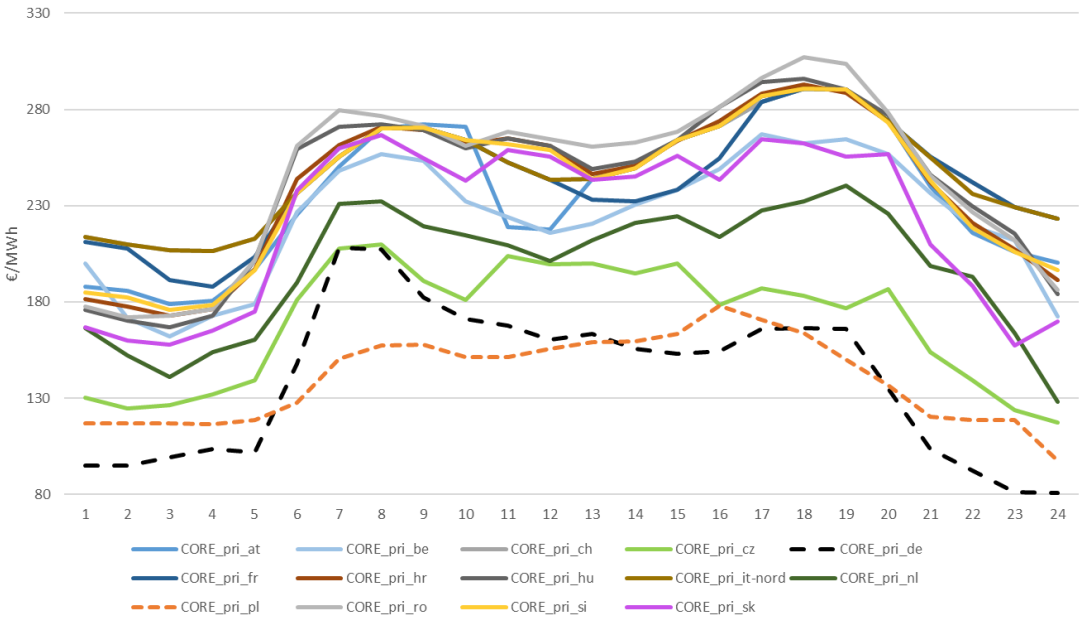
Main trends:

- DE, NL, CZ, SI, HR – decrease in prices
- AT, SK, RO, PL, HU – increase in prices

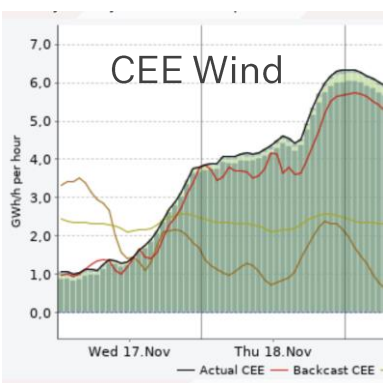
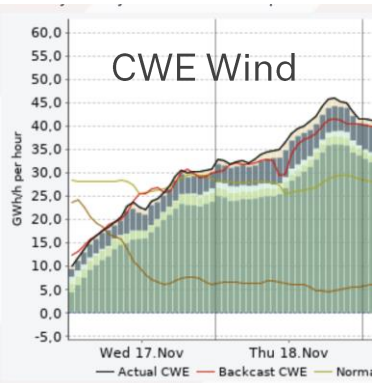
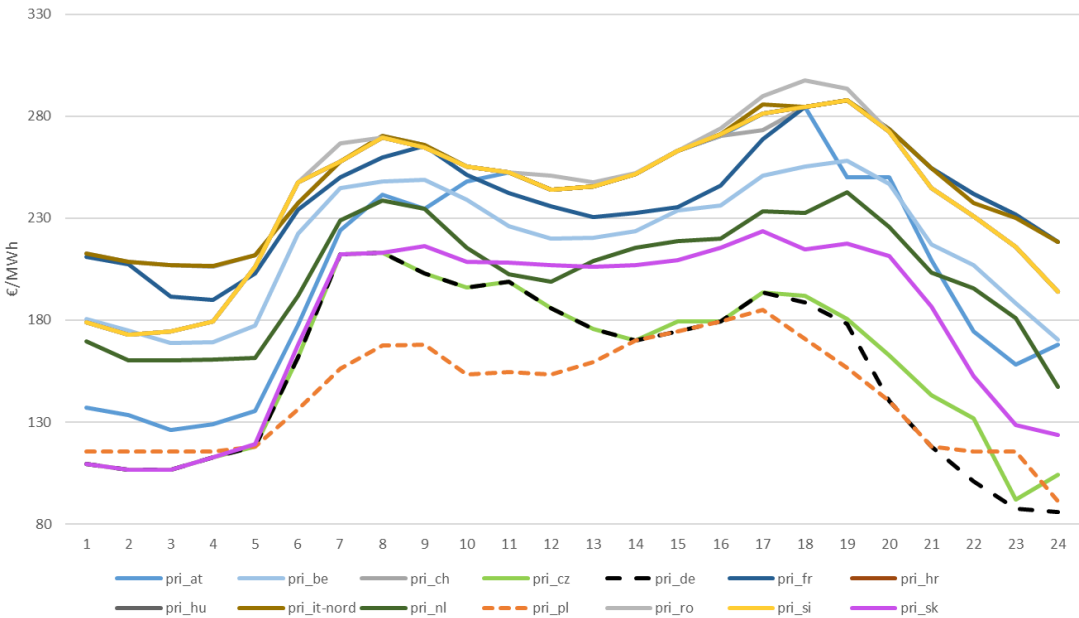
# SPOTEX back-cast CORE-CWE 18.11.2021

Average of pri_at	Average of pri_be	Average of pri_de	Average of pri_fr	Average of pri_nl	Average of pri_cz	Average of pri_hr	Average of pri_hu	Average of pri_pl	Average of pri_ro	Average of pri_si	Average of pri_sk
25,0	6,0	-15,0	3,9	-4,0	9,9	1,3	3,3	-3,1	4,9	1,0	44,6

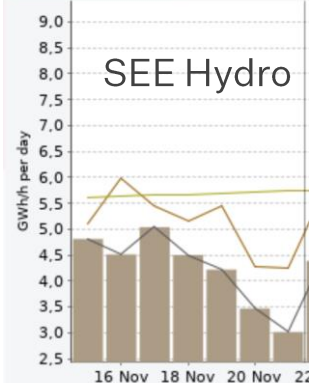
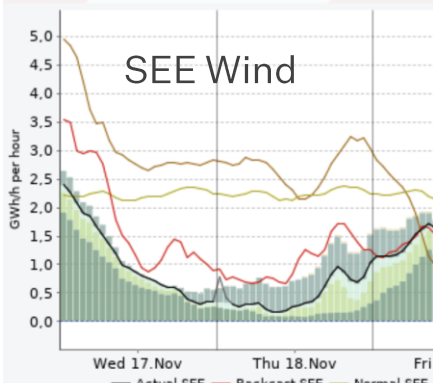
CORE 18.11.2021



CWE 18.11.2021



Much higher-than-normal wind production in CWE and CEE and tight SEE with lower-than-normal wind and poor hydro production  
These days usually show the largest spreads between CORE Flow Based versus CWE Flow Based



