


SDAC report on the 'partial decoupling'
incident of June 7th 2019

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SDAC REPORT ON THE 'PARTIAL DECOUPLING' INCIDENT OF JUNE 7TH 2019

SDAC

27 September 2019



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EXECUTIVE SUMMARY

Summary of the partial decoupling incident

On Friday, June the 7th of 2019, an incident took place in the Day Ahead Market Coupling process that led to a partial decoupling of the Multi-Regional Coupling (MRC), affecting the day ahead trades for Saturday, June the 8th. More specifically, due to missing order books of EPEX SPOT for the CWE area and the GB area, these areas were decoupled. Root cause was a corrupt order unintentionally entered into EPEX Spot's trading system.

Following the partial decoupling of CWE and GB from MRC, Shadow auctions for cross-zonal capacity were run by TSOs and JAO, and local auctions were run by NEMOs for each local national market area. Following a delayed declaration of the partial decoupling from the Incident Committee, the shadow auction results were sent to market participants with delay, making it very difficult to nominate volume granted in shadow auctions. Moreover, the local spot market auctions in the decoupled areas were subject to further delays beyond the foreseen timelines.

Although this decoupling did not lead to any grid security issues anywhere in Europe, this incident caused a major disruption of the Day Ahead Market within the Multi-Regional Coupling and processes on market parties and TSOs' side.

Preliminary findings

All the procedures in place to manage the cases for partial decoupling, despite being the first case of "live" application, have been properly applied and proved successful in retaining the coupling among the bidding zones not involved by the triggering event.

The decoupling event did not affect 4MMC, which is not yet coupled with MRC, and did not induce major impacts on market prices or security of operations in 4MMC.

Due to the incident committee giving extra time for trying to find a solution to avoid a decoupling, the critical deadline for declaring a partial decoupling was exceeded. This led to a situation that there was not enough time for a controlled completion for all subsequent processes. Morespecifically, there were issues with respect to the shadow auctions and the subsequent opportunity for adapting bids.

Lessons learnt and recommended follow up actions

The probability that a similar incident will happen again is very low. Critical deadlines in the procedures need to be respected, because these enable the mitigating effect of shadow auctions and local spot market auctions.

Now that the Multi NEMO Arrangement (MNA) is implemented in CWE, a similar type of incident will not lead to a decoupling of CWE, because the other, remaining NEMOs (EMCO, EXAA) would stay coupled.



In order to secure that all parties, especially the Market Participants, know exactly what to do in case of a decoupling incident, Market Participants will be invited for a joint training session of NEMOs, TSOs, and JAO.

NEMOs and TSOs will investigate the robustness of the procedures at the different levels (European, regional, and local) and their consistency for specific types of incidents and the actual impact of the incident.



THE MAIN REPORT

1 Introduction

On Friday, June the 7th of 2019, an incident took place in the Day Ahead Market Coupling process that led to a partial decoupling of the Multi-Regional Coupling (MRC). More specifically, due to missing order books of EPEX SPOT for the CWE area and the GB area, these areas were decoupled. Given the central geographic location of CWE within MRC, this led to a separation of the remaining coupled countries in several small coupled areas.

Since the Go-live of the NWE Market Coupling on February the 4th of 2014, that is after 1948 successful market coupling sessions, this is the first incident that has led to a partial decoupling. Although this did not lead to any grid security issues anywhere in Europe, the incident caused a major disruption of the European Day Ahead Market within the Multi-Regional Coupling and processes on market parties and TSOs' side.

This report is structured as follows.

In Chapter 2, the Single Day-ahead Coupling (SDAC) is described.

In Chapter 3, the normal operational process as covered in the operational procedures and the fallback measures in place are described together with their timings.

In Chapter 4, a description of the partial decoupling event, including the chronological course of events, and the root cause are presented.

In Chapter 5, the actual handling of the incident is evaluated.

Finally, in Chapter 6, the lessons learnt and recommendations are presented.



2 Single Day-ahead Coupling (SDAC)

2.1 Background

The aim of Single Day-ahead Coupling (SDAC) is to create a single pan European cross zonal day-ahead electricity market. An integrated day-ahead market increases the overall efficiency of trading by promoting effective competition, increasing liquidity and enabling a more efficient utilisation of the generation resources across Europe.

SDAC allocates scarce cross-border transmission capacity in the most efficient way by coupling wholesale electricity markets from different regions through a common algorithm, simultaneously taking into account cross-border transmission constraints thereby maximising social welfare.

SDAC is an initiative between the Nominated Electricity Market Operators (NEMOs) and Transmission System Operators (TSOs) which – in the framework of CACM implementation – enables cross-border trading across Europe via implicit auctions for delivery of power for the following day.

Significant progress has been achieved in the establishment of a pan-European Single Day-Ahead Coupling in recent years, thanks to early implementation initiatives and pilot projects. SDAC relies on the Price Coupling of Regions (PCR) solution developed by a group of power exchanges. At this stage, the SDAC is in an interim phase during which two parallel market couplings co-exist, i.e., the Multi Regional Coupling (MRC) and the 4M Market Coupling (4M MC). These couplings are considered on an equal basis as jointly forming, for this interim period, the Single Day-Ahead Coupling in implementation of CACM. In the enduring stage MRC and 4M MC shall be coupled.

2.2 SDAC geographical scope and extensions

In February 2014 the launch of the North-Western Europe (NWE) Price Coupling operating under a common day-ahead power price calculation using the PCR solution was accomplished. The same solution was also used at the same time in the SWE region in a common synchronised mode.

The first go-live of this coupling included the following countries: Belgium, Denmark, Estonia, Finland, France, Germany/Austria, Great Britain, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland (via the SwePol Link), Sweden, Portugal and Spain.

