

**14.04.2016**

**Proposal for a Multiple NEMO Arrangement (MNA) in the bidding zone Germany/Austria/Luxembourg (DE/AT/LU)**

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# 1 Introduction

This document is the common proposal of 50Hertz, Amprion, APG, CREOS, TenneT TSO, TransnetBW (the “TSOs”) to the BNetzA, E-Control and ILR (the “NRAs”) for operating more than one nominated electricity market operator (NEMO) for the single day-ahead and intraday coupling within the bidding zone Germany/Austria/Luxembourg (DE/AT/LU).

The above mentioned TSOs have years of experience cooperating with single/ designated PXs and CCPs in the day-ahead and intraday timeframes. The current setups are the starting point for analysing and developing this proposal for facilitating the integration of multiple NEMOs in both timeframes; the ultimate goal of the TSOs being to re-use as much as possible the existing tools and environments while ensuring a level playing field among the NEMOs.

As an illustration of this and for information purposes to ensure a better understanding of the proposed solution for day-ahead, an extract of the CWE high level architecture for the current market coupling<sup>1</sup> configuration can be found in Annex 3 of this document. The complete version of the CWE high level architecture is part of the NWE final approval package that has been defined and agreed with NRAs in 2012 (CWE high level architecture for NWE). Annex 3 shows that existing tools and environments are part of the proposed solution. Furthermore it should be noted that for the borders IT-DE/AT/LU and DK2-DE/AT/LU similar arrangements are in place or are currently elaborated as in case of PL-DE/AT/LU, CZ-DE/AT/LU and SI-DE/AT/LU.

## 1.1 Background and context

In line with Article 4 (NEMOs designation and revocation of the designation) of the Guideline on Capacity Allocation and Congestion Management (EU) 2015/1222 (GL CACM), up to date the following legal entities have been designated as NEMOs by the NRAs BNetzA, E-Control and ILR in the bidding zone DE/AT/LU:

### **Day-ahead:**

Austria: EPEX Spot SE, EXAA AG, Nord Pool AS  
Germany: EPEX Spot SE, Nord Pool AS  
Luxembourg: EPEX Spot SE

### **Intraday:**

Austria: EPEX Spot SE, EXAA AG, Nord Pool AS  
Germany: EPEX Spot SE, Nord Pool AS  
Luxembourg: EPEX Spot SE

The proposal for operating more than one NEMO for the single day-ahead and intraday coupling within the bidding zone DE/AT/LU needs to be compliant also with the System

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<sup>1</sup> In this document the notions “market coupling” or “price coupling” refers to the currently implemented day-ahead coupling process also referred to as Multi-Regional Coupling (MRC) which will evolved into the single day-ahead coupling process as defined in the GL CACM.

Operations Guidelines (GL SO<sup>2</sup>). At present, the GL SO is still in the comitology process and therefore, this proposal is based on the latest available draft GL SO dated 08.03.2016.

## 1.2 Legal obligation to implement a Multiple NEMO Arrangement

The following GL CACM-provisions are the legal basis for the Multiple NEMO Arrangement within the bidding zone DE/AT/LU:

- *Article 8: TSOs shall [...] establish cross zonal capacity allocation and other arrangements in accordance with Articles 45 and 57;*
- *Article 45, 57: TSOs [...] shall develop a proposal for cross-zonal capacity allocation and other necessary arrangements for such bidding zones in cooperation with concerned TSOs and NEMOs ... to ensure that the relevant NEMOs ... provide the necessary data and financial coverage for such arrangements.*
- *Article 7: NEMOs shall [...] in accordance with Article 45 and 57, coordinate with TSOs to establish arrangements concerning more than one NEMO within a bidding zone and perform single day-ahead and/or intraday coupling in line with the approved arrangements.*

The notion “multiple NEMO arrangement” (MNA) in this document refers to the obligations resulting from the articles listed above regarding “cross-zonal capacity allocation and other necessary arrangements”.

The legal provisions of article 45 and 57 are comparable; article 45 defines them for the single day-ahead coupling whereas article 57 fixes the same provisions for the single intraday coupling.

Furthermore article 68 (6) related to the Clearing and Settlement provides guidance in case a Shipping Agent is involved in the exchange of energy between bidding zones.

## 1.3 Compliance of the MNA with the objectives of GL CACM

The proposed Multiple NEMO Arrangement in the bidding zone DE/AT/LU contributes to fulfilling the achievement of the objectives of Article 3 of GL CACM.

The Regulation aims at:

*(a) promoting effective competition in the generation, trading and supply of electricity;*

The implementation of the MNA described in this document will enable several NEMOs to operate in the Bidding Zone DE/AT/LU and promote the competition in the generation, trading and supply of energy.

*(c) ensuring operational security;*

By choosing a centralized approach for the data exchange for pre- and post-coupling arrangements additional interfaces are minimized and potential risks of errors are reduced. Apart from that the proposal foresees the possibility for each NEMO to download the Cross

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<sup>2</sup> The latest publicly available version of the GL SO dated 11.12.2015 can be found under the following link: <https://www.entsoe.eu/major-projects/network-code-development/system-operation/Pages/default.aspx>

Zonal Capacities and Allocation Constraints from a single endpoint and hence to serve as Back up if the “Coordinator of Local NEMO IT Systems” is affected by technical issues.

Furthermore the proposed solution for the physical Clearing and Settlement ensures the necessary operational security standards in line with the GL SO. The appointment of one Shipping Agent with a balancing group per Scheduling Area instead of entitling each Central Counter Party or several Shipping Agents per Scheduling Area within the Bidding Zone DE/AT/LU facilitates the location of faults in an error sequence.

*(d) optimising the calculation and allocation of cross-zonal capacity;*

The MNA proposal allows for an efficient consideration of several NEMOs in one bidding zone without hampering the capacity calculation and allocation processes.

*(e) ensuring fair and non-discriminatory treatment of TSOs, NEMOs, the Agency, regulatory authorities and market participants;*

TSOs consider the proposed solution as fair, transparent, cost-efficient multiple NEMO arrangement, balancing interests of market parties, NEMOs and TSOs and facilitating NEMO-competition within the bidding zone DE/AT/LU. To ensure this during the drafting process the feedback of the NEMOs has been evaluated by the TSOs and taken into account in this document as much as possible. For this reason and to ensure transparency all NEMOs comments can be found in Annex 7. Furthermore in some cases several options are left open for the implementation phase. In parallel the TSOs agreed with the neighbouring CWE-TSOs on common principles applicable to the whole CWE region. Regarding the subsequent implementation, this proposal includes a description of every new entity or role to be performed in the context of the MNA solution. In the light of a cost recovery a solution should be developed that creates incentives to guarantee efficiency. With regard to the financial shipping solution and due to the fact that clearing and settlement leads to non-negligible ongoing costs, an efficient, cost saving approach is proposed.

*(f) ensuring and enhancing the transparency and reliability of information;*

By using one single endpoint for the data exchange provides every NEMO with the possibility to have access to Cross zonal Capacities and Allocation Constraints which enhances transparency of this information on this way.

Besides the obligation to implement a MNA solution due to the GL CACM, the MNA proposal takes into account the GL SO, which will come into force by autumn 2016 and harmonizes the TSO-processes that require Schedules from market participants and the inter TSO-scheduling. The process of the physical clearing and settlement described in the MNA is also compatible to the upcoming concept of “scheduling in Net Positions” developed by ENTSO-E.

*(h) respecting the need for a fair and orderly market and fair and orderly price formation;*

The MNA is linked to the MCO function carried out jointly by all NEMOs. In the light of that the present MNA proposal foresees that under normal circumstances one single price per bidding zone is calculated. This, together with Fall Back solutions outlined in the document in the event of arising issues causing extremely cases of decoupling enable a fair and orderly market and price formation.

*(i) creating a level playing field for NEMOs;*

In order to ensure a level playing field and non-discriminatory treatment of competitors, a sustainable, stable model for sharing and recovery of costs related to the MNA will need to be agreed between all concerned parties and NRAs with reference to the relevant articles of GL CACM.

#### **1.4 Scope of the document**

With this proposal the TSOs fulfill the obligations of article 45 and 57 (MNA proposal for the bidding zone DE/AT/LU) meaning to enable the participation of all currently designated and all future NEMOs of the bidding zone DE/AT/LU in the single DA/ID coupling.

Aim of this proposal is also to define the roles and responsibilities related to clearing and settlement (the different GL CACM-roles “Central Counter Party” and “Shipping Agent”).

In line with the GL CACM, this proposal is based on cooperation with the NEMOs designated in the bidding zone DE/AT/LU. On 5<sup>th</sup> February 2016 50Hertz, Amprion, APG, Tennet TSO GmbH, TransnetBW informed EPEX Spot SE, EXAA AG, Nord Pool AS in a common meeting about the foreseen concepts for the multiple NEMO arrangement. The feedback of the NEMOs in and following this meeting has been evaluated by the TSOs and taken into account in this document.

In parallel the TSOs had informal exchanges with the neighboring CWE-TSOs aiming at developing a coordinated approach for the CWE region.

After the finalization of the proposal in March 2016, the TSOs sent on 21<sup>st</sup> March 2016 the final draft proposal to the NEMOs for comments. The TSOs took their comments into account for the final proposal at hand. For transparency reasons and especially related to aspects which could not be included in the final proposal, all inputs of the NEMOs are attached in Annex 7.

The topic “Governance” has been highlighted during the meeting on 5<sup>th</sup> Feb 2016. TSOs share the view that an efficient and transparent governance for co-operating with multiple NEMOs has to be developed. However, from point of view of the TSOs, this can only be discussed in a second step in cooperation with other CWE and MRC parties after the approval of this proposal and especially after more clarity will have been received on the NEMO-proposal for the MCO-functions (Article 7 (3)). Therefore this document only contains a proposal for a high level governance framework under chapter 5 which should be considered as preliminary and non-exhaustive at this stage and subject to potential future evolutions.

## 2 Day-Ahead

### 2.1 Data exchange with the MCO-function

The TSOs have analyzed two scenarios for the data exchange for pre- and post-coupling arrangements. The main principles of these two scenarios are described in the Figure 1 below. The high-level configuration of these scenarios is depicted in Annexes 4 and 5.

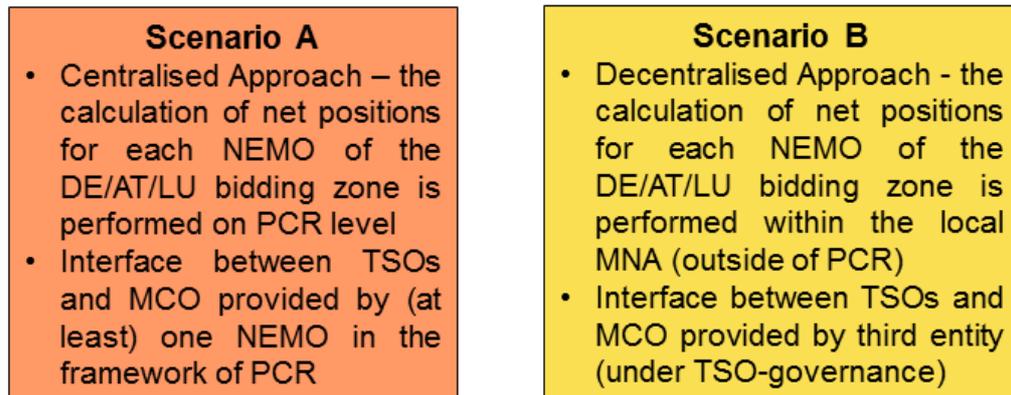


Figure 1: Scenarios for data exchange pre- and post-coupling arrangements

After coordination with NEMOs, Scenario A is proposed for the following reasons:

- (1) Presumably, on PCR side it can easily be implemented (simplicity and operational robustness);
- (2) The solution can be re-used for all bidding zones where multiple NEMOs were designated (cost-efficiency);
- (3) The impact on TSOs compared to the current MRC processes is limited and mainly affects the data exchange with the MCO function (simplicity and operational robustness).

However if it turns out that the implementation of scenario A is not possible, scenario B might be considered as alternative.

This chapter does not cover clearing & settlement (physical and financial shipping) which is described in chapter 2.2.

#### 2.1.1 General principles of the solution

For the communication between TSOs and the MCO-function the following general principles shall apply:

- A technical solution shall be used for TSO data submission to the NEMOs and reception of results from the NEMOs as a central interface accessible to all NEMOs on equal terms. (one single endpoint for data exchange)
- CZCs (cross-zonal capacity) and allocation constraints (if applicable) are sent by TSOs to one single endpoint for data exchange.
- Each NEMO shall have access to this single endpoint; the data access/usage by NEMOs has to be documented.
- One or several NEMOs download the CZCs from the single endpoint.

- It is up to the NEMOs to organize themselves with regards to who is in charge of forwarding the CZCs and allocation constraints to the PMB (PCR Matcher/Broker) for a given day (the so called Coordinator of Local NEMO IT Systems or CLNIS) and who is designated as its back-up.  
Should the NEMOs not agree within 2 months after one of the NEMOs is ready to start operations, the following rule shall apply: monthly rotations of the NEMOs starting in alphabetical order of the company names of the NEMOs. Furthermore a precondition is to ensure a coordinated approach with other relevant TSOs in CWE.
- After the calculation performed in the PMB, the preliminary price coupling results are sent to the single endpoint for data exchange by the CLNIS. (Coordinator of Local NEMO IT Systems)
- The price coupling results are checked by the TSOs. (in the TSO Common System)
- The final confirmation is sent by the TSOs to the single endpoint and forwarded to by the CNLIS to the PMB.
- When all parties have sent the Final Confirmation to the PMB Coordinator, the PMB Coordinator provides the Global Final Confirmation which is then forwarded by the CLNIS to the TSOs via the single endpoint.