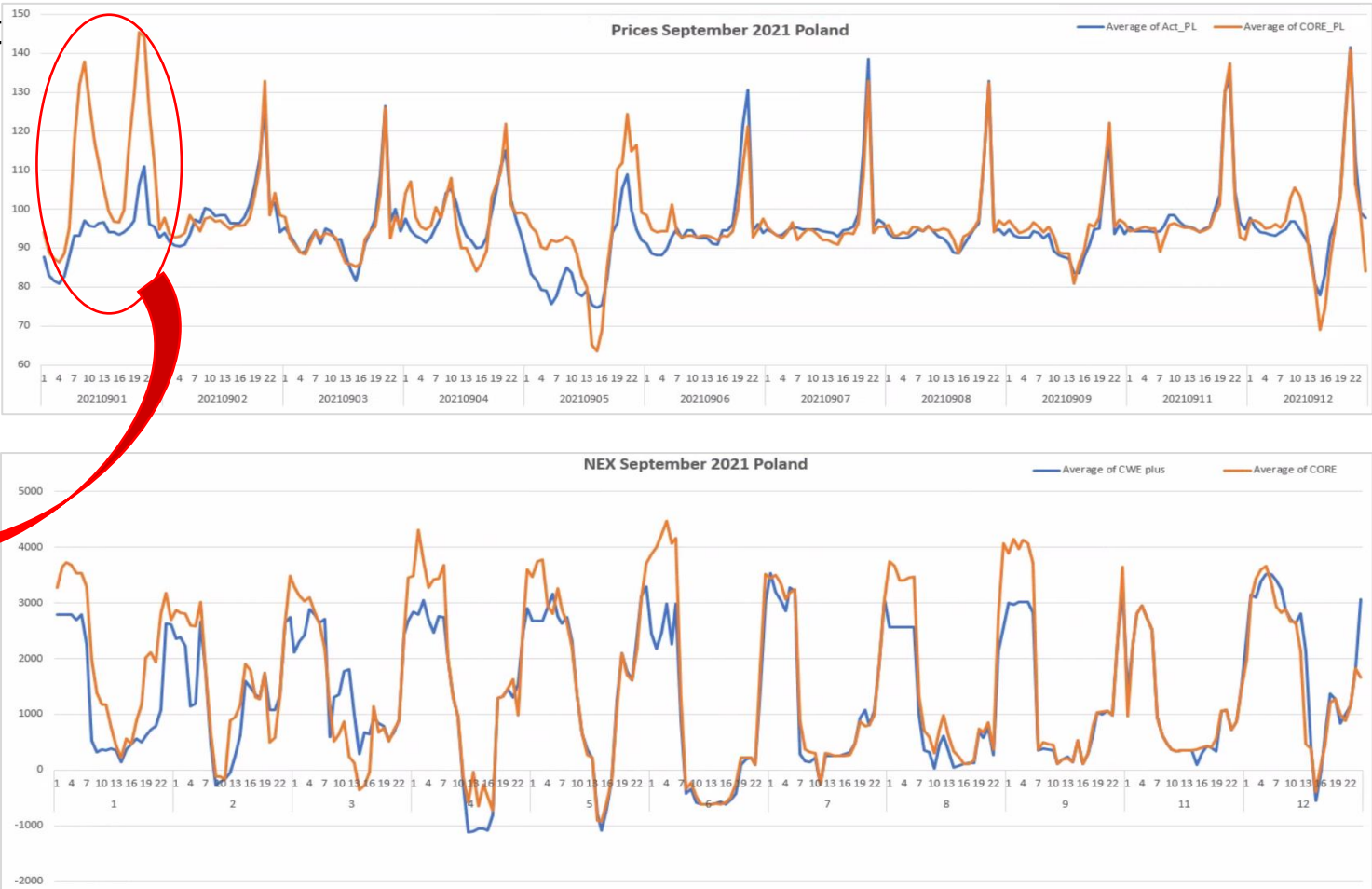
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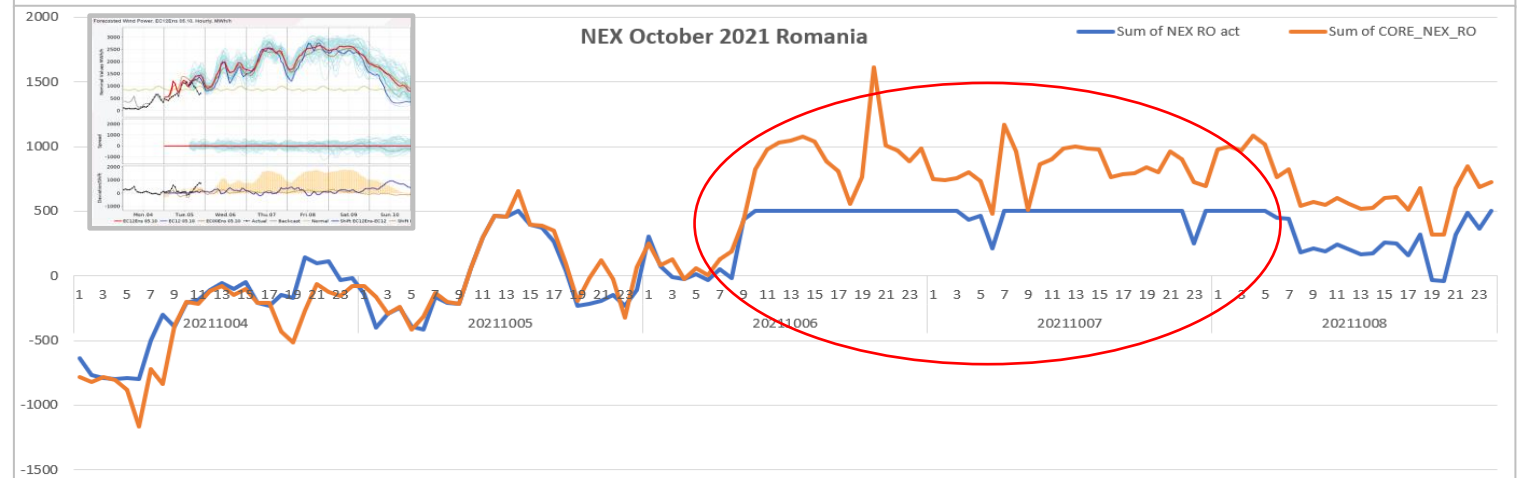
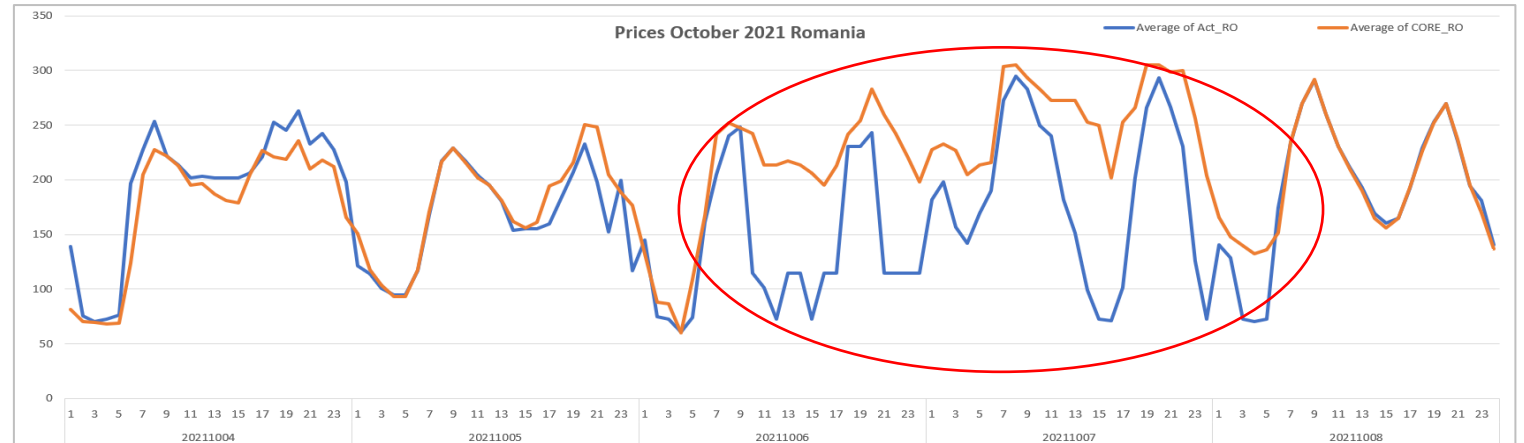
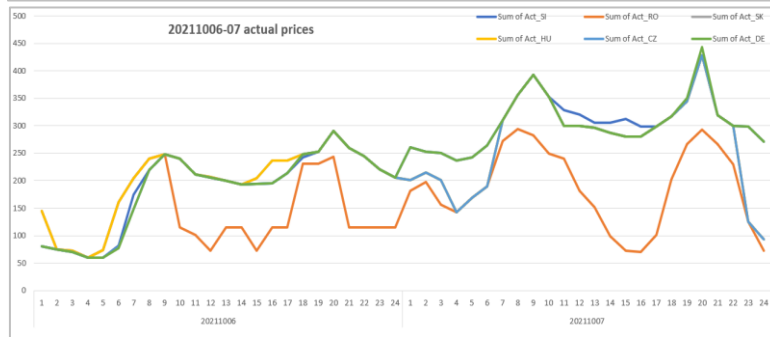
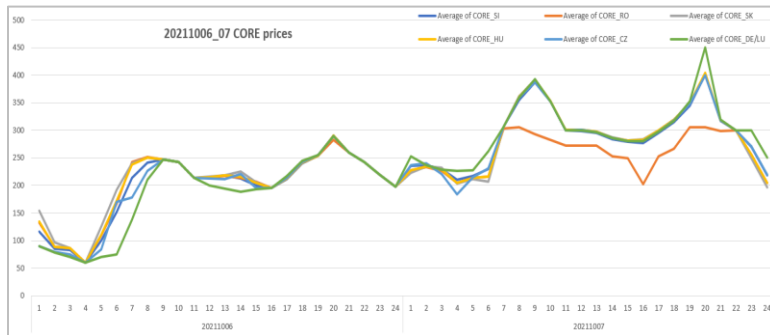
# JAO's parallel run – observation 1 Poland