The following milestones were achieved:

- 2014, May: full coupling NWE and SWE (MRC coupling)
- 2014, November: the 4M MC went live using the PCR solution. The following countries are part of the 4M MC: Czech Republic, Hungary, Romania and Slovakia.
- 2015, February: CSE coupled with MRC
- 2016, January: Bulgaria joined MRC (isolated mode)
- 2016, February: Croatia joined MRC (isolated mode)

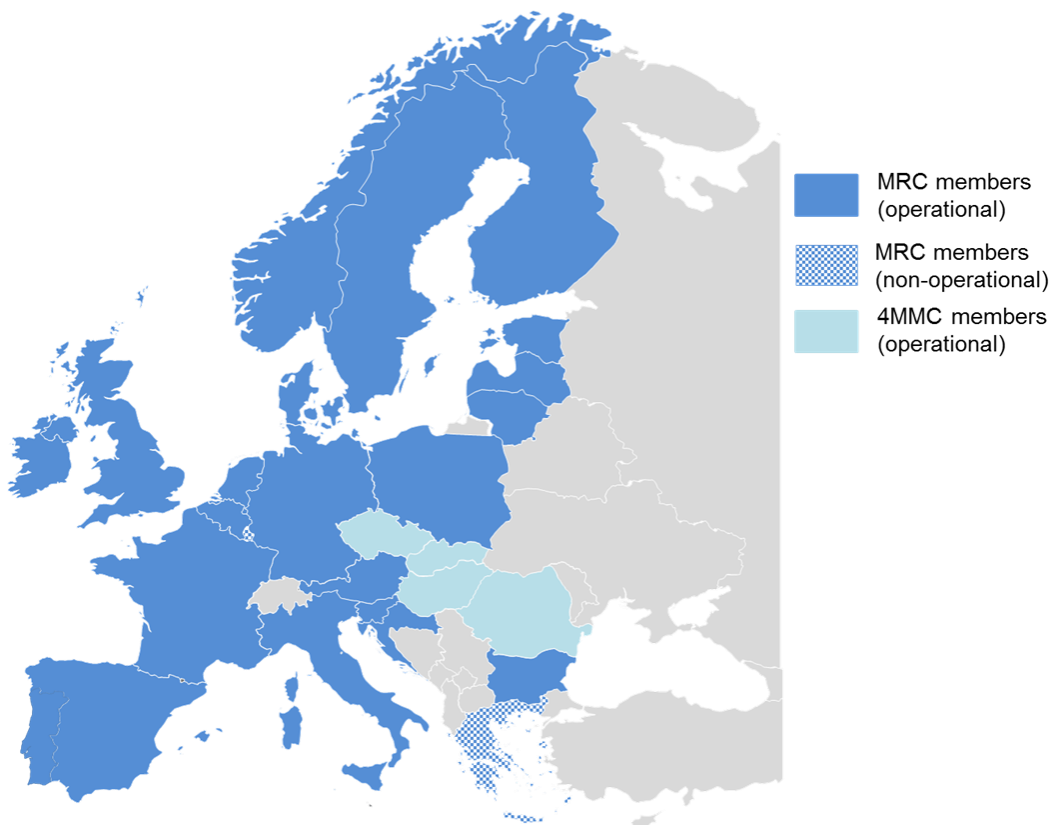


- 2018, June: Croatia coupled with MRC
- 2018, October: the Single Electricity Market on the island of Ireland coupled with MRC, split of the German-Austrian bidding zone into two separate ones

It is foreseen that the next step will include coupling the 4M MC, Poland and the MRC by introducing NTC-based implicit allocation on 6 borders (PL-DE, PL-CZ, PL-SK, CZ-DE, CZ-AT, and HU-AT). The current planning envisages the go-live of the so-called Interim Coupling in Q2 2020. This is to be regarded as a stepwise transition on the aforementioned borders from current NTC-based explicit allocation towards the flow-based implicit allocation which is to be implemented in the framework of the Core Flow-Based Market Coupling Project as the target solution required by regulation.

Furthermore, by the end of 2020, the SDAC shall be extended to Greece via the HVDC interconnector between Italy and Greece.

The following figure illustrates the MRC members and the 4MMC members.



The parties involved in SDAC are:

Transmission System Operators (TSOs):

50Hertz Transmission, ADMIE, Amprion, APG, AST, BritNed, ČEPS, Creos, EirGrid, ElecLink, Elering, ELES, ELIA, Energinet, ESO, Fingrid, HOPS, Litgrid, MAVIR, Nemolink, NGIC, PSE, REE, REN, RTE, SEPS, SONI, Statnett, Svenska Kraftnät, TenneT DE, TenneT NL, Terna, Transelectrica and TransnetBW.



Nominated Electricity Market Operators (NEMOs):

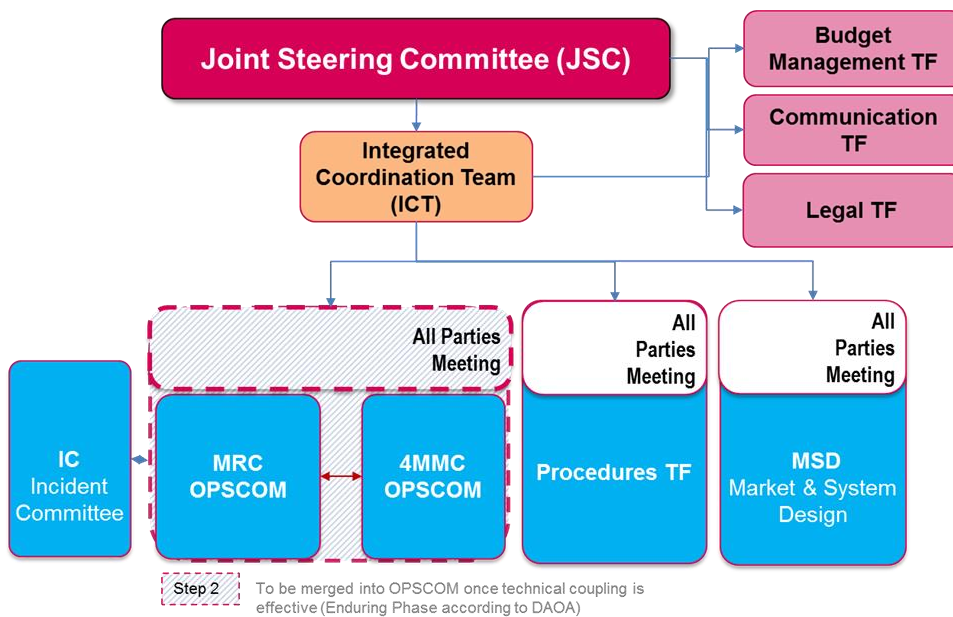
BSP, CROPEX, SEMOpX (EirGrid and SONI), EPEX, EXAA, GME, HEnEx, HUPX, IBEX, Nasdaq, Nord Pool, OMIE, OKTE, OPCOM, OTE, and TGE.