## 2.1.2 Detailed overview of data exchange

The data exchange between TSOs and the MCO function is indicated in Figure 2.

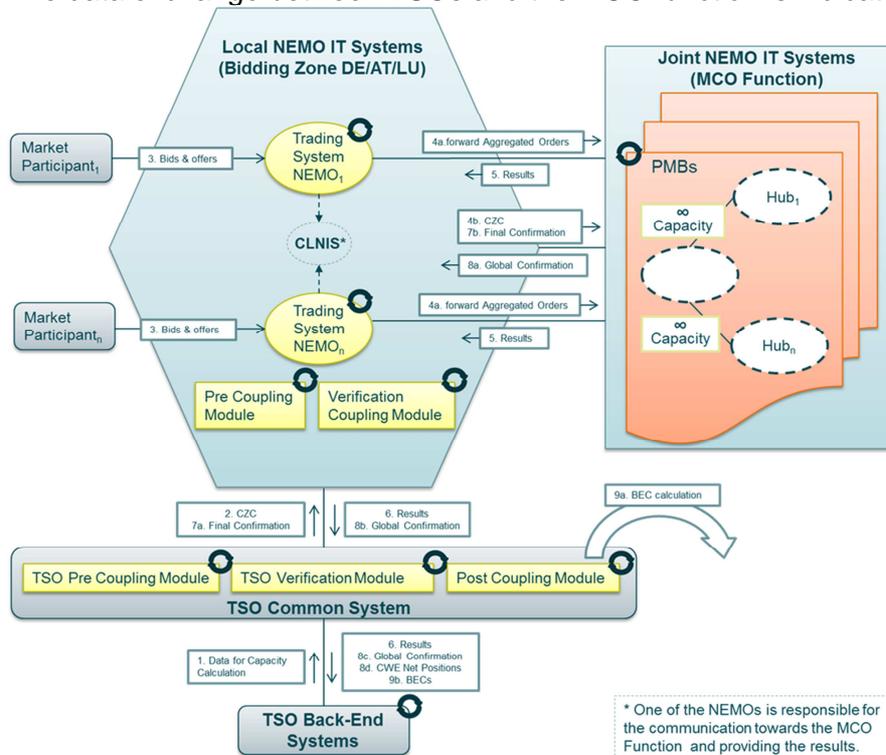


Figure 2: Data exchange with the MCO function

A detailed description of the individual steps is attached as Annex 3.

The list below gives a short description of the relevant systems of the current MRC design, that are relevant for the data exchange between the MCO function operated by multiple NEMOs and the TSOs, with a focus on CWE systems.

- **The TSO Back End Systems:** The back-end systems of the TSOs involved in the individual areas are grouped together as the 'TSO Back-End Systems', which are used to prepare for the CZC calculation as well as the individual TSO systems to receive the notifications from NEMOs and the market participants.
- **CWE TSO Common System**
  - *The TSO Pre-Coupling Module* produces the Cross Zonal Capacities.
  - *The TSO Verification Module* validates the MRC Net Positions for the CWE Bidding Zones and the Scheduled Exchanges on the non-CWE interconnectors. This module also calculates the CWE Net Positions.
  - *The TSO Post-Coupling Module* produces the Scheduled Exchanges between the CWE Bidding Zones as a result of the Price Coupling. This process is called the CWE bilateral exchange calculation (BEC).
- **The Local NEMO IT Systems consists of:**
  - *Pre-Coupling Module* are the NEMO's pre-coupling systems used to receive the Cross Zonal Capacities and Allocation Constraints from the CWE TSOs and send them to the Broker-module within the PMB system
  - *The Trading systems* collect the Orders from the Market Participants for each Bidding Zone of CWE region and provide them the Individual Results.
  - *The Verification Coupling Module* handles communication between the Broker-module of the PMB system of each PCR PX and the TSO Verification Module. In doing this, the Verification Coupling Module provides the Price Coupling Results to the TSO Verification Module and receives the Final Confirmation from the TSO Verification Module.
- **The Joint NEMO IT Systems:** This consists of the PMB (PCR Matcher/Broker). The PMB is a system which embeds the PCR Algorithm and links the different NEMO IT Systems. Each participating NEMO runs at least one Broker and, depending on his role in PCR, potentially also runs a Matcher. The Broker is the component responsible for Input/Output (I/O); the Matcher is the components running the coupling algorithm which calculates the MRC Price Coupling Results. On any given day, one of the NEMOs will assume the role of Coordinator, whereas others will assume role of Hot Backup or Operator. The PCR algorithm calculates the MRC Net Positions and Prices. An amendment of PCR has to be implemented by the NEMOs to allow for having several hubs per bidding zone (one for each NEMO and Scheduling Area) and ensuring a single day-ahead price in a bidding zone in all other circumstances except when one NEMO has a problem to send orders in the common calculations.

Existing Systems shall be used as much as possible and adapted where necessary. As a single endpoint for data exchange between TSOs, NEMOs and the MCO-function operated by the NEMOs the ECP Node already implemented in CWE shall be used serving as a basis for further development. This ECP Node is mentioned in Annex 3 as "CWE ECP Endpoint". Therefore each NEMO within CWE shall ensure a connection to this "CWE ECP Endpoint".

### 2.1.3 Summary of the necessary changes compared to the current market coupling configuration

In order to enable multiple NEMO participation in the single DA coupling for the bidding zone DE/AT/LU the following high-level changes are relevant:

- Additional tasks for TSOs:
  - Limited need for changes on TSO side (align data exchange with MCO function)
  - BEC-calculation by the CWE TSOs' Common System (TSO CS): to be defined based on shipping arrangement
- Additional tasks for NEMOs:
  - Submit infinite capacity between NEMO 1, NEMO 2 and NEMO 3 (depends on how the bidding zone DE/AT/LU is modelled within PCR but in principle to be treated similar as CZCs and allocation constraints) Changes within PCR (to be specified by NEMOs):
  - Due to the fact that currently only one NEMO of the bidding zone DE/AT/LU is operationally involved in the day-ahead market coupling process the DE/AT/LU bidding zone is modeled as one single hub in PCR.
  - To model in PCR the prospective configuration, i.e. all three NEMOs in the bidding zone DE/AT/LU in principle **two options** would exist:
  - Option 1 (maximum 18 Net Positions - related to each CCP per Scheduling Area):
    - Modelling for each Scheduling Area within the DE/AT/LU bidding zone three NEMO hubs (connected between each other via infinite capacity)
    - PCR calculates for all NEMO hubs within each Scheduling Area of the bidding zone DE/AT/LU the CCP's Net Position and prices per Scheduling Area (identical prices)
    - Provided that all NEMOs designated in Germany and/or Austria and/or Luxembourg become active in each of the six Scheduling Areas the Market Coupling result would consist for the bidding zone DE/AT/LU of 18 Net Positions (present working assumption; 3 x 6). This needs to be respected in the PCR modeling of the bidding zone DE/AT/LU.
  - Option 2 (maximum 3 Net Positions for the bidding zone DE/AT/LU):
    - Modelling of a second and third NEMO hub for the DE/AT/LU bidding zone (connected between each other via infinite capacity)
    - PCR calculates for all three NEMO hubs of the bidding zone DE/AT/LU Net Position and prices (identical prices)
    - In that case the Market Coupling result would consist for the bidding zone DE/AT/LU of 3 Net Positions. This needs to be respected in the PCR modeling of the bidding zone DE/AT/LU.
    - Each CCP calculates his part of the Net Position per Scheduling Area based on the results from the PCR

## 2.2 Clearing & settlement (physical and financial shipping)

In line with Article 7(1) (g) of GL CACM it is a NEMO-task to act as central counter parties and according to the definitions it is a Central Counter Party's task to organize the transfer of Net Positions resulting from capacity allocation with other central counter parties or Shipping Agents. In line with Article 8 (2) (l) of GL CACM, it is a TSOs' task to act as Shipping Agents,

where so agreed. Nonetheless based on Article 68 (6) Shipping Agent may act as a counter party between different central counter parties for the exchange of energy, if the parties concerned conclude a specific agreement to that effect and this task is not performed according to Article 68 (3) by the central counter parties.

The following chapter provides an overview of the proposed clearing & settlement arrangements in the presence of multiple NEMOs within the same bidding zone.

This chapter assumes that physical and financial shipping can be separated. This needs to be confirmed with particular attention to contractual relationships between Agents and CCPs. Conditions are listed in chapter 2.2.

Clearing & settlement is divided into a physical shipping process and a financial shipping process. The objective of the physical shipping is to secure the physical energy delivery according to the day-ahead market outcome by designing a suitable scheduling process between CCPs/ Shipping Agents and TSOs. The objective of the financial shipping process is to secure the financial settlement of the day-ahead market outcome among the involved CCPs.

For the bidding zone DE/AT/LU cross border clearing and settlement becomes relevant for the following bidding zone borders:

<b>Border</b>	<b>Involved TSOs</b>		<b>Clearing/Settlement established due to Day Ahead Market Coupling</b>
FR-DE/AT/LU	Amprion, Transnet BW	RTE	Yes
NL-DE/AT/LU	TenneT GmbH, Amprion	TenneT BV	Yes
PL-DE/AT/LU	50Hertz	PSE	No
CZ-DE/AT/LU	APG, TenneT GmbH, 50Hertz	CEPS	No
HU-DE/AT/LU	APG	Mavir	No
SI-DE/AT/LU	APG	Eles	No
IT-DE/AT/LU	APG	Terna	Yes
CH-DE/AT/LU	APG, Amprion, Transnet BW	Swissgrid	No
DK1-DE/AT/LU	TenneT GmbH	Energinet.dk	Yes
DK2-DE/AT/LU	50Hertz	Energinet.dk	Yes

**Table 1: bidding zone borders of the bidding zone DE/AT/LU**

From a financial point of view, the following chapters will also address the two main cost drivers related to shipping, collaterals and clearing fees.

#### **Collaterals:**

Both the CCP and the Shipping Agent have to address the following risks:

- 1) The possible default of the party before the money is successfully transferred. This collateralization is dealt with in the financial shipping chapter (see 2.2.2).
- 2) The default risks arising from the physical non-delivery of completed transactions. This collateralization is dealt with in the corresponding physical shipping chapter (see 2.2.1.6).

Therefore, for each transaction between a CCP and the Shipping Agent both risks are in general to be hedged by applying collaterals.

### **Clearing Fees:**

Clearing fees are usually charged for the transferred MWh assuming that the financial and physical exchanges are coherent. In case this coherence is not maintained anymore (see option 2 in financial shipping chapter), the underlying of the variable clearing fee is to be clarified.

## **2.2.1 Physical shipping and scheduling solution**

When designing the physical shipping and scheduling solution of the MNA, the specific situation of the DE/AT/LU bidding zone with its several Scheduling Areas had to be taken into account. In addition, as already described in the introduction of this document the GL SO<sup>3</sup> needs to be considered in the MNA proposal and consequently the combination of the specific situation of the bidding zone DE/AT/LU and the requirements of GL SO has a significant impact on the prospective clearing & settlement arrangement. At the moment the GL SO is a draft, which is expected to enter into force in autumn 2016.

According to the respective definitions of GL CACM and GL SO, the DE/AT/LU bidding zone consists of six Scheduling Areas. Furthermore it should be highlighted that each Control Area of 50Hertz, APG, Amprion, CREOS, TenneT TSO and TransnetBW equals a Scheduling Area. In that light the respective area definitions are listed in annex 1.

### **2.2.1.1 Current shipping process**

To further illustrate today's situation, in Figure 3 the current situation is highlighted. In this configuration in the bidding zone DE/AT/LU only EPEX Spot is actively involved in the day-ahead Market Coupling. Today ECC is in all six Scheduling Areas the only CCP and consequently no explicit Shipping Agent is required. With the MNA implementation this configuration needs to be extended by the other NEMOs to be actively involved in the bidding zone DE/AT/LU.

Furthermore it should be highlighted that Figure 3 only intends to illustrate the current scheduling process within the bidding zone DE/AT/LU and the respective bidding zone borders with the Netherlands, France and Italy but should not be considered as complete. In that light it should be further underlined that not all neighbouring bidding zones are depicted in this figure (e.g. DK1, DK2, BE).

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<sup>3</sup> General remark: The GL SO impacts the current Market Coupling process. Therefore the needed changes are defined in this document. However in this context the GL SO has no impact on OTC trades as they occur today.