The parallel run shows the impact on convergences and exchanges



# JAO's parallel run – observation 2 Romania

In very windy days Romania sees strong impact on XB exchanges affecting price level, going up to the rest of CORE

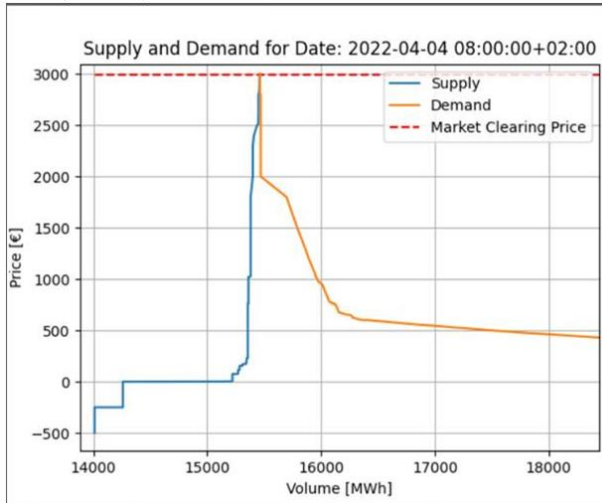


# JAO's parallel run – observation 3 France the day of the spike: 4<sup>th</sup> of April 2022

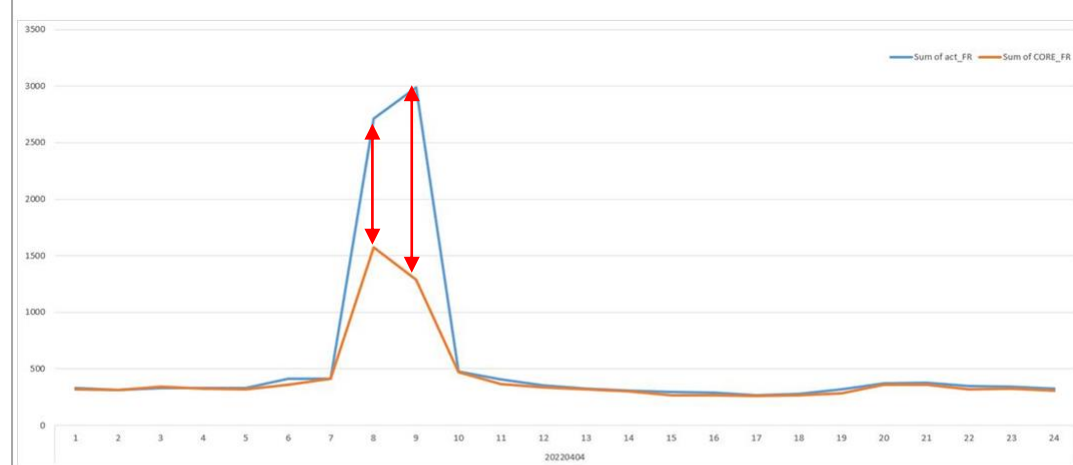
Hour 8 ( 7.00-8.00)



Hour 9 ( 8.00-9.00)



Prices: blue the spot, orange the CORE // run



NEX CORE: blue the spot, orange the CORE // run ( negative = import)



Under CORE FBMC  
higher net import  
positions would have  
reduced the upside in  
the FR spot exchange

H8: -1137 euro/MWh  
H9: -1697 euro/MWh

# JAO's parallel run results – October 2021

BL prices CORE - spot: + means CORE > spot BL price												
daily average in euro/MWh												
Row Lab	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20211001	14.1	2.5	13.8	-5.9	2.0	3.1	18.4	-12.5	1.9	18.6	3.9	18.3
20211002	15.2	-5.1	4.6	-5.7	-2.9	-27.7	-5.6	-3.4	8.9	-6.1	-30.7	19.6
20211003	23.3	5.4	12.6	0.1	1.6	-98.8	20.6	-3.4	-0.5	20.5	-102.1	53.7
20211004	4.1	1.6	-4.0	-2.1	0.4	-2.1	-18.0	1.7	0.3	-18.7	-1.7	11.7
20211005	6.3	-3.6	3.6	-2.9	-2.0	-8.3	11.3	-2.7	0.2	11.5	-10.5	20.1
20211006	10.0	-4.3	8.5	-1.0	-1.4	12.2	3.2	-1.1	0.6	64.0	11.1	6.4
20211007	-8.8	-2.9	18.7	-3.5	-5.2	-20.2	18.1	-2.7	22.9	71.1	-17.3	16.9
20211008	-4.2	-1.4	-4.3	-1.0	-1.5	-5.9	-7.2	-1.2	2.1	7.7	-5.3	-7.3
20211013	2.1	-2.2	2.1	-1.8	-1.5	-2.5	12.9	-3.8	2.1	32.4	-5.9	18.8
20211014	5.3	-1.2	-9.1	-6.7	1.4	-4.9	22.0	-7.4	-0.5	14.7	-10.7	55.8
20211015	18.9	-2.9	20.2	-5.3	-2.5	20.9	3.1	-12.7	0.7	9.2	20.2	78.4
20211016	6.7	-7.1	6.1	-2.4	-6.1	-12.6	-7.6	-9.0	0.9	-2.5	-17.1	47.0
20211017	11.5	-6.2	-6.8	-4.5	-6.6	0.7	13.3	-5.5	-0.2	15.1	-3.2	51.2
20211018	11.3	-2.6	-3.0	-3.1	-3.2	-1.1	13.2	-4.1	1.2	10.8	-9.1	36.4
20211019	31.0	-2.6	8.1	-7.2	-0.5	-11.1	24.0	-5.4	-0.2	26.4	-12.8	17.4
20211021	17.8	-8.7	27.9	-8.1	-0.1	-4.0	16.1	-6.8	-4.6	1.2	-6.9	100.6
20211022	17.4	-0.8	23.1	-5.9	-4.9	-1.9	5.7	-1.9	2.8	6.8	-4.4	100.1
20211023	28.5	-7.0	6.0	-12.5	-0.0	-19.4	-2.0	-3.0	10.6	2.0	-19.3	31.4
20211024	23.4	-31.1	-4.5	-13.9	23.3	2.8	7.5	-19.6	16.2	1.7	3.0	54.7
20211025	-3.5	-0.8	-13.5	-4.0	4.8	-3.7	-17.2	-3.5	4.5	-11.2	-1.2	19.3
20211026	6.9	-6.9	3.8	-2.7	-0.5	-4.5	2.0	7.0	1.7	0.4	-6.6	69.8
20211028	6.3	-7.9	-25.1	-0.7	-3.5	3.8	3.2	-4.5	2.1	3.8	0.8	61.6
20211029	19.1	-3.8	2.4	-1.9	3.6	-18.0	1.3	-6.5	5.4	0.4	-18.6	72.1
20211030	-12.5	-10.9	-3.7	-3.7	0.5	36.6	21.8	-24.3	-5.5	21.7	32.0	44.8
Grand Total	10.4	-4.6	3.7	-4.4	-0.2	-6.9	6.7	-5.7	3.1	12.6	-8.9	41.6