2.3 Governance structure

The governance of the SDAC consists of three layers:

- Joint NEMOs and TSOs: governed by the Single Day-Ahead Coupling Operations Agreement (DAOA);
- Only NEMOs: governed by the All NEMO Day Ahead Operation Agreement (ANDOA);
- Only TSOs: governed by the TSO Cooperation Agreement for Single Day-Ahead Coupling (TCDA).

Therefore, the governance structure is headed by a Joint Steering Committee (JSC) that includes representatives of all the parties involved. The JSC activities are supported by horizontal groups which address the legal, financial and communication aspects of the coupling. Furthermore, there are three joint groups which deal with the following operational aspects: Market & System Design, Procedures and Operation.



2.4 What does SDAC do?

Day-ahead market coupling requires processing input from all involved NEMOs and TSOs – essentially bids and offers and network capacities and constraints – matching them by operating one single algorithm, and lastly validating and sending outputs, such as matched trades, clearing prices, and scheduled exchanges, to NEMOs and TSOs. These procedures occur within precise and tight timelines, while ensuring optimal economic solutions, high performance, and robustness.



The SDAC makes use of a common price coupling algorithm, called PCR EUPHEMIA, to calculate electricity prices across Europe and to implicitly allocate auction-based cross-border capacity. Both the MRC and the 4M MC apply PCR EUPHEMIA that will also be the IT asset for the execution of market coupling following the merge of the two abovementioned couplings.

Input data to PCR EUPHEMIA are the network capacities and constraints provided by the TSOs and the bids and offers provided by the NEMOs.

PCR EUPHEMIA matches energy demand and supply for 24 hours simultaneously. The algorithm runs a combinatorial optimization process based on (i) the modelling of the matching problem (ii) the implementation of dedicated branch-and-bound strategies and (iii) the utilization of a standard optimization solver. The code of the algorithm uses Java and is interfaced with the matching system via an Oracle database.

This process maximises social welfare (consumer surplus, supplier surplus and congestion rent) and takes into account price limits of orders and network constraints. The algorithm is designed to regard a large variety of orders and network features as well as local market rules.

Output data are clearing prices, matched trades, scheduled exchanges and the net position of bidding areas.

Since its launch PCR EUPHEMIA has been continuously developed further. The most recent major development has been the integration of multi-NEMO requirements.

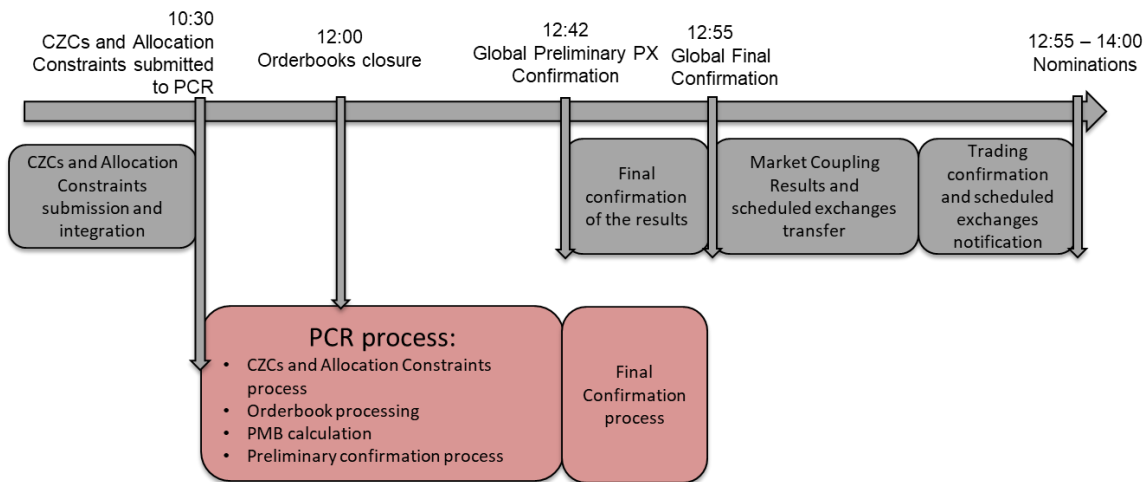


3 Operational process and timings as described in the operational procedures

In order to understand the effect of the issue that triggered the chain of events that finally led to a partial decoupling, in this chapter the normal process is briefly described together with the timings. Subsequently, the measures in place to handle a partial decoupling are described.

3.1 Normal process and timings

In the below Figure, the regular operational process is visualized.



To start with, the TSOs provide cross border interconnector capacities to PCR through the PMB (PCR Matcher Broker) and Market Participants make bids for buying and selling through the Local Trading System of their PX(s).

At 12:00, the local order books are closed and submitted to the PMB, which subsequently starts the calculation with EUPHEMIA. The results of this calculation are subsequently shared and validated. After that the results are confirmed by the PXs and TSOs.

After the global final confirmation of the results, the market coupling results and scheduled exchanges are transferred and the trading confirmations and the scheduled exchanges notifications are given.



3.2 Fallback process and timings

In order to handle issues in operations, there are backup procedures. These provide workarounds for issues that do not lead to exceeding the critical deadlines for the different process steps. When these backup procedures do not suffice, there are fallback measures in place to limit the negative impact on the market.

In the below Figure, the timings for the operational process are shown and the deadline for declaring a Partial Decoupling is shown.