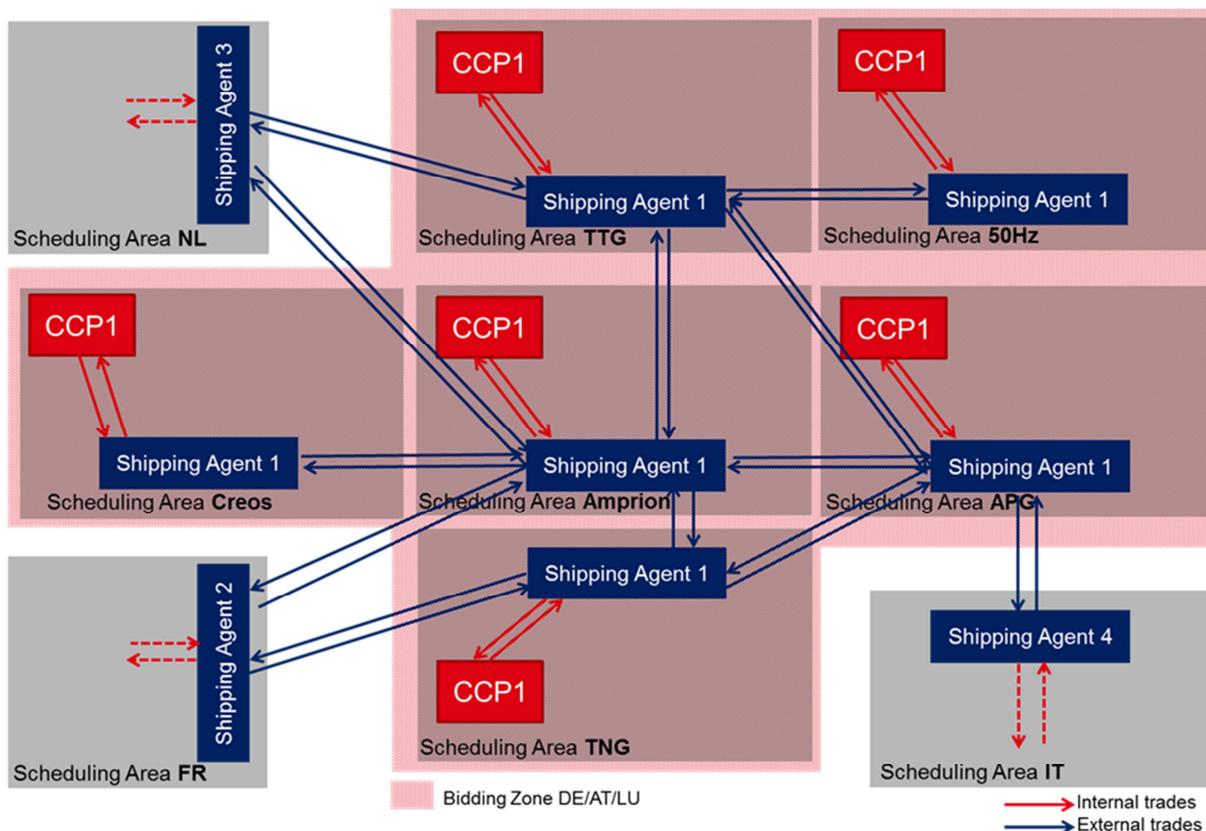


Figure 3: today's shipping configuration

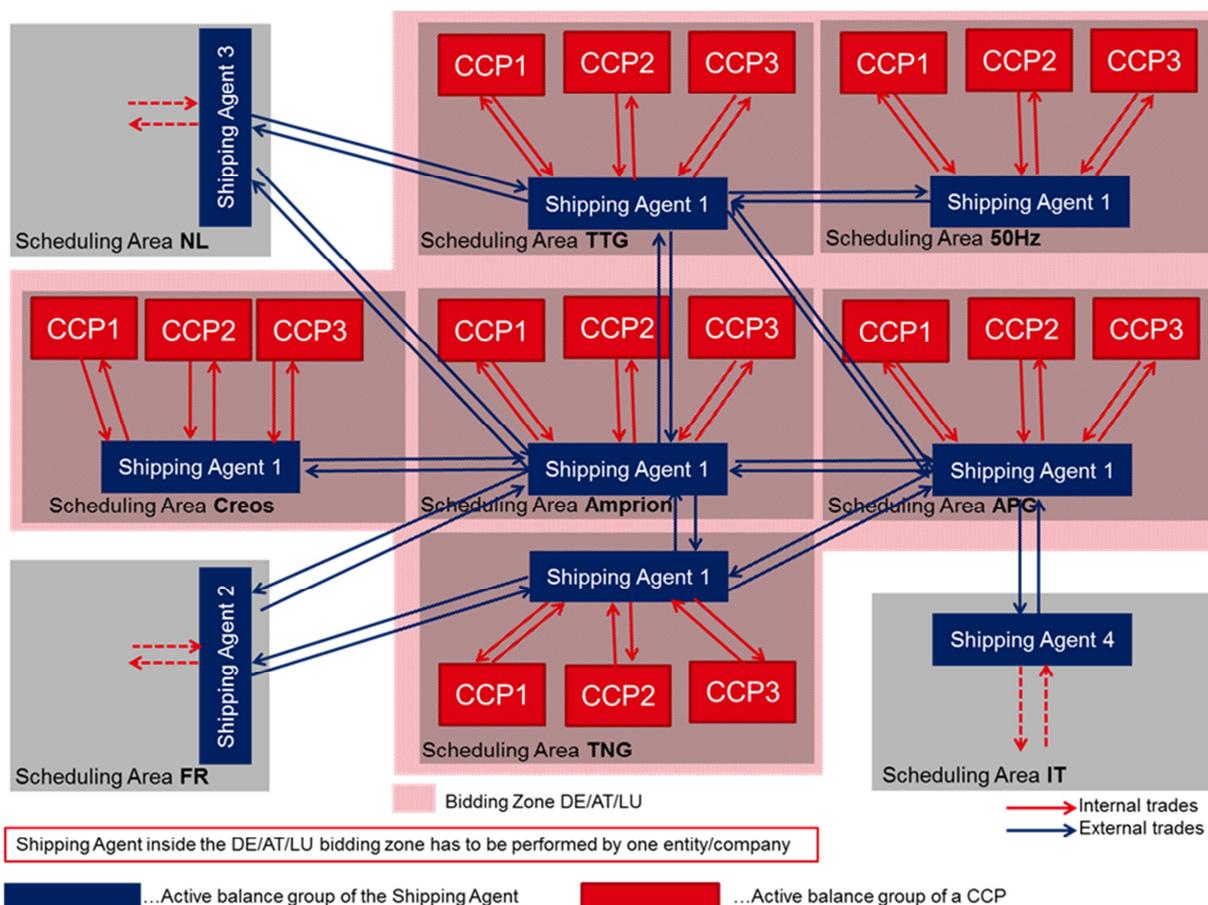
### 2.2.1.2 Introduction of the prospective shipping process

This physical shipping solution takes into account the legal obligations of GL CACM and the current draft of the GL SO. In that light based on the designation of several NEMOs in the bidding zone DE/AT/LU today's configuration is not feasible in the future (i.e. same entity is CCP and Shipping Agent). According to the requirement of GL CACM, an entity called "Shipping Agent" has to be implemented to transfer the Net Positions for day-ahead and intraday timeframes between different CCPs. In GL CACM the term "Net Position" is defined as "netted sum of electricity exports and imports for each market time unit for a bidding zone". To fulfill these requirements a single entity in form of the central Shipping Agent has to be set up on bidding zone level (This requirement would not be fulfilled in case of several Shipping Agents per Scheduling Area). Consequently the Shipping Agent 1 in Figure 4 is performed by the same entity. Additionally this Shipping Agent must have a valid balance group in each Scheduling Area in the bidding zone.

The implementation of a single active balance group of the Shipping Agent per Scheduling Area is needed in order to fulfill the technical requirements of the current scheduling processes and the GL SO. This, together with the Guideline's/ Network Code's legal obligations is a technical requirement defined in national market rules currently in place.

The Shipping Agent performs internal and cross-border<sup>4</sup> physical shipping to enable the shipping for multiple CCPs in one Scheduling Area and between Scheduling Areas.

Each CCP's Net Position related to the Scheduling Area is transferred to the Shipping Agent of its Scheduling Area which is described in an Internal Commercial Trade Schedule. In case of a trade between CCPs in different Scheduling Areas irrespectively whether these CCPs are within the same bidding zone or in two different bidding zones, the Shipping Agent of the Scheduling Area then transfers the energy to the neighbouring Shipping Agent(s) of the neighbouring Scheduling Area(s) in form of an External Commercial Trade Schedule. However, in case of a trade between different CCPs within a Scheduling Area the energy is transferred in form of an Internal Commercial Trade Schedule also via the Shipping Agent. Figure 4 illustrates the concept of the possible trades (considering the physical connections of the Scheduling Areas) within the bidding zone DE/AT/LU and the respective bidding zone borders the Netherlands, France and Italy. Furthermore it should be highlighted that not all neighbouring bidding zones are depicted in Figure 4 (e.g. DK1, DK2, BE).

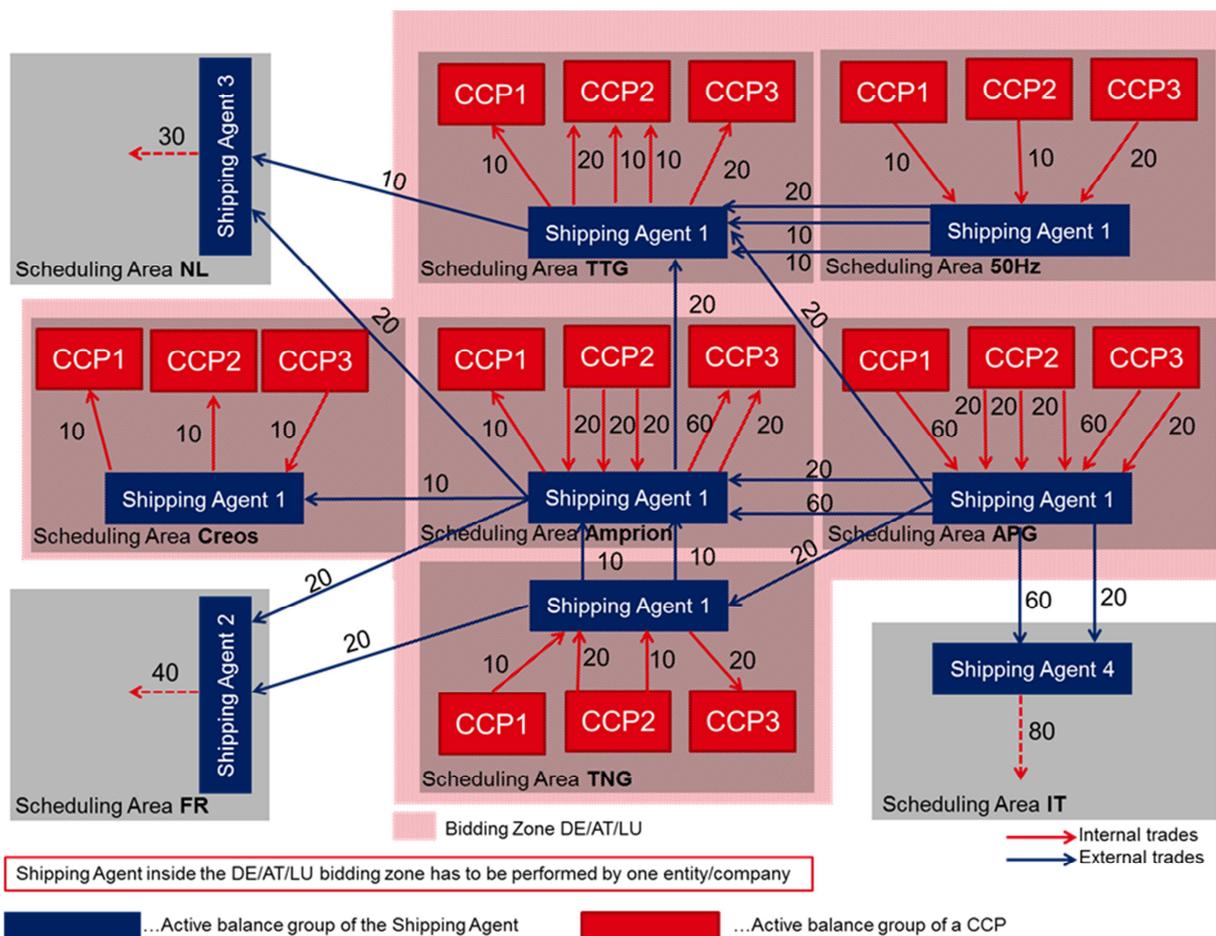


**Figure 4: exemplified physical shipping concept**

<sup>4</sup> The term cross-border refers to the crossing of a scheduling area border. Furthermore in the figures the red arrows refer to internal trades whereas the blue arrows to external trades.

For the sake of a simplified illustration, Figure 4 does not represent possible trades between non neighboring German-TSOs. This means in Germany it is possible to perform trades between TSOs, which do not have a direct physical connection. For example a trade between TransnetBW and 50Hertz is possible.