# JAO's parallel run results – October 2021 NEX

Net Exchanges (NEX) CORE - spot: + means higher export/lower import in CORE												
daily average in MW - means higher import/lower export in CORE												
Row Label	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20211001	-54.0	258.6	78.9	-1192.9	120.9	1150.1	-1.4	-205.2	155.7	67.1	-716.7	338.9
20211002	139.3	249.8	-141.0	-862.2	-232.6	628.2	-216.1	-329.1	625.5	326.4	-272.6	84.6
20211003	-132.6	93.9	19.1	-216.7	573.5	584.6	-100.7	-336.1	-373.1	182.2	-408.4	114.3
20211004	-155.3	180.9	-202.0	-148.5	2.9	645.4	-229.6	82.0	40.8	-133.1	-166.0	82.5
20211005	-76.6	220.3	-53.0	-435.1	-349.8	639.0	-70.5	-100.4	278.7	60.9	-238.9	125.5
20211006	-95.9	93.4	-157.2	-100.8	-420.3	687.8	-146.2	-85.4	-37.8	309.3	-130.5	83.6
20211007	-26.7	31.2	389.6	-72.0	-1211.1	550.5	176.7	-627.0	896.9	354.9	-598.9	135.8
20211008	-157.6	293.8	-277.7	57.2	-142.7	534.7	-29.3	-757.3	316.6	379.4	-322.5	105.6
20211013	-183.6	77.6	-175.5	-232.0	28.7	506.9	250.1	-585.8	235.8	137.8	-192.2	132.4
20211014	-90.7	261.4	-247.2	-465.7	194.8	501.6	327.5	-535.4	12.4	101.1	-233.7	173.7
20211015	346.5	647.4	84.0	-795.9	-750.6	596.5	14.5	-470.8	135.2	-5.5	65.6	133.2
20211016	19.5	157.0	-89.6	-225.7	-123.2	570.0	-206.3	-198.9	192.8	-16.4	-423.4	344.4
20211017	208.1	83.0	-215.5	-446.6	-391.5	568.5	71.4	-119.7	181.0	56.2	-197.7	202.8
20211018	114.1	49.2	-218.2	-336.8	-234.0	744.5	-113.7	-254.6	152.7	113.9	-144.3	127.0
20211019	776.5	97.1	-130.0	-1002.7	-249.7	731.8	-5.6	-31.0	-105.5	281.4	-491.9	129.6
20211021	55.4	327.6	148.1	-880.6	155.0	735.1	-42.4	-266.0	-613.0	55.6	-92.3	417.4
20211022	371.3	127.1	236.2	-1125.6	-603.7	708.1	-140.0	-80.1	172.4	45.3	-102.8	391.7
20211023	680.0	39.2	-153.2	-1470.5	561.7	728.9	-400.3	-254.0	424.5	11.3	-430.0	262.4
20211024	217.3	-26.2	-231.1	-2974.2	2132.3	776.2	-262.8	-916.5	1060.7	280.4	-150.2	94.1
20211025	-238.3	-316.3	-294.3	-272.1	382.8	853.9	-440.1	-15.4	577.6	-28.8	-290.9	82.1
20211026	-29.9	-61.8	-212.7	-225.1	-450.1	802.0	-280.7	286.6	335.2	-12.2	-351.6	200.2
20211028	-247.1	-103.9	-536.5	161.7	-325.4	845.0	-262.0	23.6	219.0	24.2	-17.5	218.9
20211029	181.3	295.2	-149.2	-1016.5	326.9	721.0	-192.3	-349.3	300.5	73.9	-408.1	216.8
20211030	-793.8	166.5	-244.4	-476.4	429.1	871.1	157.0	-519.6	-651.2	587.3	371.1	103.3
Grand Total	34.5	135.1	-115.5	-614.8	-24.0	695.0	-89.3	-276.9	188.9	135.5	-247.7	179.2

# JAO's parallel run results – November 2021

BL prices CORE - spot: + means CORE > spot BL price												
daily average in euro/MWh												
Row Label	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20211101	32.9	0.4	-0.2	-7.8	-0.1	4.1	9.2	-6.9	5.8	-1.8	-5.3	33.0
20211102	-3.0	-5.2	-8.9	-5.2	-6.8	-1.8	1.9	-4.6	25.7	-3.1	-2.3	1.1
20211103	1.5	-7.2	-15.7	-2.1	-5.5	10.1	28.0	-6.0	2.7	24.3	2.7	23.7
20211104	-6.4	-6.7	-25.7	-6.7	9.0	26.7	32.1	-6.1	1.1	26.1	10.1	1.5
20211105	-0.8	-6.3	10.0	-5.8	-0.8	18.8	49.1	0.4	1.5	48.4	7.0	45.6
20211106	0.5	5.7	7.0	-7.6	3.2	-19.5	-19.6	2.5	7.7	-17.3	-15.4	41.5
20211107	-6.3	9.3	24.4	-1.3	3.4	-24.5	-9.1	-5.4	2.7	-7.9	-22.9	87.6
20211108	5.5	-3.7	2.3	-3.2	-2.4	3.5	7.2	-6.0	6.0	4.6	-0.4	12.7
20211109	-4.8	-4.9	1.8	-2.8	19.0	16.2	11.4	-2.3	0.7	18.1	13.6	20.6
20211110	18.9	-25.7	-2.7	3.6	-3.4	-13.5	24.9	7.6	2.4	11.1	-14.2	14.0
20211112	7.4	1.7	6.9	-2.5	-0.9	7.2	10.6	-2.6	8.2	3.5	2.4	4.2
20211113	13.6	-10.1	5.3	-4.3	-0.8	17.6	13.7	-5.6	-5.3	23.5	8.6	30.1
20211114	2.5	-4.3	2.6	-6.1	-3.3	15.2	20.6	-7.4	6.5	33.3	9.6	5.1
20211116	1.1	-13.3	-8.1	-0.7	0.2	6.3	14.4	-15.4	0.8	24.5	2.5	6.7
20211117	16.1	-9.3	12.0	-4.8	3.1	6.3	21.4	-10.0	-6.4	20.9	-4.1	61.5
20211118	23.1	1.1	17.7	-16.4	9.8	12.8	19.4	-5.9	-11.6	21.3	5.7	105.8
20211119	22.9	-1.0	22.8	-18.9	2.2	-2.9	14.8	-18.8	1.6	17.5	-2.7	66.3
20211120	39.4	-2.8	13.1	-2.8	-3.4	19.7	32.6	-13.2	-8.0	40.9	16.0	70.9
20211121	19.9	-4.2	19.2	-14.4	0.7	23.7	26.5	2.4	-10.0	33.9	20.6	84.8
20211122	0.5	-13.0	-8.2	-9.4	-1.2	3.7	11.0	-7.4	5.2	11.5	-0.9	0.6
20211123	-4.7	-11.7	3.7	-3.8	-1.0	7.1	16.6	5.2	1.5	22.0	0.4	22.7
20211124	-8.9	-12.4	-7.9	-12.2	25.7	16.8	28.5	-15.0	-21.8	30.2	9.9	20.6
20211125	1.7	-22.3	-25.2	-37.2	11.0	26.7	54.3	-0.8	2.8	47.8	14.7	38.3
20211126	30.1	-10.0	9.6	-6.2	-4.8	26.5	28.7	0.6	3.3	48.1	26.1	43.6
20211127	19.6	1.4	-6.2	-16.8	3.0	12.4	12.8	-0.3	0.8	32.5	13.9	13.9
20211128	-1.1	-4.2	-1.6	-2.7	-0.5	0.1	1.2	-0.7	24.4	17.4	-0.3	1.8
20211129	4.0	-4.7	-0.9	-1.8	-2.6	-1.6	2.6	3.5	2.7	44.4	-0.6	3.4
20211130	19.0	-2.8	-3.5	-7.3	6.0	16.2	25.6	6.2	-2.3	27.6	20.0	26.2
Grand Total	8.7	-5.9	1.5	-7.4	2.1	8.3	17.5	-4.0	1.7	21.5	4.1	31.7