Phase	Time	Event
Pre-Coupling	09:00	Start of the Market Coupling Session
	09:00	TSOs start computing and matching the CZC values
	09:15	Latest Time start an IC for issues in the Configuration step
	09:45	Deadline to skip the Configuration Synchronization step
	10:30	Target Time for submitting the Network Data in the PMB
	11:00	Latest time to start an IC for missing Network Data
	11:15	Risk of Partial Decoupling for one or more interconnectors
	11:45	Deadline to declare the Partial Decoupling for an interconnector
Coupling	12:00	NEMO Order book Gate Closure Time
	12:10	PMB GCT/Reception of Order Data files → Start of Calculation
	12:10	Latest Time to start an IC for Order Data-related reasons
	12:20	Deadline to send the message for Risk of Partial Decoupling
	12:22	End of Calculation
	12:24	Reception of Results + Start of 12 min Confirmation process
	12:36	Deadline to send the Preliminary Conf → Generation of GPC
	12:38	Reception of Preliminary Final Confirmation in local PMBs
	12:40	Deadline to declare Partial Decoupling
	12:42	Publication of Preliminary Results and sending to the TSOs → Start of 10 min Final Confirmation process
	12:52	Deadline to send the Final Confirmations
	12:53	Reception of all Final Confirmations → Generation of GFC
	12:54	Reception of Global Final Confirmation in local PMBs
	12:55	Publication of Final Results → Start of Notification Process
	13:05	Latest time to Start an IC and invite TSOs
13:20	Deadline to send the message for Risk of Full Decoupling	
	13:50	Deadline to declare the MRC Full Decoupling

3.2.1 Shadow auction process

Shadow auctions are the fallback measure in place to handle a situation where the capacity of interconnectors cannot be allocated in the normal Market Coupling process. Market participants have the possibility to place default bids and provide (updates of) bids through dedicated platforms (e.g. JAO's website) to obtain capacity until 12:30. The results of this auction are published at the moment that the partial decoupling is declared (normally at 12:40) and represents the allocated capacity. Once this phase is terminated, the market participants can adjust their power bids in the different markets between 12:50 and 13:00 to take into account the results of this shadow auction.

Once the market coupling process has run, participants can nominate the capacity allocated through shadow auctions. These nominations done towards TSOs are then matched among the TSOs border by border.

3.2.2 Local auctions

In case the issues are so severe that the coupling cannot be completed for the whole Multi Regional Coupling, it can be decided to partially or fully decouple. The decoupled bidding zones can then perform a local auction that enables trading within these individual zones.



4 Description of the partial decoupling event

On Friday, June the 7th of 2019, EPEX SPOT experienced a technical issue causing a chain of events that finally led to decoupling of EPEX SPOT market, cancellation of an erroneous set of local auction market results in CWE and the publication of new and final local results.

The root cause at the beginning of the chain of events was a corrupt order entered into ETS (EPEX SPOT Trading System) unintentionally by a market participant.

The chain of events can be divided into two parts: one concerning the decoupling incident and the subsequent processes on MRC level (covered in Sections 4.1 until 4.4), the other concerning an incident on the local auction (covered in Section 4.5).

4.1 Decoupling incident

From 11:39 onwards, EPEX SPOT experienced a technical issue with its ETS system, triggered by a corrupt order, which caused an ETS server lock. Once the server was unlocked, the corrupt order was removed followed by a restart of the server. The same corrupt order was again unintentionally introduced, despite EPEX SPOT's request to the market participant not to do so.

This caused a chain of events, which led to multiple server locks resulting in a delay of the order book submission on EPEX SPOT side. This delay meant that the deadline of 12:40 for partial decoupling, as defined in the PCR procedures, was reached and partial decoupling was declared at 12:49.



4.2 Detailed Timeline

In the below overview the timeline is shown from MRC perspective.

Time	Event
11:45	EPEX SPOT informed the Market Coupling Coordinator (TGE) in a bilateral call that they were experiencing some technical issues and that this could impact the timing for delivering their order data.
12:09	EPEX SPOT order data were still missing in the PMB (PCR Matcher Broker) and in the Operational call it was confirmed by EPEX SPOT that the problem was persisting and that the order data would be sent late relative to the normal timing (normal timing is before 12:10).
12:10	Due to this missing order data, the Market Coupling Coordinator triggered an IC (Incident Committee) call.
12:15	Order data were still missing and therefore the invitation to the IC call was forwarded to TSOs and third parties (serviced PXs and JAO).
12:18	<p>The Market Coupling Coordinator sent the ExC_03a (risk of partial decoupling) message to all PXs for EPEX-CWE, EPEX-GB and OMIE. OMIE was included in this list, because in case of decoupling of EPEX-CWE and due to the fact that they are connected only with France, it is foreseen that also OMIE is would be decoupled from MRC (as described in the operational procedures) and their market is would run locally.</p> <p>The message ExC_03a (risk of partial decoupling) was forwarded to TSOs and third parties and shadow auctions were opened on the borders that were involved in the decoupling:</p> <ul style="list-style-type: none">• Spain-France• Italy-France• Italy-Austria• Slovenia-Austria• Sweden-Germany• Germany-Denmark• Norway-Netherlands• Great Britain-Netherlands• Great Britain-Belgium• Great Britain-France• Great Britain-Ireland/Northern Ireland• Great Britain1-Great Britain2 <p>Shadow auctions were also triggered for all the CWE internal borders. See for more information the Paragraphs 3) EPEX SPOT description of the issue and CWE local market process and 4) Shadow auction process and results.</p>



- 12:35 The bid submission window for the shadow auctions was closed and the auctions were run.
- 12:40 (Deadline for declaring the partial decoupling), EPEX SPOT informed that their local systems were running again; parties (all NEMOs and TSOs part of the MRC Market Coupling) that were present in the IC jointly agreed to wait a few minutes for the missing order data in order to avoid a Partial Decoupling: no party objected to this decision.
- 12:48 EPEX SPOT informed that their local systems were down again. Therefore, the Partial decoupling was triggered; partial decoupling was declared for the following Virtual Brokers:
- EPEX-CWE
 - EPEX-GB
 - OMIE
- Message ExC_04 (partial decoupling) was sent by the Market Coupling Coordinator. In this message, it was also indicated that each “remaining” NEMO (those that were not decoupled) could reopen its own order book from 12:50 to 13:00.
- 12:50 The Coordinator started the procedure to partially decouple the above indicated Virtual Brokers in the PMB.
- 12:51 JAO sent the results of the shadow auctions to parties (TSOs, ENTSO-E and participants) and at 12:53, JAO published the results of these auctions on their website.
- For the interconnectors Germany-Denmark2 and for Norway-Netherlands, this was done 10 minutes later due to the ramping constraints that require more time for the analysis of the results (after the gate closure time) and an issue experienced which resulted in a small delay in sending the results compared to the other borders. Although a little later than foreseen, the deadline after the declaration of the decoupling was still kept.
- 13:00 All “remaining” NEMOs closed their order books and resent the updated order data to the PMB.
- 13:15 The calculation started and took 2-3 minutes. From a coupling point of view, the following countries remained coupled:
- Italy-Slovenia-Croatia
 - Ireland-Northern Ireland
 - Norway, Sweden, Denmark, Finland, Poland, Estonia, Latvia, and Lithuania
- 13:18 Results were distributed to the NEMOs.
- 13:20 The message Exc_03b (further delay of the Market Coupling session) was sent by the market Coupling Coordinator.