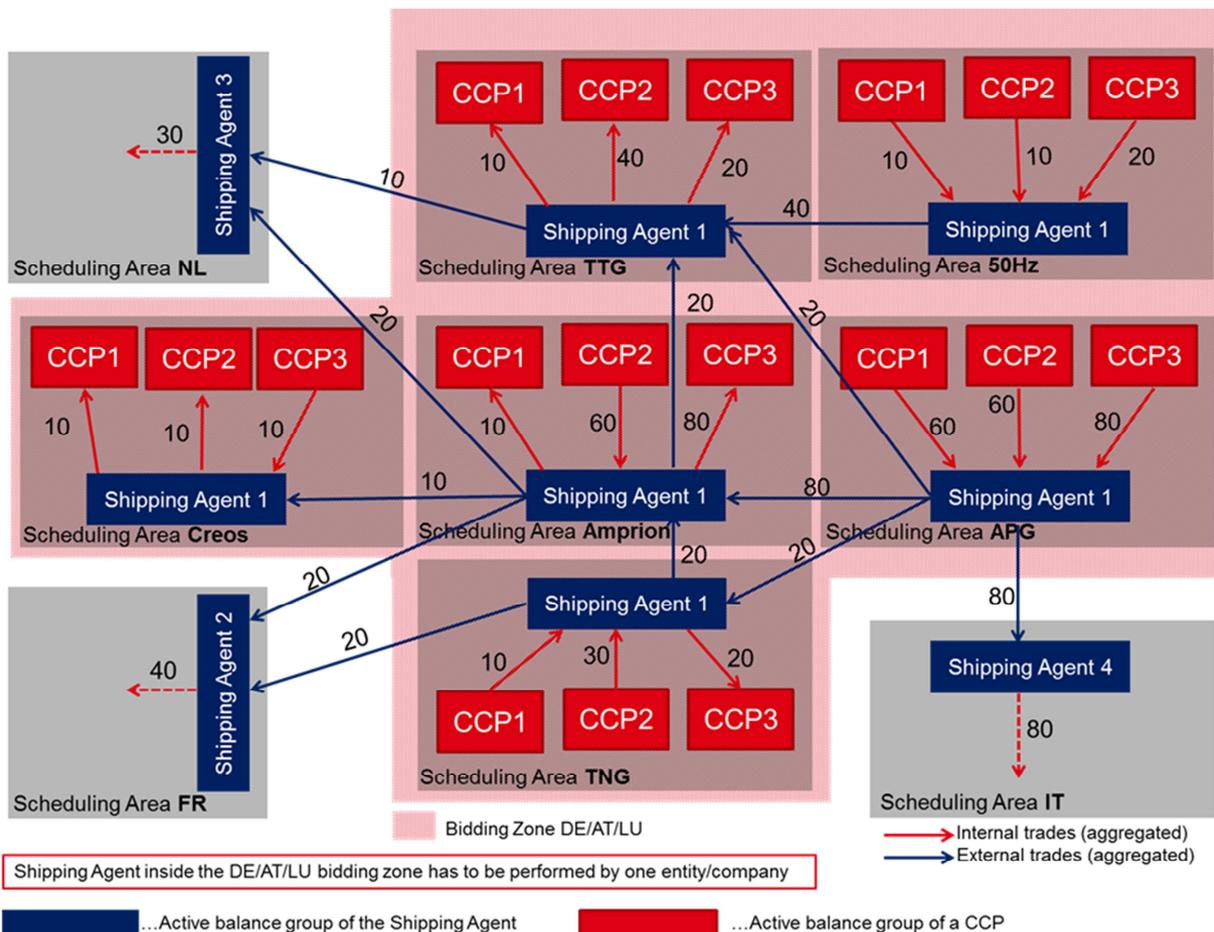
Figure 5 describes an example of internal and external trades for one market time unit (MTU). In this diagram the physical shipping process illustrates each trade of the involved CCPs (without aggregation).



**Figure 5: example of physical shipping**

### 2.2.1.3 Border to border scheduling

Based on the physical shipping concept using a central Shipping Agent who has an active balancing group per Scheduling Area it is necessary to create an aggregation of all trades for the scheduling process. Schedules are aggregated and netted sets of values representing these physical shipping flows (such as illustrated in Figure 5). Figure 6 illustrates the level of aggregation necessary for the scheduling concept currently in practice.



**Figure 6: concept of scheduling for the border-to-border approach**

All planned energy exchanges between CCP and Shipping Agent are aggregated and netted in form of an Internal Commercial Trade Schedule. All cross-border exchanges between Shipping Agents are aggregated and netted in form of External Commercial Trade Schedules. Both, Internal and External Commercial Trade Schedules, are needed by the respective TSOs operating the Scheduling Area, to perform the scheduling process. These schedules have to be provided by so called Scheduling Agents. The Scheduling Agent role is further described in Figure 8 in chapter 2.2.1.5. According to GL SO, each market participant and Shipping Agent subject to requirements for scheduling set out in the national terms and conditions shall appoint or act as a Scheduling Agent. Following, a Scheduling Agent for each CCP and each Shipping Agent is required.

Each Scheduling Agent of a CCP submits energy exchanges between CCP and Shipping Agent in form of an Internal Commercial Trade Schedule to the TSO. This energy exchange reflects the amount of energy that each local CCP does not clear with its own market participants but with other CCPs (i.e. other local CCPs or CCPs of other Scheduling Areas or bidding zones)

It is an obligation that the Scheduling Agent of both parties (sink and source party of a Schedule) submits their Schedules to the TSOs (Internal and External Commercial Trade Schedules) in order to enable the subsequent matching process.

The Scheduling Agent of the Shipping Agent must be provided with all Net Positions per CCP related to the Scheduling Area to create an Internal Commercial Trade Schedule. The preferred solution in order to minimize operational risks is to adapt the PCR according to Option 1 in chapter 2.1.3 so that the Scheduling Agent of the Shipping Agent receives the required information from the PCR directly.

Option 2 would provide the Scheduling Agents only with each CCP's part of the bidding zone Net Position. In order to provide the Scheduling Agent of the Shipping Agent with the required information, the CCPs themselves have to forward all Net Positions per CCP related to the Scheduling Area (Option 2 in chapter 2.1.3). In this case both, the Schedules submitted by the CCPs and the Schedule submitted by the Scheduling Agent of the Shipping Agent to the respective TSO, originate from the CCPs. This is prone to errors and the matching process does not provide any further value.

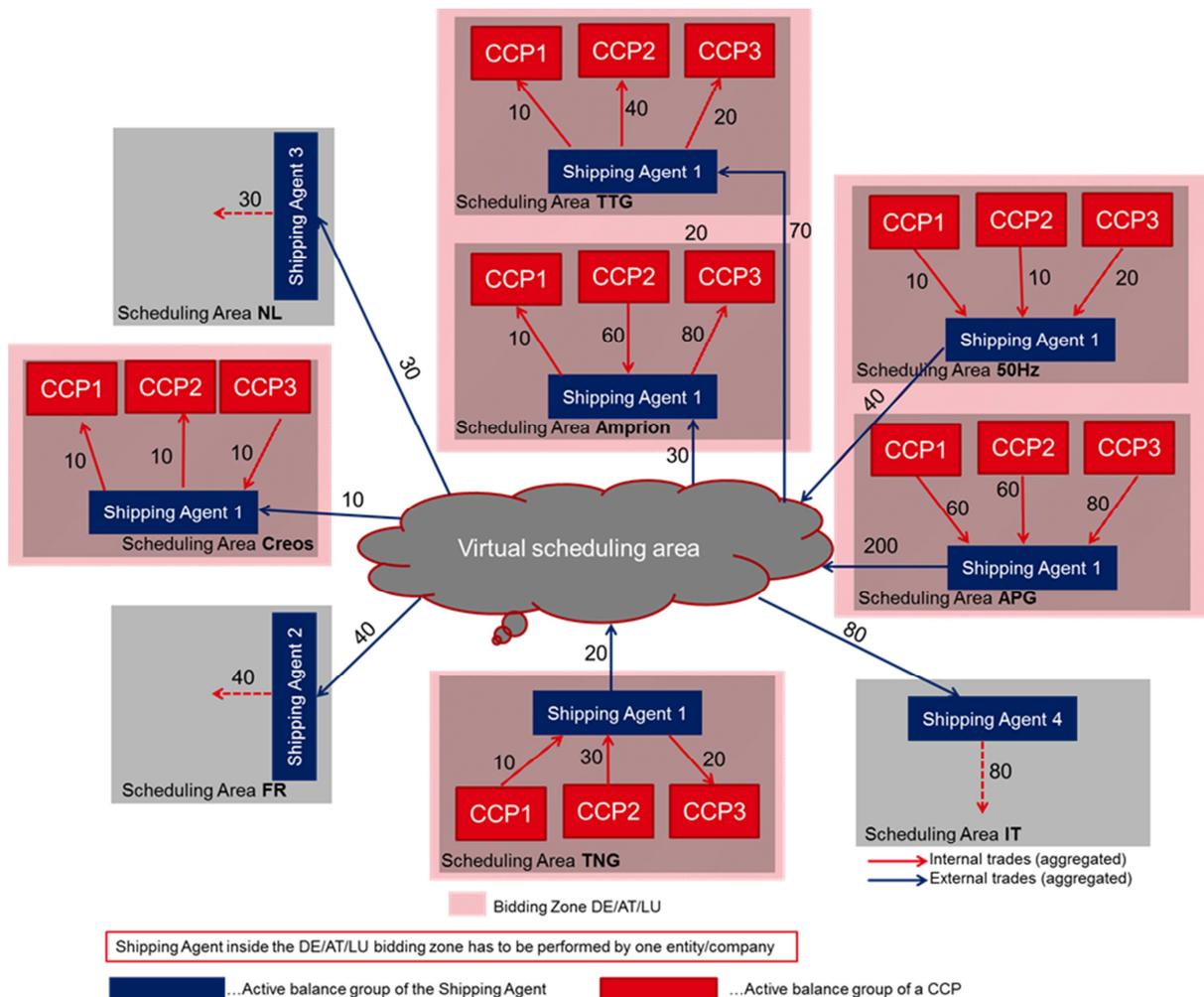
This process regarding the Internal Commercial Trade Schedules described in this chapter applies similarly for the concept of 'scheduling in Net Positions' (chapter 2.2.1.4).

In summary, it is recommended that the PCR directly provides the Scheduling Agent of the Shipping Agent with each CCP's part of the Net Position related to the Scheduling Area (Option 1 in chapter 2.1.3). The Scheduling Agent of the Shipping Agent also needs this information for the concept of 'Scheduling in Net Positions', which is described in chapter 2.1.3.

For External Commercial Trade Schedules on all Scheduling Area borders the Scheduling Agent of the Shipping Agent is responsible for nominating the External Commercial Trade Schedules to the respective TSOs (of the concerned cross-border energy flows).

#### **2.2.1.4 Scheduling in Net Positions**

The concept of physical shipping using a central Shipping Agent per Scheduling Area also fulfills the requirements of introducing 'scheduling in Net Positions' which should be applied for centralized mechanisms like market coupling. However, border to border scheduling according to chapter 2.2.1.3 remains possible. In this concept the highest level of aggregation of all external trades (either import/export value per MTU) of the Shipping Agent related to each Scheduling Area are described in External Commercial Trade Schedules, but here in contrast to chapter 2.2.1.3 only in form of multilateral exchanges, which reflect the Net Position related to the entire Scheduling Area. This Schedule describes the scheduled energy exchanges between a virtual Scheduling Area and each of the Scheduling Areas involved in the coupling process. The virtual Scheduling Area is needed to support scheduling in Net Positions. The sum of all imports of this virtual Scheduling Area is equal to the sum of all exports of this virtual Scheduling Area.



**Figure 7: concept of scheduling in Net Positions**

Each CCP's scheduled energy exchange is transferred to the central Shipping Agent balance group of its Scheduling Area which is described as an Internal Commercial Trade Schedule. Each of the Shipping Agents' balance groups then transfer the energy to the virtual Scheduling Area which is described as an External Commercial Trade Schedule containing a multilateral exchange (in this example aggregated to the Net Position related to the entire Scheduling Area). This transfer can be either an import or export of energy from or to the virtual Scheduling Area.

This concept requires only a single multilateral External Commercial Trade Schedule instead of several bilateral physical flows related to the number of its neighboring Scheduling Areas as described in the border to border scheduling process (chapter 2.2.1.3). This is further illustrated in Figure 7 wherein only a bilateral connection from each Shipping Agent to the virtual Scheduling Area exists.

During the implementation it will be decided from border to border whether the scheduling concept according to chapter 2.2.1.3 or 2.2.1.4 will be used. However for DC-Links between Scheduling Areas Scheduling will be applied according to chapter 2.2.1.3.

### 2.2.1.5 Notification flows

In Figure 8, a high-level overview of the notification flows between Scheduling Agents and TSO are illustrated. Further details on notification flows can be found in Annex 9: Further details on notification flows.