# JAO's parallel run results – November 2021 NEX

Net Exchanges (NEX) CORE - spot: + means higher export/lower import in CORE												
daily average in MW - means higher import/lower export in CORE												
Row Labels	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20211101	413.0	139.4	-220.4	-944.1	-281.4	543.8	-17.2	-251.3	281.0	4.0	66.0	267.2
20211102	-319.1	84.1	-277.0	-496.5	-593.7	582.4	-58.2	-94.2	1149.2	40.1	-156.6	139.4
20211103	-148.2	-23.2	-382.8	-324.0	-639.1	563.7	282.0	-139.4	437.9	292.5	-68.5	149.1
20211104	-544.0	-106.4	-346.2	-485.4	991.5	511.9	176.3	-983.6	73.3	316.3	253.9	142.3
20211105	-217.6	-8.5	-21.6	-911.7	-14.9	587.2	322.4	-505.1	97.7	428.3	20.1	223.8
20211106	-59.7	258.6	-140.7	-1459.0	647.0	404.8	-109.2	216.2	470.2	-234.4	-362.6	368.8
20211107	-261.3	199.2	163.6	-747.8	570.8	524.5	-134.8	-195.2	113.7	-94.4	-328.2	189.7
20211108	-155.3	145.4	-99.7	-386.4	-590.1	525.9	-10.8	-51.1	583.9	43.1	-174.8	170.1
20211109	-499.9	-86.0	-674.9	-1348.3	2464.2	495.5	193.8	-1138.1	131.2	213.1	84.1	165.1
20211110	326.5	-875.1	-209.7	218.5	-502.4	408.5	296.6	-54.7	423.7	135.4	-315.7	148.3
20211112	458.0	9.4	-55.6	-1084.7	-348.2	542.3	106.7	-284.8	400.6	80.3	17.1	158.9
20211113	394.1	-86.7	-138.4	-579.1	-236.7	631.7	68.4	-494.2	-364.4	330.9	253.1	221.2
20211114	-8.2	60.6	-279.8	-517.6	-924.1	634.9	61.2	-796.9	661.2	361.4	511.9	235.5
20211116	-110.7	-180.7	-472.3	-10.0	-239.4	488.3	230.2	-400.5	31.7	237.6	283.0	142.5
20211117	472.3	-29.4	-75.4	-880.0	541.0	505.3	254.7	-500.3	-412.8	313.8	-379.6	190.5
20211118	311.9	248.6	316.5	-1603.6	1111.8	480.9	197.6	-971.5	-531.8	336.1	-121.3	224.9
20211119	554.0	378.6	212.2	-1782.6	148.4	471.6	68.6	-617.6	199.1	265.4	-90.9	193.3
20211120	566.9	312.0	81.7	-313.8	-1107.0	637.5	82.9	-826.7	-565.7	356.1	298.2	478.0
20211121	634.9	-413.8	-71.4	-1376.9	-241.9	583.8	137.6	342.9	-549.5	280.5	340.5	333.4
20211122	-239.5	77.3	-259.1	-682.4	150.7	479.1	102.2	-459.2	739.0	178.8	-224.8	137.9
20211123	-525.8	145.3	-188.6	-299.8	-418.5	475.1	141.1	55.5	-16.5	372.8	77.6	181.9
20211124	-291.9	49.2	-289.6	-627.5	599.2	496.7	77.2	-447.1	-379.5	356.0	305.6	151.8
20211125	-48.8	-196.2	-326.6	-1931.0	532.8	531.9	266.9	42.3	-43.6	557.4	446.8	168.2
20211126	1064.2	-488.2	-157.7	-902.6	-850.4	544.4	281.2	-60.2	-89.3	354.5	95.4	208.6
20211127	472.6	244.0	-258.4	-1909.8	-34.6	948.5	6.1	-138.5	206.5	329.5	-64.9	199.0
20211128	-78.1	-219.5	-207.0	-464.0	-593.0	553.7	-49.0	-567.4	1083.0	277.8	123.3	140.3
20211129	-67.2	25.7	-202.5	-222.2	-641.5	416.4	42.0	40.5	176.4	440.6	-155.4	147.1
20211130	127.0	93.7	-653.5	-1262.0	1384.6	471.1	174.2	-7.1	-601.1	227.7	-106.8	152.3
Grand Total	79.3	-8.7	-187.0	-833.4	31.6	537.2	114.0	-331.7	132.3	242.9	22.4	201.0



# JAO's parallel run results – December 2021

BL prices CORE - spot: + means CORE > spot BL price												
daily average in euro/MWh												
Row Lab	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20211201	-2.9	-23.1	-1.2	-3.7	20.6	14.8	14.4	-10.1	-9.6	-7.2	14.8	24.2
20211202	-11.8	-31.6	-3.3	-21.5	66.4	0.2	14.5	-15.7	-21.9	10.9	0.2	22.1
20211203	-18.3	-28.6	9.0	0.2	39.3	-17.2	-4.1	6.2	-7.2	-6.1	-17.2	19.1
20211204	-5.7	-6.3	-18.9	-18.9	16.1	19.7	14.2	-0.4	6.9	9.7	12.9	-11.4
20211213	8.1	-22.3	14.1	-10.1	8.7	25.9	58.8	-18.0	38.6	30.3	18.8	44.7
20211214	8.2	-4.8	-10.4	-9.9	-1.6	-1.6	-6.3	-3.4	0.5	45.9	1.3	-2.7
20211215	11.3	-8.3	-8.5	-15.0	4.5	2.2	8.6	-20.7	12.3	49.7	4.8	4.1
20211216	0.4	0.6	3.7	-6.4	-2.1	-3.4	0.9	0.9	10.0	17.3	1.3	5.4
20211217	-4.8	-7.9	-4.0	-3.6	9.4	-1.7	4.3	-8.1	-11.6	-11.5	-1.7	-3.7
20211218	-2.2	-4.3	-6.2	-5.9	8.3	-35.7	-9.0	-0.3	0.6	-11.6	-6.2	5.5
20211219	5.4	7.1	24.4	-4.6	6.0	-5.4	-16.1	-1.5	0.1	-11.9	-0.9	42.3
20211225	-21.2	10.4	-34.7	-26.6	8.4	-58.9	-30.9	-2.8	26.9	14.1	-21.7	-29.2
20211226	-1.9	2.6	-1.1	-7.1	3.7	-5.3	-1.9	-4.2	1.3	-0.8	-4.1	3.7
Grand Total	-2.7	-9.0	-2.8	-10.2	14.4	-5.1	3.6	-6.0	3.6	9.9	0.2	9.6