13:26

The final confirmation phase ended and the process in MRC finished and the nomination process started. From the MRC point of view, starting the nomination process only at 13:36 has been encountered and handled before (e.g. in case of a second auctions in 2016).

13:36

The preliminary confirmation phase ended.

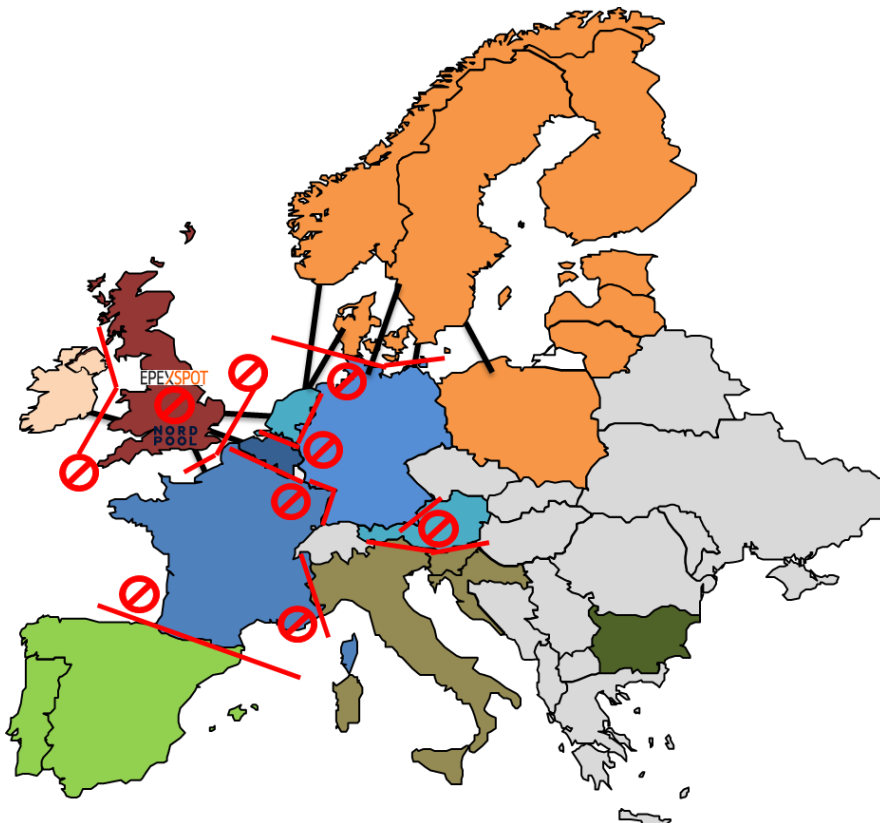
4.3 Communication to the market

As part of the MRC process, the following joint communication towards the market was made:

- 12:20: Risk of partial decoupling and opening of shadow auction window
- 12:49 Partial decoupling declared
- 12:51-13:01 Results of shadow auction were published
- 13:20 Further delay in market results

4.4 Impacted borders and the areas that stayed coupled

In the below Figure a visualization is given of the impacted borders and the areas that stayed coupled.



In this Figure, the MRC areas with the same color stayed coupled and borders labelled with Ø were decoupled.



Here, it has to be pointed out that the severity of the decoupling was not related to how the incident was managed, but rather is a consequence of the central geographic location of CWE within MRC. Consequently, this partial decoupling of CWE led to a separation of the remaining coupled countries in several small coupled areas.



4.5 Local Auction in CWE

Following partial decoupling, CWE manages its local processes, according to local procedures and outside the control of the wider SDAC parties.

This partial decoupling of CWE and GB from Multi-Regional Coupling (MRC) means that, according to the procedures, local auctions are run for each local national market area.

All internal CWE borders were decoupled:

- France-Belgium
- France-Germany
- Germany-Austria
- Germany-Netherlands
- Germany-Belgium
- Netherlands-Belgium

and shadow auctions were run on those borders with the same timings of the remaining MRC ones.

The fixing measure applied to remedy the issue of the corrupt order in the EPEX SPOT system resulted in a further IT issue and, subsequently, led to the publication of erroneous local market results (only part of the order book was taken into consideration in this calculation).

Upon later detection, the erroneous local results were cancelled, and the orderbook was re-opened until 14:35, since EPEX SPOT had doubts regarding the correctness of the order book. EPEX SPOT then calculated market results, based on a complete order book set, and final results were published at 15:38, instead of 14:45 according to CWE procedures.

On that day, the running of the last local auction took longer than foreseen, because of extra checks needed to make sure that the new publication was going to be correct. A second auction was not triggered due to lack of time, as the deadline for second auctions was already exceeded and this operational situation was not covered in the CWE procedure at the time of the incident.

At 15:49, EPEX SPOT sent the trade results to ECC, which in turn validated all transactions. All nominations and payments were consequently completed and settled correctly.

The gate closure for nominations was moved progressively by EPEX sending the corresponding delay messages to the CWE TSOs. The last message that was sent, postponed the nomination gates to 15:30, which corresponds to the last deadline available in the CWE procedures for cross-border and local nominations.

Some TSOs moved the deadline further after 15:30 (until 17:00) to allow market participants to nominate based on the final local market results. Other TSOs confirmed the 15:30 deadline, forcing participants to do nominations without knowing the market results. In either case, TSOs received information necessary for security calculations too late and/or in an inconsistent way.

4.6 Solution for the issue that triggered the chain of events

In order to permanently remedy the underlying root cause, ETS system updates have been issued. After successful testing, these updates were deployed in ETS at 19:30



that very same day (June the 7th), in order to secure the continued robustness of the trading system.