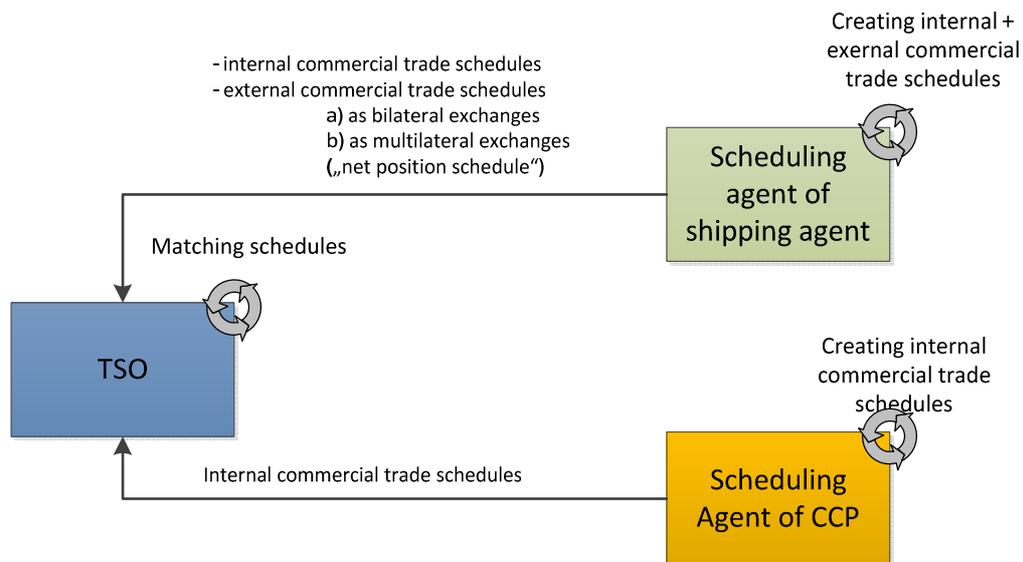


Figure 8: overview of the notification flows

### 2.2.1.6 Collaterals for physical exchanges

According to the clearing & settlement rules of CCPs currently in place, also the risk of physically not delivering the energy is collateralized. This is not applicable in DE/AT/LU due to the CCPs' priority nomination right ("Börsenfahrplan") in case of mismatches. Hence, as the submission and acceptance of Schedules constitutes the physical delivery, these collaterals are tightly linked to the scheduling regime and materialize independently from the feasibility of the various financial shipping design options. Options that allow for a netting possibility similar to the financial shipping section are further detailed in chapter 2.2.2. However, assuming the CCPs' currently existing priority nomination right ("Börsenfahrplan") in case of mismatches was maintained also towards the Shipping Agent, this collateralization by CCPs would not materialize.

## 2.2.2 Financial Shipping

The financial shipping process depicts the process of financially settling the DA market outcome among all involved CCPs. That means, for each transaction that links a buy and sell order between different Scheduling Areas with each other, there has to be a process of how the monetary flow between the Shipping Agent(s) and the involved CCPs are secured. The relevant parties are the involved CCPs and the Shipping Agent. Similar to any standard business contract, there is an agreement among the involved parties that money is transferred in exchange for the provision of a good – in our case the physical delivery of energy. This implies that there is an inherent link between the setup of the physical shipping

and the corresponding financial shipping arrangement. From a financial point of view the usage of a Shipping Agent in accordance with the proposed physical shipping setup results in a high number of interfaces, transactions and high transaction volumes. Both result in high transaction costs which could be reduced in case the financial shipping process can be decoupled from the physical shipping process. Essentially, this boils down to the question whether financial transactions among the same CCP operating in different Scheduling Areas can be netted or not. The following chapter therefore presents two different options: Option 1 presumes that the financial process has to follow the physical process. Option 2 presumes that the financial process can differ from the physical process. Both options are considered for the bidding zone internal shipping and for the shipping case across bidding zone borders. The listed options will focus on the main cost drivers being collaterals and clearing fees. After coordination with the NEMOs “netting” (Option 2) seems generally possible under the condition that the counterparties in the involved Scheduling Areas are identical (e.g.: CCP1 – SA 1 vs. CCP1 – SA 1). In that light, Option 2 needs to be conclusively confirmed. Therefore for the moment Option 1 is shifted to Annex 6.

The following two subchapters distinguish between “cross Scheduling Area shipping – within the same bidding zone” (2.2.2.1) and “cross bidding zone shipping with multiple scheduling areas” (2.2.2.2). Furthermore each of these two subchapters further describe both: Option 1 (“without netting”) and Option 2 (“including netting”). As already stated above the provisions referring to Option 1 (“without netting”) are further detailed in Annex 6.

**2.2.2.1 Cross Scheduling Area shipping – within the same bidding zone**

The following subchapters focus on the financial effects of multiple shipping options across scheduling areas within the same bidding zone.

**2.2.2.1.1 Cross Scheduling Area financial shipping including netting (Option 2)**

In this setup, it is assumed that any financial transaction that takes place between the same CCP – however operating in different Scheduling Areas – does not have to be routed through the mediating Shipping Agent. Consequently, only those financial transactions between different CCPs are routed through the Shipping Agent. This is illustrated in Figure 9 which is based on the same numerical example as under Option 1: (1) CCP1 settles 100€ with itself across 2 different Scheduling Areas; (2) CCP1 settles 30€ with CCP2 via the existing Shipping Agent. Since netting is possible across scheduling areas for each CCP, the figure shows only a single Scheduling Area.

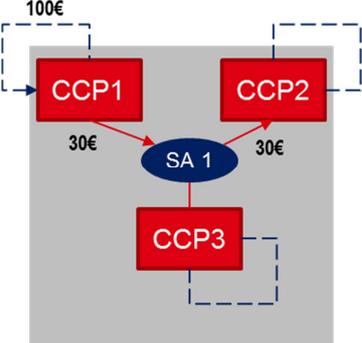


Figure 9: Financial shipping including netting

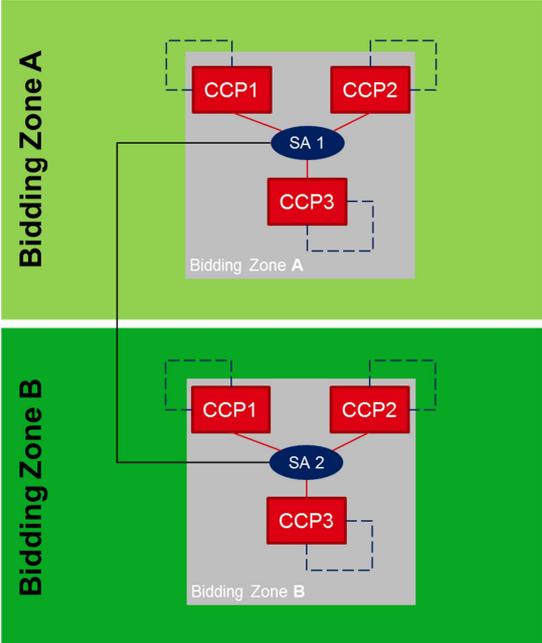
In Figure 9 CCP1 is able to settle the 100 € transaction with itself without involving the mediating Shipping Agent even though this constitutes a transaction between CCP1 and CCP1 across the Scheduling Area. This is only possible because CCP1 is able to net transactions with itself before involving the mediating Shipping Agent. Furthermore, additional 30 € are to be settled between CCP1 and CCP2 which is routed through the Shipping Agent. The CCPs will charge the Shipping Agent its standard clearing fees as applicable to any market participant on its hub.

As a result, the required financial transactions among CCPs and Shipping Agent are reduced significantly which translates into a substantial reduction of transaction costs caused by collateral calls between CCPs and Shipping Agent as well as clearing fees.

**2.2.2.2 Cross bidding zone shipping with multiple Scheduling Areas**

The following subchapters focus on the financial effects of multiple shipping options across bidding zone borders.

**2.2.2.2.1 Financial cross-zonal shipping - bilateral transactions, including internal netting (Option 2a):**



**Figure 10: Financial cross-zonal shipping - bilateral transactions, including internal netting**

In this cross-border financial shipping setup, there are bilateral interfaces among the individual Shipping Agents of each involved Scheduling Area only. At the same time, bidding zone internal netting among the same CCPs is possible allowing each CCP to financially settle transaction across Scheduling Areas but within the same bidding zone. This is indicated by the dotted lines attached to each CCP.

### 2.2.2.2.2 Financial cross-zonal shipping - central Shipping Agent, including internal netting (Option 2b):

In this option a central Shipping Agent (“Central SA”) co-ordinates the shipping between bidding zones.

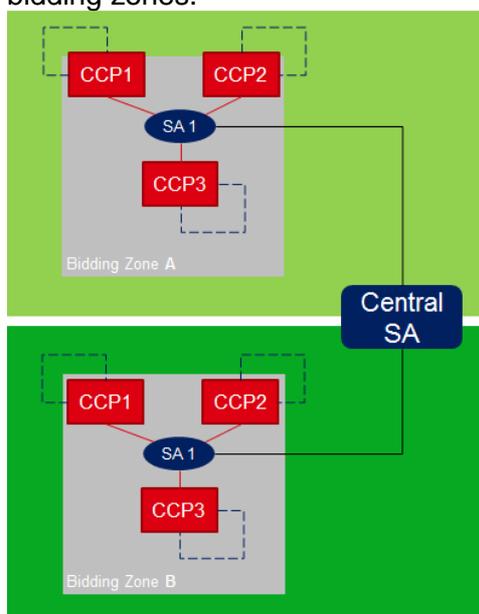


Figure 11: Financial cross-zonal shipping - central Shipping Agent, incl. internal netting

### 2.2.3 Summary of the functions and entities

The following roles and entities are needed to enable the scheduling in the options described above.

- MCO (function)
  - Match bids and offers in an optimal manner by using the price coupling algorithm. MCO provides the Market Coupling result to all NEMOs in a non-discriminatory way.
  - The bidding zone DE/AT/LU consists of six Scheduling Areas (50Hertz, Amprion, APG, CREOS, TenneT TSO, TransnetBW). In that context the Market Coupling results of the bidding zone DE/AT/LU need to be calculated per each NEMO of each Scheduling Area. Thus for each Scheduling Area a separate Net Position needs to be calculated for each respective NEMO. Provided that all NEMOs designated in Germany and/or Austria and/or Luxembourg become active in each of the six Scheduling Areas the Market Coupling result would consist for the bidding zone DE/AT/LU of 18 Net Positions (present working assumption; 3 x 6). This needs to be respected in the PCR modeling of the bidding zone DE/AT/LU.
- Scheduling Agent of Shipping Agent (entity) shall submit to the TSOs operating a Scheduling Area which is covered by market coupling the Schedules as requested by the concerned TSOs:
  1. External Commercial Trade Schedules (Shipping Agent <==> Shipping Agent) in form of

- a. multilateral exchanges between the Scheduling Area and a group of other Scheduling Areas (in the context of this document this is the “Net Position Schedule”); or
  - b. bilateral exchanges between the Scheduling Area and another Scheduling Area;
2. Internal Commercial Trade Schedules (Shipping Agent <==> other Shipping Agents);
  3. Internal Commercial Trade Schedules (Shipping Agent CCP <==> other Shipping Agents);

This shall occur based on the following requirement that one central MCO function is jointly performed by NEMOs

- Scheduling Agent of CCP (entity)
  - Shall submit to the TSOs operating a Scheduling Area the Internal Commercial Trade Schedules (CCP <==> Shipping Agent).
- Scheduled Exchange Calculator (entity)
  - Calculates the scheduled exchanges for each MTU;
  - Shall notify the relevant NEMOs, CCPs, Shipping Agents and TSOs of the agreed scheduled exchanges (scheduled exchanges do not equal Schedules).
- TSO (entity)
  - Is the receiver of Schedules from market participants, CCPs and Shipping Agents;
  - Acts in its role as Scheduling Area operator and is responsible for the scheduling process.

#### **2.2.4 Congestion Income**

According to the GL CACM, all CCPs or Shipping Agents shall collect congestion incomes arising from day-ahead Coupling. The collected incomes should be transferred to the TSOs not later than two weeks after the date of settlement.

## **3 Intraday**

### **3.1 Data exchange with MCO function**

The MCO function for the single intraday coupling is being implemented by the ongoing “XBID Market Project”. Details thereof will be provided by the NEMOs’ proposal for the MCO function in accordance with Article 7 (3) GL CACM. In general, the XBID solution is designed to easily accommodate more than one NEMO per Bidding Zone.

With regards to the data exchange with the Intraday MCO function, the XBID solution foresees a direct access for TSOs to the relevant central modules, i.e. Capacity Management Module (CMM) and Shipping Module (SM). TSOs will upload and maintain cross-zonal capacities and other input for the single intraday coupling via the CMM. Results will be received from the CMM as well as from the Shipping Module

This will allow TSOs (and NEMOs) to submit and receive all necessary data on a non-discriminatory basis. The use of these modules and their respective technical interfaces will be defined in the course of the implementation of the XBID project. No additional technical or legal arrangements have to be implemented on Bidding Zone level.

## **3.2 Clearing & settlement (physical and financial shipping)**

In the course of the XBID project no standard solution for clearing and settlement has been defined. For the local implementation of the XBID solution it had been agreed to rely in principle on the cross-zonal clearing and settlement arrangements which are currently in place for the day-ahead timeframe or which will be in place following this MNA proposal. Given that these arrangements are likely to undergo substantial modifications (cf. chapter 2.2) at the same time, the aforementioned agreement may not apply in the same sense anymore.

Nevertheless, the TSOs of the DE/AT/LU Bidding Zone propose to use for the intraday timeframe the same solution which will be eventually implemented for the day-ahead timeframe. Thereby, synergies can be easily used and the same level of equal treatment can be applied for both timeframes.

The concrete concepts for clearing and settlement are being developed together in close coordination with neighbouring TSOs and will be presented to NRAs at a later stage.

### **3.2.1 Congestion Income**

Once capacity pricing is introduced for intraday according to the GL CACM, all CCPs or Shipping Agents shall collect congestion incomes arising from intraday Coupling. The collected incomes should be transferred to the TSOs not later than two weeks after the date of settlement.

## **4 Fallback arrangements**

Issues may arise that provide challenges to TSOs, NEMOs and the market coupling system. In most extreme circumstances, the market coupling stakeholders and shareholders face decoupling. Different cases of decoupling are possible: bidding zone partially coupled; bidding zone fully decoupled, and bidding zones coupled with subset of bidding zone hubs.