# JAO's parallel run results – December 2021 NEX

Net Exchanges (NEX) CORE - spot: + means higher export/lower import in CORE												
daily average in MW												
Row Lab	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20211201	-186.1	78.6	-676.8	-775.0	2463.4	445.8	88.5	-972.6	-536.8	65.6	-160.0	165.4
20211202	-705.0	-606.8	-154.8	-1810.2	4783.9	428.0	52.9	-848.7	-1138.6	194.0	-344.8	150.1
20211203	-590.0	-1456.6	-549.7	274.4	2505.1	474.1	-60.7	698.9	-1085.8	-93.4	-293.0	176.9
20211204	-584.3	255.8	-543.2	-1446.7	2824.7	526.1	13.5	-787.7	-577.3	290.0	-104.7	133.9
20211213	-7.3	-85.0	-62.1	-892.4	731.6	592.8	211.0	-1097.6	254.3	302.7	-124.6	176.8
20211214	180.3	186.9	-298.3	-352.8	-153.2	504.0	-152.4	-250.4	50.8	400.0	-254.6	139.7
20211215	300.9	-60.0	-273.0	-830.9	371.2	479.7	-70.7	-894.4	511.7	464.1	-135.1	136.5
20211216	-73.7	233.4	-119.3	-453.7	-667.4	480.7	-105.7	-250.7	600.2	141.6	58.9	155.7
20211217	-525.2	194.6	-217.5	-221.6	2147.8	556.2	-123.1	-421.2	-1455.2	-4.0	-62.6	131.9
20211218	-269.7	161.0	-245.1	-575.7	785.9	569.7	-308.4	-119.3	12.6	-28.5	-133.4	151.2
20211219	-64.1	318.2	-144.2	-167.9	664.2	696.7	-319.7	-262.5	-518.7	-109.8	-240.6	148.5
20211225	-132.3	370.8	-371.1	-4022.9	1288.7	564.7	-204.9	1292.0	1062.1	505.7	-270.5	-82.3
20211226	-84.1	65.1	-244.2	-747.8	619.6	482.7	-98.2	76.2	97.3	-37.1	-267.7	138.1
Grand Total	-210.8	-26.5	-299.9	-924.9	1412.7	523.2	-82.9	-295.2	-209.5	160.8	-179.4	132.5

# JAO's parallel run results – January 2022

BL prices CORE - spot: + means CORE > spot BL price												
daily average in euro/MWh												
Row Lab	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220118	-4.2	-3.4	-14.8	-10.4	2.6	-4.7	-3.6	-4.2	12.8	31.1	-3.7	-8.6
20220119	14.6	0.9	0.6	-12.9	13.7	29.3	34.0	0.6	-4.5	36.4	10.7	22.2
20220120	16.5	14.5	-6.1	-8.9	-1.1	3.5	33.4	-7.7	-10.6	35.3	-4.2	38.9
20220121	14.9	4.8	3.8	-2.0	2.8	-6.9	-0.2	3.3	-1.1	-0.4	-11.8	1.7
20220123	-2.5	-2.0	-8.8	-5.3	0.9	-0.5	-5.4	-2.2	16.4	5.6	-1.9	-1.8
20220124	-0.1	-6.0	-0.7	-1.2	-1.3	-0.4	-0.7	-5.6	6.6	7.1	-0.3	-0.6
20220125	-0.7	-8.7	-1.5	-2.3	-1.6	1.6	1.4	-14.8	9.7	10.9	0.6	2.3
20220126	-5.7	0.2	-23.3	-24.9	17.7	67.6	64.4	-13.3	-2.8	27.9	28.1	-9.5
20220128	9.8	7.2	-10.5	-3.8	1.3	-24.6	-27.1	-12.4	-0.7	-17.0	-26.5	-23.7
20220130	30.3	7.9	0.9	-1.7	-0.7	-39.0	22.5	-7.7	-6.2	19.5	-40.6	33.1
20220131	-12.3	-23.1	-13.0	-13.0	11.7	31.9	71.1	-10.4	35.5	38.7	11.8	7.8
Grand Total	5.5	-0.7	-6.7	-7.9	4.2	5.3	17.3	-6.8	5.0	17.7	-3.4	5.6

# JAO's parallel run results – January 2022 NEX

Net Exchanges (NEX) CORE - spot: + means higher export/lower import in CORE												
daily average in MW - means higher import/lower export in CORE												
Row Lab	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220118	-424.5	295.2	-262.6	-1222.1	865.3	389.4	-254.1	-486.7	571.8	477.2	-70.3	121.4
20220119	397.9	100.2	-318.2	-2115.2	1280.3	525.5	-107.6	-483.6	-421.2	807.0	153.9	180.8
20220120	750.8	1141.1	-61.7	-1723.4	-129.2	429.3	12.0	-596.7	-389.7	488.8	-63.2	142.0
20220121	446.9	335.8	-596.6	-796.4	161.1	425.3	-230.5	228.6	-115.0	109.6	-100.7	131.9
20220123	-666.9	59.5	-191.7	-471.7	272.8	625.8	-431.8	-219.7	847.9	120.7	-67.7	122.8
20220124	-118.5	140.6	-126.6	-72.5	-701.2	547.9	-314.5	-105.1	334.0	271.2	21.7	123.0
20220125	-161.6	226.1	-143.7	-156.4	-543.2	523.7	-261.4	-200.8	428.1	142.6	7.3	139.5
20220126	-298.1	311.3	-121.6	-1245.3	1213.7	583.8	112.4	-1103.0	-317.5	361.3	365.4	137.6
20220128	327.0	302.5	-613.8	-400.0	361.7	538.8	-506.0	-360.2	584.6	-137.6	-214.5	117.6
20220130	255.6	511.6	-184.4	-344.1	16.9	577.9	-268.4	-250.7	-787.6	539.8	-344.9	278.4
Grand Total	50.9	342.4	-262.1	-854.7	279.8	516.7	-225.0	-357.8	73.5	318.1	-31.3	149.5

# JAO's parallel run results – February 2022

BL prices CORE - spot: + means CORE > spot BL price												
daily average in euro/MWh												
Row Lab	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220201	0.5	-13.5	-4.8	-1.8	6.4	5.9	40.0	-8.8	-4.9	43.8	-4.7	46.6
20220202	-1.3	-13.1	-10.9	-6.1	1.8	46.2	73.5	-11.9	-3.9	55.0	20.8	91.2
20220203	8.9	-1.3	6.1	-3.2	-3.2	9.0	7.5	-3.7	1.7	11.3	6.5	20.4
20220204	10.7	-7.5	-21.0	-9.8	3.0	60.9	75.0	-9.6	-7.2	63.5	19.4	85.2
20220205	14.8	40.6	-7.8	-25.6	0.3	-3.8	0.5	-13.0	3.5	3.9	-9.1	22.5
20220206	39.8	52.0	25.2	-22.5	11.6	-0.4	45.5	-15.9	-4.6	30.3	-7.0	109.6
20220208	16.7	6.3	-3.1	-7.1	3.3	20.5	5.1	-14.1	-5.8	23.5	18.8	26.1
20220209	14.6	-16.6	-4.8	-10.4	5.0	13.2	32.6	-6.2	-8.9	33.8	6.7	60.6
20220211	10.3	-1.7	1.9	-4.7	0.4	-5.9	12.4	-0.8	4.9	15.2	-10.6	31.8
20220212	-13.8	-18.7	-20.6	-20.4	13.9	69.7	78.1	-26.7	-3.6	51.8	20.3	-20.9
20220213	11.4	3.8	6.9	1.3	4.1	-38.5	-2.0	-29.9	2.9	0.3	-39.7	49.9
20220214	7.9	13.6	-9.8	-6.6	5.4	16.4	26.1	-28.2	-1.4	35.0	2.7	62.5
20220215	-1.9	4.9	-1.7	-7.9	-3.0	1.1	16.6	-16.9	7.0	17.4	-5.4	32.9
20220216	1.0	19.8	4.3	-7.7	3.2	10.8	47.0	-6.1	-1.3	47.5	-2.6	73.9
20220217	2.5	-3.2	10.6	-2.2	-0.9	38.8	46.6	-9.8	-3.0	41.2	17.3	98.4
20220218	16.4	4.7	12.9	-5.0	-1.5	-3.8	13.8	-7.0	-0.9	21.0	-7.7	52.6
20220219	17.0	-3.4	-8.6	-5.1	3.6	1.1	-8.5	-3.2	-3.7	4.9	-5.5	30.4
20220220	15.4	-3.2	2.3	-6.8	-3.3	13.6	17.8	-1.0	2.6	16.7	7.5	30.8
Grand Total	9.5	3.5	-1.3	-8.4	2.8	14.2	29.3	-11.8	-1.5	28.7	1.5	50.2