All technical issues on ETS have been fixed and the EPEX SPOT markets have been running smoothly since.



5 Handling of the incident - Evaluation

In this chapter, the way that the incident was handled is evaluated.

5.1 Detection of the issue

EPEX SPOT became aware of the issue and directly pro-actively informed the Market Coupling Coordinator well in advance, so preparations could be made to manage the matter in a controlled manner.

5.2 Communication between the Market Coupling Coordinator, PXs, TSOs and third parties prior to declaring a partial decoupling

In line with the procedures, TGE in its role of Market Coupling Coordinator communicated with the PXs, TSOs and third parties.

The Incident Committee was triggered and the PXs were invited at the right time. The invitation was subsequently correctly forwarded by the PXs to the TSOs and JAO (in line with the agreements between the TSOs and the NEMOs).

In line with the procedures, the risk of partial decoupling message was sent with the correct information.

5.3 Shadow auctions

In line with the procedures, shadow auctions were opened at 12:20 for the borders involved in the decoupling, including the CWE internal borders. At around 12:35, the bid submission window for the shadow auctions was closed and the auctions were run. The slightly later bid submission window closure, which is normally at 12:30, offered the market participants a little more time.

Border/Interconnector	Shadow auction process		
	Bid submission closed (auction ran)	Auction results sent	Results published on JAO website
AT-DE	12:37	12:51	12:53
AT-IT	12:34	12:52	12:53
AT-SI	12:35	12:52	12:53
BE-FR	12:33	12:51	12:53
BE-NL	12:33	12:51	12:54
D1-DE	12:34	12:51	12:54
D2-DE	12:34	13:01	13:03
DE-AT	12:37	12:51	12:54
DE-D1	12:34	12:51	12:54
DE-D2	12:34	13:01	13:03
DE-FR	12:33	12:51	12:54
DE-NL	12:33	12:51	12:54
ES-FR	12:34	12:51	12:54



FR-BE	12:33	12:51	12:54
FR-DE	12:33	12:51	12:54
FR-ES	12:34	12:51	12:54
FR-IT	12:35	12:52	12:54
IT-AT	12:34	12:52	12:54
IT-FR	12:35	12:52	12:55
NL-BE	12:33	12:51	12:55
NL-DE	12:33	12:51	12:55
NLL-BE-GB	12:35	12:52	12:55
NLL-GB-BE	12:36	12:53	12:55
NL-NO	12:34	13:00	13:02
NO-NL	12:34	13:00	13:01
SI-AT	12:35	12:52	12:55

In line with the procedures, the auction results were sent as soon as the partial decoupling was declared. For Germany-Denmark2 and for Norway-Netherlands, this was done 10 minutes later due to the ramping constraints that require more time for the analysis of the results (after the gate closure time) and an issue experienced, which resulted in a small delay in sending the results compared to the other borders. Although a little later than foreseen, the deadline after the declaration of the decoupling was still kept.

Here, it has to be pointed out that the partial decoupling was declared 9 minutes later than the deadline explicitly stated in the procedures.

5.4 Incident Committee declaration of partial decoupling

In line with the operational procedures¹, an Incident Committee call was triggered. At 12:40 (=deadline for declaring the partial decoupling), parties in the Incident Committee call jointly agreed to wait a few minutes more for the missing order data in order to try to avoid a partial decoupling.

The decision to exceed the deadline for declaring the partial decoupling is not in line with the procedures. In case this would have avoided the partial decoupling, all parties would have been relieved and happy with this decision. It, however, turned out differently and caused complications with respect to subsequent operational processes.

The MRC process is performed based on a set of jointly agreed processes with certain timings. For some of the process steps, deadlines have been jointly agreed at the central level and regional/local processes are complying with those. When (one of) the involved parties disregard(s) the agreed procedures and the associated deadlines, this can jeopardize the whole operations.

¹ Please note that in principle all operational MRC parties are invited to incident committees through the NEMOs, unless agreed otherwise between the parties and their associated NEMO(s).



5.5 Update of bids based on shadow auction results

After declaration of the partial decoupling in the Incident Committee, there are 10 minutes for informing the market participants, 10 minutes for keeping the markets reopened and 10 minutes for the preparation and sending of new files.

5 minutes before the reopening of the markets, the shadow auction results should be there. Since the decoupling was declared 8-9 minutes after the deadline, there was an equal delay in the sending and publication of the shadow auction results (see Table under 5.3).

The PXs for the decoupled areas closed their markets at different moments in time. This left little and for some borders very little to no time for the market participants to update their bids for shadow auctions, before their PX gate closure time.

See for an overview of the results of the shadow auctions per border and what was finally nominated the table in Annex 1. The fact that nominated values are considerably lower than what has been allocated, indicates that the capacities are not used to the full extent.

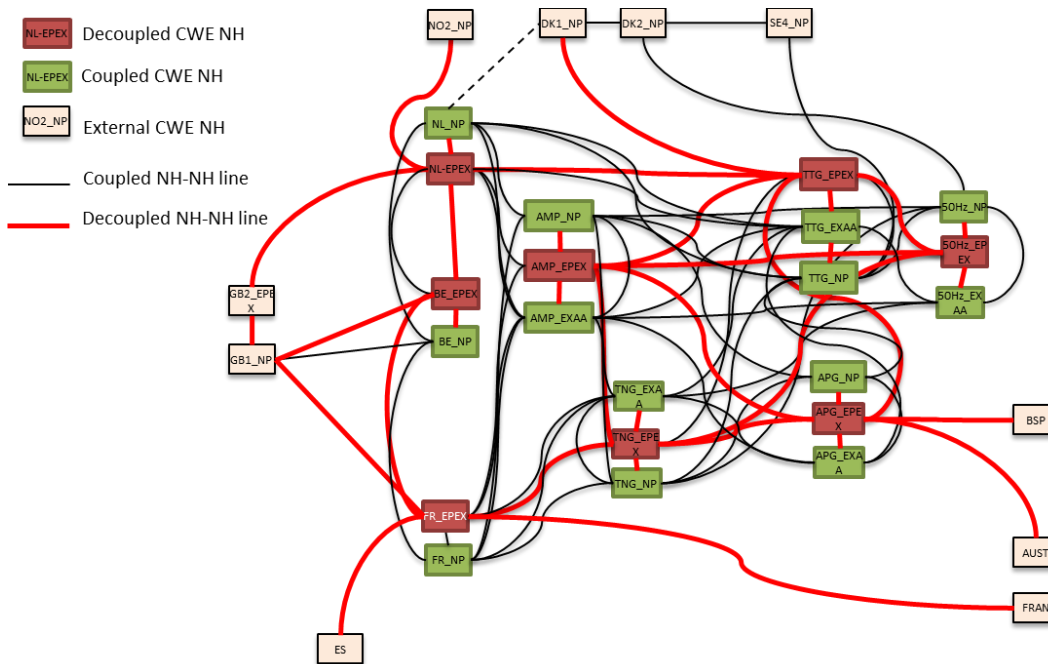


6 Lessons learnt and recommended follow up actions.

6.1 Probability that it will happen again

For this particular incident, the involved party deployed a fix that makes it impossible for corrupted orders to enter the system.