### **4.1 Bidding zone partially coupled**

The bidding zone DE/AT/LU may be coupled through the following interconnectors listed in Table 1 in the introduction of chapter 2.2. In that light the case may occur that the bidding zone DE/AT/LU is only coupled through some bidding zone borders whilst for other borders it is decoupled. In this case a backup explicit allocation solution on decoupled borders will be applied.

In the day-ahead timeframe, notwithstanding of the partial decoupling, a single price shall be calculated for the bidding zone DE/AT/LU. Hence, a subset of the DE/AT/LU NEMO hub(s) will be coupled and therefore in these hubs a single price will result. In this case the orders of the non-coupled NEMO(s) are isolated: the bidding zone capacities are used for the coupling remaining NEMO hub(s). In day-ahead, a single price is calculated on the remaining coupled NEMO hubs, and a different price on each of the decoupled NEMO hub(s).

### **4.2 Full Decoupling**

In cases of full decoupling, the NEMO hubs shall each calculate separate prices. If required, a single bidding zone price can be calculated from hub prices (e.g.: a weighted average bidding zone price).

## 5 Contractual architecture and financial aspects

The following sections provide an indicative overview of the contracts which NEMOs and TSOs will enter into (if not already the case) to ensure implementation of the MNA. They are divided into local- (DE/AT/LU parties only), regional- (all regional cooperations in which the DE/AT/LU bidding zone participates) and European agreements (All NEMOs and TSOs). They do not include the necessary contractual framework that will be agreed solely between NEMOs and CCPs, in part as these will depend on the organization of the governance of the MNA which will be finalized during the implementation phase.

This legal framework shall at this stage neither be considered exhaustive nor finalized but instead as an indicative guideline on what a high level framework required for implementation could look like. It will in any case be updated during the implementation phase.

### 5.1 Local DE/AT/LU arrangements

The contracts listed below are to be signed between the DE/AT/LU TSOs and the NEMOs (and/or the Central Counter Parties and/or the entities defined as Shipping Agents) in order to provide the necessary framework for MNA operation. The contracts required for the establishment of the necessary links between CCPs and NEMOs amongst themselves are not listed under this section.

Contract	Signatories	Contents
All parties framework agreement (if necessary)	All DE/AT/LU TSOs NEMOs/CCPs	Overarching framework agreement to manage the common operational cooperation terms
NEMO Contract for operational and financial cooperation	DE/AT/LU TSOs each NEMO	Terms for local operational and financial cooperation between TSO(s) and each NEMO for the processes concerned, in particular for the transmission of price data
CCP Contract for operational and financial cooperation	DE/AT/LU TSOs, each CCP <sup>5</sup>	Terms for local operational and financial cooperation between DE/AT/LU TSOs and each Central Counter Party for the processes concerned, in particular for: - the transmission of buy and sell orders, - the physical settlement of energy exchanges
Contract for cross-border nomination	TSO(s) each entity defined as SA for DA and ID timeframes	Contractual and operational terms for cross-border nomination
Contract for the use of market data	DE/AT/LU TSOs, each NEMO	Terms of use for the matched volumes and prices calculated by each NEMO on its Hub

**Table 2: Indicative list of local arrangements**

<sup>5</sup> This contract could be bundled with the NEMO contract should the respective NEMO and CCP be a single company.

## **5.2 Regional architecture**

- Contracts setting the daily modalities for operation of market coupling between TSO and NEMO for all regions in which DE/AT/LU bidding zone participates,
- Contracts setting the intraday market coupling modalities between TSO and NEMO for a given region (if required),
- Contracts setting the sharing of regional costs for day ahead and intraday operations between TSOs and NEMOs, according to dispositions of GL CACM,
- Contracts establishing the modalities for the collection and the distribution of congestion income following daily market coupling between the relevant TSO or to the entity acting on behalf of the TSO (if applicable at regional level).

## **5.3 European architecture**

- Contracts establishing the daily modalities for operation of day-ahead market coupling between all European NEMOs and TSOs,
- Contracts establishing the intraday market coupling modalities between TSO and NEMO for a given region (if required),
- Contracts establishing the sharing of European costs related to day ahead and intraday market coupling.

## **5.4 Cost recovery and cost sharing**

Terms for financial cooperation in these contracts will have to be set following agreements on cost sharing and recovery of national costs. Such agreements will have to be concluded between relevant parties and NRAs, according to the provisions of the CACM regulation.

In light of this and in order to ensure a level playing field and non-discriminatory treatment of competitors, a sustainable, stable model for sharing and recovery of these costs will need to be agreed between all concerned parties and NRAs with reference to the relevant articles of GL CACM.

In context of the requirements to implement the multiple NEMO arrangements (MNA) in accordance to Article 45 and 57 several cost related questions arise. For these questions clear guidance from NRAs is required.

In that light especially for the topics listed in the table below the question of cost sharing and cost recovery becomes relevant. In this table it is also indicated whether these costs apply during the implementation and/or the operational phase:

No	Topic	Cost category
1	PCR modelling of DE/AT/LU bidding zone	Implementation phase
2	Setup of data exchange between TSOs and PCR	Implementation & operational phase
3	Cross PX clearing costs (clearing fee, collaterals, ...)	Operational phase
4	Operational PX fee (e.g. current financial agreement - FINA)	Operational phase
5	Local systems implementation (including setup of clearing and settlement, testing)	Implementation phase

**Table 3: different cost components regarding the MNA implementation**

In opinion of the DE/AT/LU TSOs for these topics subject to NRA decision the following cost sharing principles should apply and cost recovery should be further elaborated by NRAs:

#### **5.4.1 PCR modelling of DE/AT/LU bidding zone**

Today the bidding zone DE/AT/LU is modelled within PCR only as one single hub. The implementation of the multiple NEMO arrangement in the bidding zone DE/AT/LU results in the need to adapt how it is modeled in PCR (“scenario A”; as detailed in chapter 2.1.3 of this document).

As this change occurs solely on PCR side (within the MCO function) to maintain the CACM requirement of operating the single coupling (in accordance to Article 47 (4) the relevant costs should be solely considered NEMO costs.

#### **5.4.2 Setup of data exchange between TSOs and PCR**

The technical concept for the communication between TSOs and PCR/MCO function is defined in chapter 2.1. According to Article 46 (1) of the GL CACM cross-zonal capacity shall be forwarded to relevant NEMOs, furthermore Article 7 (2) (b) of GL CACM prescribes that NEMOs shall process input data on cross-zonal capacity accordingly. Moreover should NEMOs deliver the coupling results to all TSOs (Article 48 (1) (a)).

In that light TSOs aim to establish the communication with the involved NEMOs (as detailed in chapter 2.1 of this document). As the obligations for TSOs and NEMOs are clearly defined in the GL CACM the costs should be borne individually by TSOs and NEMOs for the imposed tasks. I.e. TSOs bear the costs for the tasks resulting of Article 46 (1) whereas NEMOs bear the ones resulting from 7 (2) (b) and 48 (1) (a)

#### **5.4.3 Cross PX clearing costs (clearing fee, collaterals, etc.)**

##### **5.4.3.1 Clearing fee**

On the one hand Article 77 of the GL CACM states that all costs incurred by CCPs and Shipping Agents shall be recoverable by means of fees or other mechanisms. On the other hand a potential clearing fee is also closely connected to the selected approach for clearing & settlement (chapter 2.2) and the related tender. For a potential service provider (selected via a tender) it needs to be clear (before participating in a tender) to which extent the service will be remunerated. Therefore TSOs see the “cost-by-cause” principle as a reasonable approach. Meaning that the involved NEMOs should compensate the provider for the “clearing service” (according to Article 77 this compensation could be considered in the PX trading fee for each involved NEMO).

### **5.4.3.2 Collaterals**

This question is closely connected to the selected approach for clearing & settlement (chapter 2.2). Consequently the impact on collaterals should be addressed in more detail once the clearing & settlement solution is further clarified.

However as a general principle the Shipping Agent shall in any case never be exposed to any cost related risks (stemming from clearing fees or collaterals).

If the priority nomination right (“Vorrangsregel”) of NEMOs/CCPs is respected this could mean that the CCPs has no risk and could consequently abstains from any collaterals towards the Shipping Agent. Furthermore the Shipping Agent should abstain from collaterals towards the CCPs as the Shipping Agent by definition shall never be unbalanced. However in case of contingency the relevant costs should born based on a detailed error analysis. This would be a possibility to ensure a cost efficient solution and minimize the need for clearing fees and collaterals.

### **5.4.4 Operational PX fee (e.g. current financial agreement - FINA)**

According to Article 76 (1) (c) NEMOs shall bear by default all costs for operating the single coupling. However based on NRA approval TSOs may make a contribution. In this context together with Article 7 (1) (wherein the operation of the single coupling is assigned to NEMOs) TSOs see it as crucial that these operational costs are considered NEMO costs. Otherwise there is the huge risk that today’s costs (resulting of the FINA) will multiply in the future with several NEMOs.

### **5.4.5 Local systems implementation (including setup of clearing and settlement, testing)**

In course of the local implementation it should be clearly defined which costs are considered TSOs- and which are NEMO-costs.

In essence it should be highlighted that the majority of costs addressed above shall be considered according to GL CACM NEMO costs. However it should be further highlighted that this chapter mainly addresses the question of cost sharing. Cost recovery, potentially via TSOs, is still a possibility subject to NRA decision. Therefore clear NRA guidance on the questions of cost sharing and cost recovery for these topics pose the precondition to start the MNA implementation. It should be further noted that the implementation timeline of the MNA will be highly impacted on the decision on the topics above.

## **6 Elements associated with the MNA implementation**

The following chapter gives an overview of the topics that are relevant in the next step to ensure the smooth MNA implementation.

The first precondition to start the implementation of the MNA is the actual approval of the involved NRA, namely BNetzA, E-Control and ILR.

In that light furthermore the following questions need to be addressed:

- Based on the final MNA proposal the NEMOs need to confirm the feasibility of scenario A; i.e. confirmation that the bidding zone DE/AT/LU can be modeled in PCR in a way that as market coupling result 18 Net Positions can be provided.
- NRA decision whether they see the need to provide also in the rare case of full decoupling a common price for the bidding zone DE/AT/LU.
- NRAs need to confirm/select the shipping option to be used for the MNA implementation (either Option 2: “with netting” or Option 1: “without netting”). This question is closely linked with the NRA decision regarding cost recovery of the clearing fees and collaterals. As a basis for this decision the following principle should be considered: regardless of who performs the Shipping Agent task in the future it always needs to be ensured that an incentive exists to act in a most cost-efficient way (reduce the clearing fees and collaterals). This incentive is ensured by option 2.

Once the MNA proposal is approved the selection process of the Shipping Agent needs to be initiated. This process shall be performed in a non-discriminative manner (e.g. via public tender). In the current situation GL CACM gives no clear indication who is obliged to perform this process. Neither NEMOs nor TSOs see themselves in the position to perform this task. Moreover the GL CACM includes in Article 68 (6) the following stipulation: [...] *If no agreement is reached, the shipping arrangement shall be decided by the regulatory authorities responsible for the bidding zones between which the clearing and settlement of the exchange of energy is needed.*

In that light TSOs see it as crucial that NRAs clearly address these questions and clarify who is responsible for the selection process of the Shipping Agent and until when the MNA shall be implemented.

Furthermore Article 9 (9) GL CACM requires the MNA document to include a timescale regarding the MNA implementation. Even though GL CACM does not define any specific deadlines for the implementation of the MNA, in the opinion of the TSOs, it shall be closely linked with the implementation deadlines defined for the MCO function. An alignment of the timings of the implementation of the MNA with the implementation of the MCO functions shall therefore be considered. The plan to set up and perform the MCO function will be submitted to NRAs by mid-April. Therein the timescale for implementation should be described. A timescale for the implementation of the MNA could be delivered once the MCO function timescale will be known.

## **7 Amendments**

According to Article 9 (13) GL CACM the TSOs of the Bidding Zone DE/AT/LU may request amendments of the MNA, especially in case of modifications of the technical, contractual or regulatory framework of the relevant mechanisms.