# JAO's parallel run results – February 2022 NEX

Net Exchanges (NEX) CORE - spot: + means higher export/lower import in CORE												
daily average in MW												
- means higher import/lower export in CORE												
Row Labels	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220201	-434.3	-411.3	-228.2	-335.9	1203.0	486.7	42.7	-546.6	-386.1	662.7	-211.9	159.3
20220202	-17.6	-67.1	-212.6	-636.0	173.2	990.0	-326.4	-390.0	-474.5	466.5	303.2	191.3
20220203	423.8	107.7	44.2	-708.2	-979.9	669.7	-263.0	-333.9	159.4	292.8	445.9	141.2
20220204	466.0	55.0	-450.9	-1510.8	629.8	166.2	683.7	-456.7	-364.2	554.6	82.3	145.0
20220205	866.3	395.4	-616.5	-1640.3	623.3	1170.4	-935.4	-565.0	212.9	150.3	-35.8	374.3
20220206	1426.3	415.1	200.6	-3083.0	769.4	1497.0	-908.9	-565.6	-378.3	601.5	-204.1	229.9
20220208	524.7	402.5	-144.5	-1496.0	1206.7	470.3	-116.4	-663.7	-449.0	297.8	-148.6	116.1
20220209	834.5	-234.0	-115.2	-1609.4	1564.9	435.5	123.3	-1083.5	-668.3	607.6	25.4	119.1
20220211	281.5	112.4	-107.2	-901.3	227.0	405.0	-44.4	-354.5	314.6	378.3	-418.2	106.7
20220212	-514.4	11.9	-309.7	-4014.9	4573.5	634.6	223.3	-1301.7	-300.8	484.4	420.8	92.9
20220213	375.4	204.9	-46.8	-24.7	294.0	507.2	-258.6	-861.7	233.3	17.8	-535.5	94.7
20220214	772.4	460.6	-176.1	-1612.7	741.8	515.0	-85.8	-1038.2	-79.5	435.7	-73.8	140.8
20220215	-160.4	345.4	336.5	-545.2	-376.3	475.8	-61.3	-533.5	272.3	378.8	-294.6	162.7
20220216	-295.4	290.1	-6.7	-1860.3	921.6	492.1	164.7	-376.4	7.9	722.6	-194.0	133.6
20220217	-208.6	240.7	72.8	-191.7	-215.6	509.5	15.4	-613.3	-389.0	437.5	167.6	174.8
20220218	744.7	389.9	41.6	-840.9	-314.6	496.2	-28.6	-583.2	-138.9	352.6	-320.1	201.3
20220219	368.9	125.1	-232.7	-436.9	165.7	581.6	-349.4	-46.8	-248.3	241.7	-273.6	104.9
20220220	334.6	242.9	-6.3	-1117.4	-145.5	1071.2	-721.5	54.8	181.6	254.0	-242.5	94.1
Grand Total	321.6	171.5	-108.8	-1253.6	614.6	643.0	-158.1	-570.0	-138.6	407.6	-83.8	154.6

# JAO's parallel run results – March 2022

BL prices CORE - spot: + means CORE > spot BL price												
daily average in euro/MWh												
Row Lab	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220301	2.8	3.5	-7.4	-0.9	-0.5	-7.4	9.2	-6.0	4.8	44.0	-8.6	10.8
20220303	6.6	-0.4	-9.7	-11.3	-2.5	2.4	42.3	-11.7	9.6	65.8	-4.5	52.1
20220304	5.5	-12.0	-16.9	-10.6	-2.5	36.3	35.6	-7.1	5.5	33.6	18.1	41.1
20220305	0.1	-12.8	-8.2	-12.0	0.5	-3.0	4.3	-1.3	31.6	6.4	-3.0	8.3
20220306	10.6	-17.2	-21.7	-14.0	-7.0	-16.8	1.0	-12.6	47.3	18.0	-8.6	0.4
20220314	2.5	6.0	-22.3	-8.3	0.4	-15.1	-4.6	-1.7	7.0	-13.6	-19.9	3.8
20220315	3.5	-2.1	-0.8	0.3	-0.3	5.0	8.2	-1.2	4.6	3.4	1.9	0.3
20220316	1.5	-5.1	-5.3	-8.6	2.1	2.9	11.7	-7.4	0.7	2.4	0.4	6.8
20220317	9.2	5.8	-38.8	-9.6	4.8	15.9	21.7	0.6	4.4	28.6	15.9	2.5
20220318	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20220319	12.9	39.1	-24.4	-7.3	-1.2	40.7	19.6	-7.3	6.3	16.4	28.0	55.3
20220320	62.2	15.2	-16.8	-6.1	3.1	-13.0	20.1	-2.8	5.1	30.3	-10.7	36.9
Grand Total	9.8	1.7	-14.4	-7.4	-0.3	4.0	14.1	-4.9	10.6	19.6	0.8	18.2



# JAO's parallel run results – March 2022 NEX

Net Exchanges (NEX) CORE - spot: + means higher export/lower import in CORE												
daily average in MW - means higher import/lower export in CORE												
Row Labels	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220301	18.0	-92.0	-298.7	-24.1	-337.2	417.3	-50.2	-464.2	469.6	372.1	-156.9	146.2
20220303	531.0	41.4	-241.0	-983.5	-840.0	546.1	-54.5	-368.4	691.2	430.7	88.4	158.6
20220304	22.9	-65.7	-122.4	-895.2	-587.1	405.1	287.0	-495.7	744.9	322.4	189.8	194.1
20220305	1044.9	-397.5	420.4	-5627.5	3531.5	211.2	25.2	434.2	105.1	67.5	239.4	-54.3
20220306	338.3	85.6	-201.6	-875.6	-601.5	-69.7	408.3	-903.5	1869.6	46.5	-242.6	146.3
20220314	80.6	235.9	-309.6	-950.0	277.9	574.9	-305.1	60.7	480.0	-66.5	-209.6	130.7
20220315	-121.3	258.9	-222.1	-243.7	83.6	598.9	-279.9	-501.7	346.0	36.2	-85.2	130.4
20220316	-125.4	370.3	41.8	-1109.0	225.5	599.3	-224.3	-207.6	336.9	79.1	-128.1	141.4
20220317	215.8	507.5	-315.8	-1384.8	383.4	598.5	-162.2	-417.8	173.1	177.8	112.7	111.7
20220319	215.1	147.1	-480.0	-1754.6	784.8	684.9	-375.2	221.5	320.9	69.1	36.3	130.1
20220320	362.9	515.3	-351.6	-1267.4	8.3	667.0	-357.0	-86.7	304.8	284.0	-200.9	121.3
Grand Total	235	146	-189	-1374	266	476	-99	-248	531	165	-32	123