In addition, it is good to point out that a similar incident in the recently implemented Multi NEMO Arrangement (MNA), will not lead to a decoupling of CWE, as other remaining NEMOs (namely EMCO and EXAA) would stay coupled. The below figure visualizes the situation of EPEX decoupling in a post CWE-MNA context.



6.2 Critical deadlines in the procedures to be respected

Although there might be exceptions to the rule that the critical deadlines in the procedures have to be respected, there should be clarity on which exceptions are considered acceptable. In an incident committee call, it is easy to overlook certain dependencies between processes and what is an acceptable delay for one party might not be acceptable for another.

6.3 Timings of MRC, regional and local procedures

Given the interlinkage of the different levels of procedures (MRC, 4MMC, PCR, regional and local) and the timings there in, consistency is necessary. For some processes, a certain degree flexibility to adapt to the specific situation at hand is desired.

To secure this consistency and to facilitate some flexibility, it is recommended to:

- investigate whether the deadlines for calculation of market results and for declaration of decoupling can be slightly extended to allow more time for the standard processes. Analyses on this are already taking place among NEMOs and TSOs and a proposal could come soon.



- investigate whether the timings of procedures on the different levels can/have to be further harmonized.
- assess whether, and if so, for which steps some flexibility can be allowed, while taking into account that when a certain deadline is relaxed, some subsequent operational steps keep the fixed deadline, whereas for some subsequent operational steps the deadlines can be relaxed similarly.

6.4 Procedures robustness

In order to secure that the whole set of MRC, 4MMC, PCR, regional and local procedures are robust, it is recommended to perform an evaluation of those procedures for specific types of operational incidents.

6.5 Shadow auction issues

The shadow auction process did not on all involved interconnectors lead to the capacities being used efficiently. Part of the reason for this is that for these interconnectors, there were only few bids placed in the shadow auction beforehand (as default bids) and updated during the incident (due to for some borders insufficient time). In addition, some market participants were not familiar enough with the shadow auction process and the following operational steps. Here, it is important to point out that right after the incident for some borders more market participants placed additional default bids for the shadow auction.

To facilitate an efficient functioning of fallback measures in general and the shadow auctions in particular, it is recommended to:

- offer market participants to participate in SDAC/MRC trainings with the TSOs and PXs, so all can get well familiar with shadow auction processes. This will facilitate all parties including the market participants to be prepared for handling a decoupling incident.
- investigate and implement optimizations that shorten the check of the shadow auction results for interconnectors with ramping constraints (Germany-Denmark² and for Norway-Netherlands), so that the results can be sent and published sooner. This will allow (more) time for market participants to adjust their power bids in the different markets to take into account the results of this shadow auction.
- evaluate in the longer term if the growing maturity of SIDC and forthcoming IDAs can represent a more reliable solution than the shadow auctions, as this would be replacing a fallback option with an ordinary process.



Annex 1: Overview of the June 7th 2019 results of the shadow auctions per border and what was finally nominated

H	Allocated / Nominated	Border/Interconnector																											
		AT-DE	AT-IT	AT-SI	BE-FR	BE-NL	D1-DE	D2-DE	DE-AT	DE-D1	DE-D2	DE-FR	DE-NL	ES-FR	FR-BE	FR-DE	FR-ES	FR-IT	IT-AT	IT-FR	NL-BE	NL-DE	NL-NO	NO-NL	SI-AT	FR-GB (IFA)	GB-FR (IFA)	BE-GB (Nemo Link)	GB-BE (Nemo Link)
1	Allocated	0	213	730	399	692	150	550	1000	400	0	1020	1354	1150	1620	1348	1200	2435	50	1154	699	1302	0	675	300	1083	350	0	0
	Nominated	0	0	280	219	0	0	0	300	0	0		669	300	318		0	1800	0	0	0	0	0	0	0	1083	0	0	0
2	Allocated	0	212	730	400	692	150	550	1000	400	0	1012	1354	1150	1618	1348	1200	2435	50	1154	699	1302	0	675	300	1083	350	0	0
	Nominated	0	0	280	170	0	0	0	300	0	0		675	0	318		0	1800	0	0	0	0	0	0	0	1083	0	0	0
3	Allocated	0	213	730	400	692	150	550	1000	400	0	1010	1354	1150	1630	1348	1200	2437	50	1154	704	1308	0	675	300	1083	350	0	0
	Nominated	0	0	280	170	0	0	0	300	0	0		644	0	318		0	1800	0	0	0	0	0	0	0	1083	0	0	0
4	Allocated	0	213	730	400	692	150	550	1000	400	0	1008	1352	1150	1600	1347	1200	2435	50	1154	693	1306	0	675	300	1083	350	0	0
	Nominated	0	0	280	170	0	0	0	300	0	0		521	0	318		0	1800	0	0	0	0	0	0	0	1083	0	0	0
5	Allocated	0	213	730	401	692	150	550	1000	400	0	1003	1352	1150	1604	1350	1200	2435	50	1154	701	1304	0	675	300	1083	350	0	0
	Nominated	0	0	280	171	0	0	0	300	0	0		517	0	318		0	1800	0	0	0	0	0	0	0	1083	0	0	0
6	Allocated	0	201	730	408	692	150	550	1000	400	0	1002	1352	1150	1604	1353	1200	1977	50	1154	704	1306	0	675	300	1083	350	0	0
	Nominated	0	0	180	178	0	0	0	300	0	0		517	0	318		0	1447	0	0	0	0	0	0	0	1083	0	0	0
7	Allocated	0	201	730	408	693	150	550	1000	400	0	1004	1352	1150	1608	1355	1200	1977	50	1154	704	1306	0	675	300	1083	350	0	0
	Nominated	0	0	230	128	0	0	0	300	0	0		496	0	318		0	1447	0	0	0	0	0	0	0	1083	0	0	0
8	Allocated	0	190	730	411	692	150	550	1000	400	0	1001	898	1150	1602	1356	1200	1827	50	968	704	1306	0	675	300	1083	350	0	0
	Nominated	0	5	130	225	0	0	0	300	0	0		475	0	318		0	1327	0	0	0	0	0	0	0	1083	0	0	0
9	Allocated	0	191	730	406	692	150	550	1000	400	0	1003	890	1000	1609	1356	1399	1827	50	968	699	1298	0	675	300	1083	350	0	0
	Nominated	0	0	130	0	0	0	0	300	0	0		475	0	347		0	1327	0	0	0	0	0	0	0	1083	0	0	0
10	Allocated	0	191	730	399	692	150	550	1000	400	0	1000	890	1000	1600	1347	1399	1827	50	968	702	1304	0	675	300	1083	350	0	0
	Nominated	0	0	205	0	0	0	0	300	0	0		475	0	318		0	1327	0	0	0	0	0	0	0	1083	0	0	0
11	Allocated	0	191	730	417	692	150	550	1000	400	0	1000	890	1000	1600	1365	1399	1827	50	968	697	1301	0	675	300	1083	350	0	0
	Nominated	0	7	315	187	0	0	0	300	0	0		475	0	344		0	1312	0	0	0	0	0	0	0	1083	0	0	0
12	Allocated	0	190	730	399	692	150	550	1000	400	0	1000	890	1000	1600	1347	1399	1827	50	968	701	1303	0	675	300	1083	350	0	0