## Annex 1: Glossary

Abbreviation	Full name	Definition
50Hertz	50Hertz Transmission GmbH	
	Aggregated Netted External Schedule	Definition according to the draft of GL SO:  'a schedule representing the netted aggregation of all external TSO schedules and external commercial trade schedules between two scheduling areas or between a scheduling area and a group of other scheduling areas'
Amprion	Amprion GmbH	
APG	Austrian Power Grid AG	
	Article	Refers to article of GL CACM
AT	Austria	
	Bidding zone	Definition according to regulation (EU) 2013/543:  'bidding zone' means the largest geographical area within which market participants are able to exchange energy without capacity allocation;  In this context the countries: Germany, Austria and Luxembourg (DE/AT/LU) constitute a common bidding zone.
B2B	Border to border	
BEC	Bilateral Exchange Calculation	
BNetzA	Bundesnetzagentur	
CCP	Central Counter Party	has the meaning set forth in Article 2 of the GL CACM.
CLNIS	Coordinator of Local NEMO IT Systems	
CMM	Capacity Management Module	has the meaning set forth in Article 2 of the GL CACM.
	cross-border	Refers to the crossing of a Scheduling Area border.
	cross-zonal	Refers to the crossing of a

		bidding zone border.
	Control Area	<p>Definition according to regulation (EU) 2013/543:</p> <p>'control area' means a coherent part of the interconnected system, operated by a single system operator and shall include connected physical loads and/or generation units if any;</p>
CWE	Central Western Europe	
CZC	Cross Zonal Capacities	has the meaning set forth in Article 2 of the GL CACM.
DA	Day Ahead	
DC	Direct Current	
DE	Germany	
E-Control	Energie-Control Austria	
ECP	Energy communication platform	<p>The ECP platform consists of two main components: the communication node and the communication endpoint. The communication node (ECP Node) provides directory services, message routing, and reliable delivery. The endpoint (ECP Endpoint) allows messages to be sent or received via a standardized communication API or GUI.</p> <p>The ECP Node is designed for companies that need a high level of control over communication between endpoints. The communication node is therefore operated by TSOs, DSOs and other large players. All grouped electricity market participants are then connected to the ECP Node. The ECP Endpoint is installed by each party involved in communication.</p>
EPEX	European Power Exchange	

EXAA	Energy Exchange Austria	
	External Commercial Trade Schedule	Definition according to the draft of GL SO:  'external commercial trade schedule' means a schedule representing the commercial exchange of electricity between market participants in different scheduling areas
GL CACM	Commission Regulation (EU) 2015/1222 of 24 <sup>th</sup> July 2015 establishing a guideline on capacity allocation and congestion management	
Hub	Market Place	
	Internal Commercial Trade Schedule	Definition according the draft of GL SO:  'internal commercial trade schedule' means a schedule representing the commercial exchange of electricity within a scheduling area between different market participants
ID	Intraday	
ILR	Institute Luxembourgeois De Régulation	
LU	Luxembourg	
MC	Market Coupling	
MCO	Market Coupling Operator	
MNA	Multiple Nemo Arrangement	The obligations resulting from articles 7, 8, 45 and 57 from GL CACM regarding cross zonal capacity allocation and other necessary arrangements.
MRC	Multi Regional Coupling	The price coupling solution currently in operation
MTU	Market Time Unit	Market time period of 1 hour
NEMO	Nominated Electricity Market Operator	Has the meaning set forth in GL CACM
	Net Position	Definition according GL CACM:  'Net Position' means the netted sum of electricity exports and imports for each market time unit

		for a bidding zone;
Nord Pool	Nord Pool AS	
NRA	National Regulatory Authority	
OH policy 2	Operation Handbook policy 2	
PCR	Price Coupling of Regions	
	MCO function	has the meaning set forth in Article 2 of the GL CACM.
PMB	PCR Matcher/Broker	
PX	Power Exchange	
	Shipping Agent	has the meaning set forth in Article 2 of the GL CACM.
	Schedule	Definition according to the draft of SO GL:  'schedule' means a reference set of values representing the generation, consumption or exchange of electricity for a given time period
	Scheduling Agent	Refer to article of SO GL
	Scheduling Area	Definition according to the draft of SO GL:  'scheduling area' means an area within which the TSOs' obligations regarding scheduling apply due to operational or organisational needs  In this context each control area of 50 Hertz, APG, Amprion, CREOS, TenneT, TransnetBW equals a scheduling area.
SEC	Scheduled Exchange Calculator	has the meaning set forth in Article 2 of the GL CACM.
SM	Shipping Module	
GL SO	Guideline on System Operation	
SOB	Shared Order Book	
TenneT TSO	TenneT TSO GmbH	
TransnetBW	TransnetBW GmbH	
TSO	Transmission System Operator	
TSO CS	TSO Common System	
XBID	Cross Border Intraday	

**Table 4: Glossary**

## Annex 2: Current MC configuration

The market coupling process today consists of the following steps (with a focus on TSOs' Communication with PCR / MCO-function)

- Submission of Cross Zonal Capacities and other constraints (Article 9(2)(e) and Article 46 GL CACM)
- Receiving preliminary MC Results (Article 48 (1) GL CACM)
- Validation of preliminary MC Results (Article 9 (2)(f) and 48 (2) GL CACM)
- Calculating and publishing scheduled exchanges (BEC calculation) on borders between bidding zones (Article 9 (2)(g) and Article 49 GL CACM)
- Receiving final MC Results (Article 9 (2)(h) and Article (39) GL CACM)

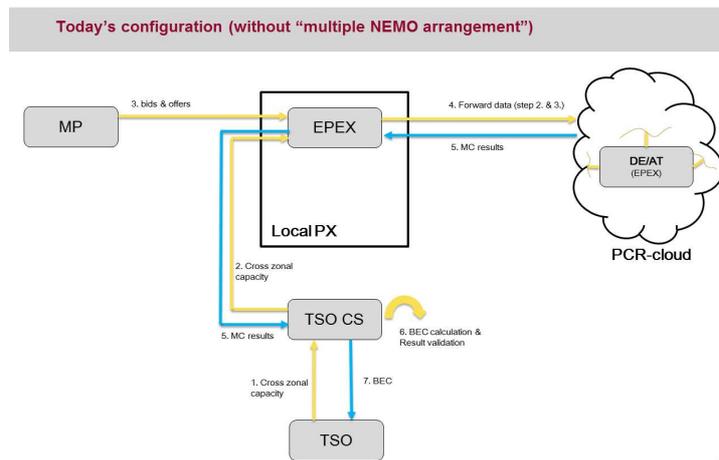


Figure 12: Current MC configuration

### Annex 3: Steps of CWE MC process

Flow Nb	Info	Produced by	From	To	Format	Communication
1	Data for capacity calculation		TSO Back-End Systems	CWE TSO Common System	Capacity Document	ECP
2	Cross Zonal Capacities (CWE + NL-NO, DE-DK1+AT-IT)		CWE TSO Common System	CWE ECP Endpoint	Capacity Document (XML)	ECP
3	Orders		Market Participant <sub>1...n</sub>	NEMO <sub>1...n</sub> Trading Systems	Order Document (XML)	Webservices
4a	Aggregated Orders		NEMO <sub>1...n</sub> Trading Systems	PMB		
4b	Cross Zonal Capacities and Infinite Capacity between the NEMO's Hubs (CWE + NL-NO, DE-DK1)		CWE Market Coupling Operator Pre-Coupling Module	PMB	PMB Capacity Document (XML)	Webservices
5	Price Coupling Results per NEMO		PMB-system of PMB-coordinator	NEMO <sub>1...n</sub> PMBs who then forward to Trading Systems	Results Document (XML)	Local Interface / Webserver
6	Price Coupling Results (MRC)		CWE ECP Endpoint	CWE TSO Common System (TSO Verification Module)	Energy Account Report (XML)	ECP
7a	CWE Final confirmation		CWE TSO Common System (TSO Verification Module)	CWE ECP Endpoint	Confirmation Document (XML)	ECP
7b	Final confirmation		NEMOs Verification Module	PMB (including coordinator)	Confirmation Document (XML)	Local Interface / Web
8a	Global final confirmation		PMB-system of PMB-coordinator	NEMOs PMBs who then forward to Verification Coupling Module	Confirmation Document (XML)	Local Interface / Web
8b	Global final confirmation		CWE ECP Endpoint	CWE TSO Common System (TSO Verification Module)	Confirmation Document (XML)	ECP
8c	Global final		CWE TSO	TSO Back-End	Confirmation	ECP

	confirmation (optional)		Common System (TSO Verification)	Systems	Document (XML)	
8d	CWE Net Positions for information		CWE TSO Common System (verification module)	TSO Back-End Systems	XML	ECP
9a	CWE Scheduled Exchanges Calculation	CWE TSO Common System (post coupling module)				
9b	CWE, NL-NO, DE-DK1, CWE-GB Scheduled Exchanges		CWE TSO Common System (post coupling module)	TSO Back-end Systems	Rights Document (XML)	ECP

	Process to be adapted
	Current Processes

## Annex 4: Configuration of scenario A (TSO-PCR interface via single NEMO on a rotational basis)

The impact of scenario A on the different parties is described below on a high-level basis:

- Additional tasks for TSOs:
  - limited need for changes on TSO side
  - BEC-calculation by TSO CS (CWE TSOs): to be defined based on shipping solution
- Additional tasks for NEMOs:
  - Submit infinite capacity between PXs
- Model additional hubs within PCR (e.g.: DE/AT 2, DE/AT 3)
  - Modelling of additional DE/AT hubs within PCR (connected to existing hub DE/AT via infinite capacity)
  - PCR calculates for all DE/AT hubs Net Position and prices (identical prices)

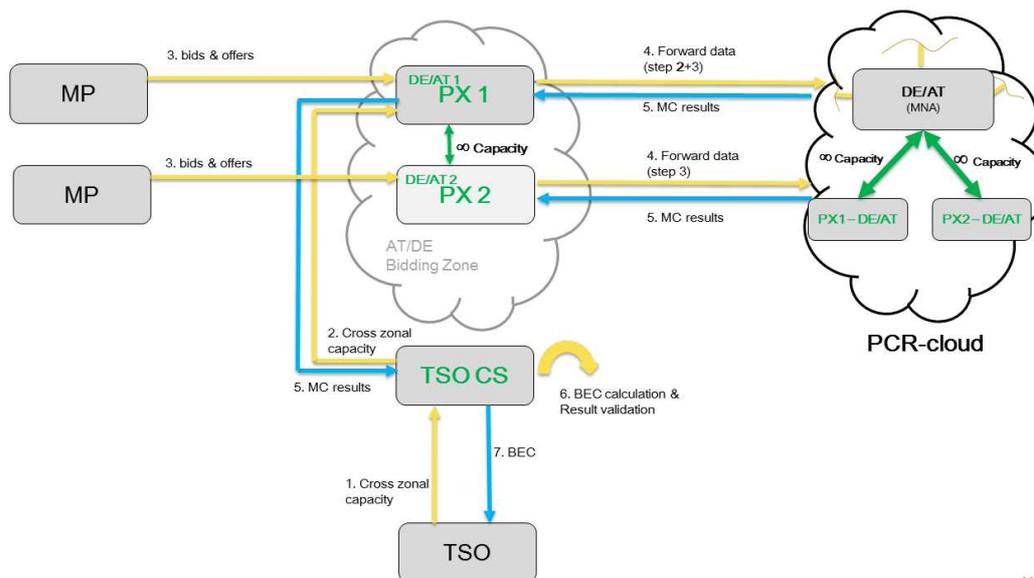


Figure 13: high-level configuration of scenario A –TSO-PCR interface via single NEMO on a rotating basis

## Annex 5: Configuration of scenario B (TSO-PCR interface via central entity)

The impact of scenario B on the different parties is described below on a high-level basis:

- Additional task for MNA-operator (central party subcontracted by the TSOs):
  - Submission of the infinite capacity (between PX1 and PX2) to PCR
  - Collect OBKs of all NEMOs in DE/AT bidding-zone and forward them to PCR
  - Collect MC-results (€, Net Positions, BECs) from PCR, split MC-results and forward them to each respective NEMO in the DE/AT bidding zone
  - Submit MC-results to TSO CS
  - Involve MNA in clearing and settlement
- BEC-calculation by TSO CS (CWE TSOs)
  - to be defined based on shipping solution
- Additional tasks for NEMOs:
  - No need for change (even less tasks, submission of capacities via MNA-operator)
- Additional tasks for PCR:
  - Create interface between MNA-operator and PCR

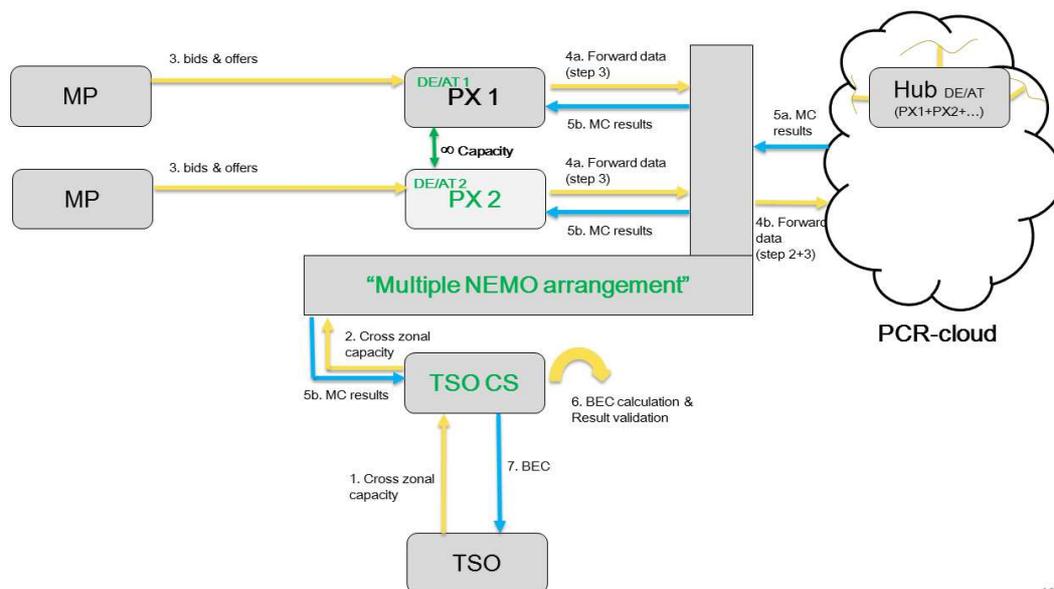


Figure 14: high-level configuration of scenario B – TSO-PCR interface via central entity

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## Annex 6 (Financial shipping – without netting)

This annex is based on chapter 2.2.2. therein further details related to option 1 (without netting) related to financial shipping are gathered. These option might be considered as fallback in case option 2 (with netting) would not be chosen.