# JAO's parallel run results – April 2022

BL prices CORE - spot: + means CORE > spot BL price												
daily average in euro/MWh					day of the FR spike ( the spike would have been 1500 instead of 3000 euros)							
Row Labels	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220404	34.2	32.9	1.7	0.2	-132.1	58.2	41.8	-9.7	-5.4	40.2	56.2	53.3
20220405	17.5	47.2	20.3	-3.1	-12.7	21.1	31.4	-4.5	3.5	28.2	19.3	12.4
20220406	43.2	-19.8	-12.0	-9.5	-1.0	64.1	70.6	-1.7	-5.5	70.4	66.9	28.7
20220407	59.7	49.8	-17.8	-7.0	-6.8	69.4	59.9	-4.5	-0.8	52.8	81.3	8.2
20220408	32.4	-4.4	-8.0	-6.7	-5.4	-21.8	19.1	-5.9	22.0	21.7	-14.2	6.0
20220409	41.6	33.0	-29.4	-8.2	-1.4	69.0	32.0	-12.2	-1.5	28.8	78.8	7.9
20220410	8.2	-14.6	-26.6	-8.8	2.8	-0.6	-8.6	0.0	5.2	1.5	3.7	-8.1
20220411	-1.6	-10.4	-6.7	-1.4	0.8	-2.3	-5.0	-7.5	5.6	49.3	-1.7	-10.5
20220412	23.7	-23.0	-13.5	-8.0	-2.5	27.5	53.9	-4.4	0.8	58.0	28.7	49.2
20220413	-6.6	1.0	-23.7	-4.6	3.4	-9.3	-11.8	-3.3	8.2	30.9	-7.3	-14.7
20220414	-5.4	-0.4	-3.7	-1.0	-0.0	-7.0	-5.4	-0.6	5.3	9.5	-6.1	-6.4
20220415	-1.5	-1.9	-8.0	-9.5	-0.3	0.9	0.3	3.5	5.6	0.0	1.9	-2.1
20220416	-14.4	2.1	-11.7	-3.4	2.8	-8.4	-19.7	2.7	-1.1	-21.0	-9.8	-23.3
20220417	-7.1	-2.4	-5.2	-3.7	-3.1	-10.2	-7.6	-1.2	4.1	5.8	-9.2	-8.8
20220418	0.6	-1.4	-0.2	-0.4	-2.8	0.4	-10.6	-6.4	4.4	-13.0	0.3	-0.3
20220419	5.7	-2.0	3.7	-3.9	-1.8	15.8	2.4	-4.7	14.4	0.9	14.8	9.8
20220420	-9.7	-51.6	18.4	-5.3	2.4	50.2	43.4	-5.4	-9.3	38.8	24.2	26.8
20220421	7.0	-9.4	1.9	-6.6	-2.7	10.7	15.0	-7.3	5.9	16.4	12.5	12.7
20220422	-3.7	-6.5	-16.2	-5.9	-3.9	0.2	4.5	0.8	4.2	38.8	-2.1	7.2
20220423	16.8	8.6	-0.4	-3.5	-21.1	4.0	2.9	14.5	-2.4	21.6	6.8	4.4
20220424	-7.7	10.6	-0.0	1.6	-11.3	-8.0	-9.5	14.2	1.1	-10.7	-7.7	0.6
Grand Total	11.1	1.8	-6.5	-4.7	-9.4	15.4	14.2	-2.1	3.1	22.3	16.1	7.3

# JAO's parallel run results – April 2022 NEX

Net Exchanges (NEX) CORE - spot: + means higher export/lower import in CORE												
daily average in MW												
- means higher import/lower export in CORE												
Row Labels	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220404	913.0	913.4	-80.4	273.5	-1376.9	661.9	-263.5	-471.8	-855.4	224.0	-42.5	104.7
20220405	160.6	811.6	68.9	-89.0	-1194.1	636.3	-267.8	-438.4	131.7	298.5	-220.6	102.3
20220406	1089.2	273.0	-284.2	-1163.8	-336.7	688.4	-54.2	-106.2	-688.9	357.0	120.2	106.2
20220407	984.5	289.1	-457.3	-1246.5	-1047.1	751.7	-203.2	-199.5	-13.2	566.1	465.0	110.5
20220408	551.5	299.5	-201.1	-636.0	-697.0	601.0	-281.0	-353.9	588.0	283.2	-269.0	114.9
20220409	1054.2	487.4	-262.6	-864.5	-837.1	695.7	-305.0	-255.7	-255.1	268.6	167.9	106.3
20220410	-175.9	212.3	-165.0	-304.5	166.6	696.2	-448.5	-119.2	145.7	124.0	-245.5	113.9
20220411	-72.5	198.3	-242.5	-381.6	-32.0	601.5	-415.8	-509.0	445.8	352.4	-50.4	105.9
20220412	661.5	197.0	-209.0	-1353.9	-615.5	590.1	-25.0	264.5	-63.6	353.4	89.4	111.2
20220413	-245.3	296.0	-209.7	-695.4	850.5	564.3	-391.2	-647.0	352.2	277.0	-250.4	99.0
20220414	-165.1	145.4	-127.0	-296.5	-82.1	571.9	-363.1	5.7	413.3	113.6	-313.5	97.3
20220415	38.3	268.2	-240.1	-828.0	-409.8	579.2	-341.6	652.2	338.6	34.9	-197.9	106.0
20220416	-268.0	195.1	-162.0	-90.5	118.0	608.7	-506.3	591.4	-219.0	-123.9	-249.4	106.0
20220417	-219.3	124.7	-153.4	187.8	-244.3	662.1	-407.0	408.5	-190.6	3.1	-277.7	106.0
20220418	-25.3	231.8	-111.5	805.4	-795.6	815.2	-369.6	28.6	-435.7	-76.6	-172.6	106.0
20220419	255.3	14.9	-105.1	-642.7	-203.4	543.6	-240.6	-299.7	342.1	90.8	138.9	106.0
20220420	-314.2	-960.4	-32.8	-61.9	134.2	624.1	157.0	-283.0	-591.6	598.8	609.7	120.0
20220421	237.9	16.2	-133.7	-486.4	-278.5	741.9	-199.7	-184.6	369.2	116.9	-301.4	102.2
20220422	-340.4	-3.2	-215.7	190.2	-1217.6	538.9	-265.9	218.7	439.5	761.0	-212.0	106.5
20220423	408.7	251.5	-178.3	470.9	-1358.4	603.8	-306.0	254.2	-243.0	207.7	-217.2	106.0
20220424	-75.7	99.8	-118.4	953.4	-1134.8	544.0	-357.6	112.2	77.9	3.4	-210.5	106.3
Grand Total	212.0	207.7	-172.4	-298.1	-504.3	634.3	-278.8	-63.4	4.2	230.2	-78.1	106.8

# JAO's parallel run results – May 2022

BL prices CORE - spot: + means CORE > spot BL price												
daily average in euro/MWh												
Row Labels	Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220502	0.0	-2.5	0.9	-2.4	-2.7	0.5	1.0	-2.9	16.2	12.8	0.5	1.7
20220503	3.8	-2.8	9.1	-3.1	-2.1	6.6	11.8	-3.3	17.6	9.6	8.0	15.8
20220504	-0.9	-0.1	0.5	-1.2	-2.9	1.5	0.5	-1.2	17.4	0.4	1.6	0.3
20220505	-2.2	-3.2	-0.2	-1.6	-1.5	1.5	-0.9	-2.9	5.8	1.5	2.9	-1.1
20220506	-0.6	-2.3	-0.2	-0.1	-2.8	-4.8	-0.5	-0.6	6.2	1.5	-4.6	-0.4
20220507	-2.1	-2.4	-2.3	-2.4	-2.3	-5.9	-1.9	-2.4	7.5	4.4	-5.9	-2.1
20220508	1.5	-3.1	0.1	-3.6	-3.4	1.0	5.2	-3.4	30.4	5.5	0.3	8.0
Grand Total	-0.1	-2.3	1.1	-2.1	-2.5	0.0	2.2	-2.4	14.5	5.1	0.4	3.2

# JAO's parallel run results – May 2022 NEX

Net Exchanges (NEX) CORE - spot: + means higher export/lower import in CORE													
daily average in MW		- means higher import/lower export in CORE											
Row Labels		Average of AT	Average of BE	Average of CZ	Average of DE/LU	Average of FR	Average of HR	Average of HU	Average of NL	Average of PL	Average of RO	Average of SI	Average of SK
20220502		-129.4	184.2	-12.3	-238.4	-531.3	582.1	-309.0	-466.8	790.5	194.3	-145.5	81.7
20220503		114.4	157.0	462.3	-1177.4	-417.1	571.2	-275.9	-604.6	1054.7	126.9	-112.1	100.6
20220504		-90.4	210.1	-141.5	-289.9	-329.2	558.2	-305.0	-14.9	482.8	32.9	-191.1	78.0
20220505		-106.3	261.4	-75.2	-130.8	-78.0	549.7	-317.0	-437.4	340.7	56.5	-133.2	69.4
20220506		-152.3	134.3	-30.0	54.2	-384.2	539.9	-314.1	-265.9	363.1	172.5	-195.7	78.0
20220507		-103.2	287.4	-34.5	-207.6	-445.0	597.3	-345.6	119.9	359.2	76.9	-383.0	78.1
20220508		-120.6	-41.9	-7.0	373.8	-583.2	638.5	-351.6	-643.3	988.8	-162.5	-169.3	78.3
Grand Total		-83.9	170.4	23.1	-230.9	-395.4	576.7	-316.9	-330.4	625.7	71.1	-190.0	80.6

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