	Nominated	0	10	280	169	0	0	0	300	0	0	475	0	318		0	1312	0	0	0	0	0	0	1083	0	0	0		
13	Allocated	0	191	730	399	692	150	550	1000	400	0	1000	890	1000	1600	1362	1399	1827	50	968	698	1301	0	675	300	1083	350	0	0
	Nominated	0	50	230	219	0	0	0	300	0	0	405	0	318		0	1312	0	0	0	0	0	0	1083	0	0	0	0	
14	Allocated	0	191	730	399	692	150	550	1000	400	0	1000	890	1000	1600	1359	1400	1827	50	968	699	1302	0	675	300	1083	350	0	0
	Nominated	0	56	230	219	0	0	0	300	0	0	415	0	318		0	1312	0	0	0	0	0	0	1083	0	0	0	0	
15	Allocated	0	191	730	399	692	150	550	1000	400	0	1000	890	1000	1600	1359	1400	1827	50	968	697	1300	0	675	300	1083	350	0	0
	Nominated	0	100	230	219	0	0	0	300	0	0	430	0	318		0	1312	0	0	0	0	0	0	1083	0	0	0	0	
16	Allocated	0	191	730	399	692	350	550	1000	400	0	1002	890	1000	1600	1362	1399	1827	50	968	697	1300	0	675	300	1083	350	0	0
	Nominated	0	100	230	219	0	0	0	300	0	0	375	0	318		0	1312	0	0	0	0	0	0	1083	0	0	0	0	
17	Allocated	0	191	730	408	693	350	550	1000	400	0	1002	890	1000	1605	1353	1400	1827	50	968	698	1303	0	675	300	1083	350	0	0
	Nominated	0	100	230	225	0	0	0	300	0	0	475	0	354		0	1327	0	0	0	0	0	0	1083	0	0	0	0	
18	Allocated	0	205	730	418	692	350	550	1000	400	0	1004	1352	1000	1604	1359	1400	2328	50	968	697	1298	0	675	300	1083	350	0	0
	Nominated	0	100	205	0	0	0	0	300	0	0	592	0	318		0	1708	0	0	0	0	0	0	1083	0	0	0	0	
19	Allocated	0	210	730	409	693	350	550	1000	400	0	1005	1353	1000	1607	1353	1399	2605	50	968	697	1300	0	675	300	1083	350	0	0
	Nominated	0	100	205	0	0	0	0	300	0	0	475	0	344		0	1800	0	0	0	0	0	0	1083	0	0	0	0	
20	Allocated	0	210	730	412	693	350	550	1000	400	0	1015	1353	1000	1608	1359	1399	2605	50	968	702	1305	0	675	300	1084	350	0	0
	Nominated	0	100	130	0	0	0	0	300	0	0	675	0	396		0	1800	0	0	0	0	0	0	1084	0	0	0	0	
21	Allocated	0	210	730	401	693	350	550	1000	400	0	1015	1353	1000	1600	1348	1399	2605	50	968	692	1310	0	675	300	1085	350	0	0
	Nominated	0	35	265	0	0	0	0	300	0	0	675	0	318		0	1800	0	0	0	0	0	0	1085	0	0	0	0	
22	Allocated	0	210	730	425	694	350	550	1000	400	0	1015	1359	1000	1603	1348	1399	2605	50	968	697	1300	0	675	300	1085	350	0	0
	Nominated	0	20	265	0	0	0	0	300	0	0	675	0	418		0	1800	0	0	0	0	0	0	1085	0	0	0	0	
23	Allocated	0	210	730	400	692	350	550	1000	400	0	1007	1354	1000	1621	1347	1399	2605	50	968	696	1300	0	675	300	1244	350	0	0
	Nominated	0	20	205	0	0	0	0	300	0	0	675	0	418		0	1800	0	0	0	0	0	0	1244	0	0	0	0	
24	Allocated	0	211	730	439	692	350	550	1000	400	0	1003	1352	1150	1604	1356	1200	2605	50	1154	699	1302	0	675	300	1244	350	0	0
	Nominated	0	0	130	0	0	0	0	300	0	0	675	0	334		0	1800	0	0	0	0	0	0	1244	0	0	0	0	

Table: Overview of the June 7th 2019 results of the shadow auctions, per border and what was finally nominated.