### Cross Scheduling Area shipping – within the same bidding zone

The following subchapters focus on the financial effects of multiple shipping options across Scheduling Areas within the same bidding zone.

#### Option 1: Cross Scheduling Area financial shipping without netting

In this setup the financial settlement among CCPs across Scheduling Areas mimics the path of the physical shipping. Figure 15 illustrates an example consisting of 2 Scheduling Areas with 3 CCPs respectively. In accordance with the physical shipping setup, there is a Shipping Agent mediating between the CCPs of both Scheduling Areas.

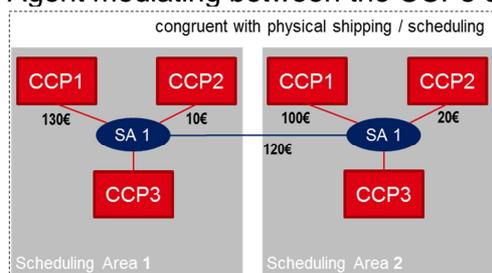


Figure 15: Financial shipping without Netting

Consequently, any Euro that is transferred between 2 CCPs follows the route of the Schedules in the opposite direction via a mediating Shipping Agent. In Figure 15, CCP1 has to settle 100€ with itself across the Scheduling Area. Additionally, CCP1 settles another 30 € with CCP2 out of which 10 € are settled with CCP2 in the same Scheduling Area and 20 € with CCP2 in the neighbouring Scheduling Area.

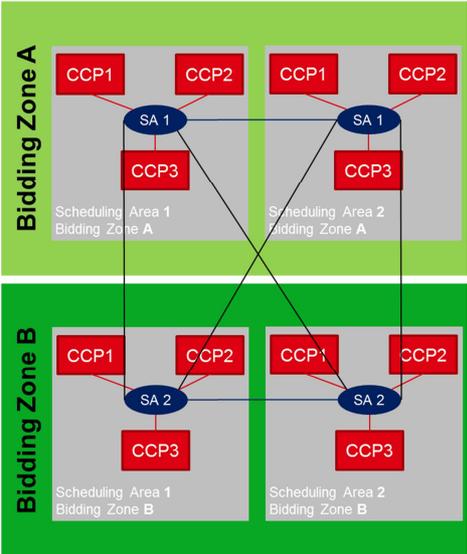
Therefore, also a financial transaction that involves the same CCP – however operating in different Scheduling Areas – has to be routed through the mediating Shipping Agent.

Consequently, each transaction relationship between  $CCP_{1...n}$  and the Shipping Agent will be collateralized – potentially in both directions meaning the CCP hedges against the default of the Shipping Agent and the Shipping Agent against the default of the CCP. Additionally, the Shipping Agent will charge the CCPs a corresponding clearing fee for each MWh that is routed through the Shipping Agent's BRP and the CCPs will charge the Shipping Agent its standard clearing fees as applicable to any market participant on its hub.

### Cross bidding zone shipping with multiple Scheduling Areas

The following subchapters focus on the financial effects of multiple shipping options across bidding zone borders.

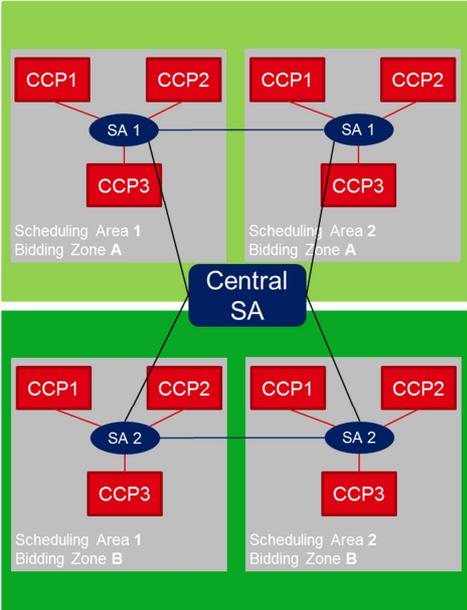
**Cross bidding zone financial shipping - bilateral transactions, without internal netting (Option 1a)**



**Figure 16: Financial cross-zonal shipping - bilateral transactions, without internal netting**

In this cross-border financial shipping setup, there are bilateral interfaces among the individual Shipping Agents of each involved Scheduling Area only. At the same time, bidding zone internal netting among the same CCPs is not allowed leading to the disadvantageous collateralization and clearing fees as mentioned in an earlier chapter.

**Cross bidding zone financial shipping - Central Shipping Agent, without internal netting (Option 1b)**



**Figure 17: Financial cross-zonal shipping - Central Shipping Agent, without internal netting**

In this cross-border financial shipping setup, there is one central Shipping Agent financially mediating between the individual Shipping Agents of each involved Scheduling Area. At the same time, bidding zone internal netting among the same CCPs is not allowed leading to the disadvantageous collateralization and clearing fees as mentioned in an earlier chapter. The establishment of a central Shipping Agent becomes superior to the bilateral setup of the last chapter in terms of transaction costs as soon as the central Shipping Agent has to mediate among more than 3 parties<sup>6</sup>.

<sup>6</sup> Amount 'a' of interfaces in a bilateral setup corresponds to  $a = (n*(n-1))/2$ . For  $n>3$ , 'a' is greater than the amount of required interfaces in a centralized setup.

## Annex 7: NEMO positions related to “Full Decoupling”

In this annex in addition to the provisions of chapter 4.2 the individual NEMO positions related to ‘Full Decoupling’ Scenarios under MNA are gathered.

### EPEX SPOT position

The following points summarise the EPEX SPOT position related to the handling of full decoupling scenarios within the DE/AT/LU zone once multiple NEMOs are active. We consider that the following arguments support the proposal which we have included in the text, to maintain individual NEMO hubs decoupled in case of no allocation of cross-zonal capacity associated with the DE/AT/LU zone.

1. Identification of full decoupling cases in which local coupling of NEMO hubs may still be possible is extremely challenging, is not included in the current PCR procedures, and will be extremely complex to manage from a procedural perspective, given the rarity of such cases.
  - a. The marginal value gained by developing solutions for these very rare cases will not be worthwhile for the market.
  - b. In such cases a weighted average bidding zone price is a more efficient and robust calculation methodology for providing a single price for system operation needs.
2. The GL CACM does not provide a legal basis for intra-zonal coupling between the NEMOs.
  - a. Cooperation on MNA solutions between NEMOs is required only in the context of the allocation of cross-zonal capacity when multiple NEMOs are present in the same bidding zone.
  - b. As in GL CACM Article 7.4 specifies: “*Cooperation between NEMOs shall be strictly limited to what is necessary for the efficient and secure design, implementation and operation of single day-ahead and intraday coupling*”.
  - c. In cases where all external borders are decoupled, there will be no allocation of cross-zonal capacity related to the DE/AT/LU bidding zone and no coupling. Intra-zonal coupling between NEMOs is therefore outside the scope of the operation of the *single day-ahead and intraday coupling* and therefore outside of the scope of the authorized cooperation between NEMOs.
3. Insofar as possible, the DE/AT/LU arrangements should mirror other European arrangements (notably the GB, FR and NL proposals) which do not prescribe the merging of individual NEMO Order Books in cases of full decoupling.

4. DE TSOs currently use intraday prices as reference for imbalance pricing, which require in any case an ex-post calculation of an index price for system operation requirements, in a manner similar to that stated under 1) b.

### **EXAA position:**

We see three levels of decoupling: partial decoupling, Bidding zone coupled with subset of bidding zone hubs and full decoupling.

In partial decoupling, it would still be possible and should be done to calculate a common Day Ahead Market Coupling price for all NEMOs. In the case of “Bidding zone coupled with subset of bidding zone hubs”, which means that some of the NEMOs have a problem in the Market Coupling process, all the remaining NEMOs should also have the possibility to calculate a common Day Ahead Market Coupling price – it should be in the responsibility of the “uncoupled NEMOs” to define their own procedure; probably calculating their own hub price.

In the case of full decoupling, we would prefer that each NEMO has to calculate his own hub price.

Probably it would be possible that in some cases (e.g. MCO still working; full decoupling only due to missing capacity values) a common Day Ahead Market Coupling price could be calculated for the whole bidding zone. However (based on discussions we already had in different Market Coupling projects) we also see that it could lead to difficult and lengthy decision processes, to decide which level of full decoupling is reached, which could lead to inadmissible delay of the whole process.

### **NordPool position :**



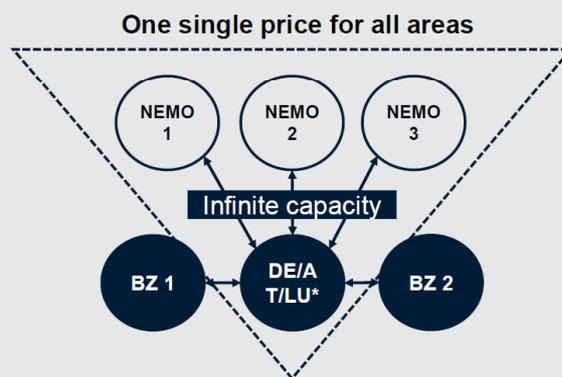
## Normal setup

NORD  
POOL

2

### Solution in single day-ahead coupling

- ▶ NEMOs use the normal shared configuration with the whole MRC topology
- ▶ NEMOs submit their own order books
- ▶ NEMOs submit infinite capacity between NEMO hub and DE/AT/LU area
- ▶ TSO common system provides capacities for external borders to NEMOs who provide it to single day-ahead coupling



NORD  
POOL

\*Potentially DE/AT/LU would be modelled with multiple scheduling areas

3

## Decoupling of all external borders

NORD  
POOL

4

### Possible scenario day-ahead

#### Scenario:

- ▶ TSOs are not able to send capacities to single day-ahead coupling for external borders to DE/AT/LU Bidding Zone
  - For example if TSO common system is down
- ▶ NEMOs are not experiencing technical problems and have been able to collect orders

#### Solution possibilities:

- ▶ In this case the single day-ahead coupling mechanism supports calculating one single price for DE/AT/LU and there is no reason to split the liquidity into several NEMO hubs without coupling
- ▶ Split of liquidity into NEMO hubs without capacity would mean several and probably highly volatile prices for DE/AT/LU NEMOs

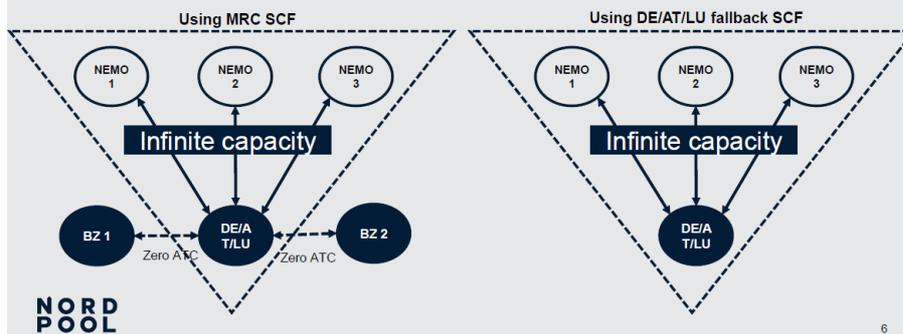
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5

## Solution in single day-ahead coupling enabling one DE/AT/LU price

- ▶ NEMOs use fallback SCF with only DE/AT/LU topology or
- ▶ NEMOs use the normal SCF with the whole MRC topology
- ▶ NEMOs submit their own order books
- ▶ NEMOs submit infinite capacity between NEMO hub and DE/AT/LU area
- ▶ NEMOs provides zero capacities for external borders if normal SCF is used

### One single price for DE/AT/LU Bidding Zone



## Solution in single day-ahead coupling

- ▶ Each NEMO employs its own local fallback solution and prices are calculated per NEMO
- ▶ Volatile prices are to be expected due to uneven distribution of liquidity and consumption/production over NEMOs
- ▶ Is there an impact on price of balancing power if you have multiple prices?

### One price per NEMO for DE/AT/LU Bidding Zone



## Nord Pool position

- ▶ NEMOs or MCO function is not experiencing problems and **coupling between NEMOs in DE/AT/LU is possible with two different options** explained earlier
- ▶ Split of liquidity into NEMO hubs without capacity would mean different and probably highly volatile prices at each DE/AT/LU NEMO
- ▶ Market participants would not appreciate the unforced volatile prices
- ▶ Economical welfare and operational robustness of the market might be jeopardized if NEMOs are be isolated

From a market perspective it would be unacceptable to split Bidding Zone in any other case than when a NEMO is experiencing problems

NORD  
POOL

8

## Annex 8: NEMO comments on preliminary MNA

The following chapter includes all comments which were submitted by the NEMOs on the preliminary MNA document dated 21.03.2016.

EXAA submitted general comments which are covered in the enclosed document: "comments\_EXAA\_MNA-proposal\_21.03.2016.pdf".

The remarks from Nordpool, EPEX Spot and ECC which were directly included in the draft MNA proposal are shown in the following document: "merged\_comments\_NP\_EPEX\_ECC\_MNA-proposal\_21.03.2016.pdf".

## Annex 9: Further details on notification flows

