Réseau de transport d'électricité

10/10/2016

Proposal for implementing a technical solution for hosting multiple NEMO in France

Definition of Multi-NEMO Arrangements for day-ahead and intra-day timeframes

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1. Document Purpose

Pursuant to the provisions of Article 4(3) of the EU regulation 2015/1222 of the Commission of 24 July 2015 establishing a guideline for allocating cross-zonal capacity and congestion management (the "Capacity Allocation and Congestion Management" regulation, hereinafter "CACM Regulation"), the French Energy Regulatory Authority (CRE) designated the French operators of the day-ahead and intraday electricity markets on 03.12.2015[1]. In its deliberation, and pursuant to the provisions of Articles 45 and 57 of the CACM Regulation, CRE asked RTE to submit within four months a proposal for the implementation of a technical solution for hosting several operators of the day-ahead and intraday electricity markets ("Nominated Electricity Market Operator", hereinafter called "NEMO").

This document (hereinafter the "Technical Solution") is a non-binding translation of the "Proposition pour la mise en œuvre d'une solution technique permettant l'accueil de plusieurs NEMO en France"[2], submitted to CRE for approval and which lays out in detail the proposal of RTE for a technical solution for hosting multiple NEMO in France (hereinafter the "Multi-NEMO Arrangements").

[1] This involves EPEX SPOT and NORD POOL.

[2] Submitted to CRE for approval on 04.04.2016 and updated on 10.10.2016.

2. Preamble

2.1. Introduction

The CACM regulation provides for the generalization of market coupling to the day-ahead and intra-day timeframes (single day-ahead and intraday market coupling solutions).

Regarding the day-ahead timeframe, market coupling is now in place on all French borders, with the exception of the France - Switzerland border[3]. It enables an implicit capacity allocation as members of power exchanges in one country can find the best counterparties in the economic sense in any coupled market in other countries without having to reserve cross-border capacities in advance. This optimization is achieved via the Euphemia algorithm as developed under the PCR project ("Price Coupling of Regions") of the European power exchanges[4]. This algorithm performs the economical optimization while taking into account the limitations of cross-border capacities between countries, as defined by the Transport System Operators (hereinafter "TSO").

Regarding the intra-day timeframe, a European project called "XBID Market Project" (hereinafter "XBID Project") was launched by power exchange operators in cooperation with the TSO to create an integrated intraday cross-border market, enabling the implementation of the single intraday market coupling solution defined in the CACM regulation. Ultimately, this solution will match orders entered by members of the power exchanges in one country continuously with orders submitted similarly by members in another country (or "continuous implicit allocation").

In the day-ahead and intraday market coupling processes, the NEMO must ensure, in cooperation with the TSO, the market coupling. According to article 7(1) of the CACM regulation, their mission consists notably to *"receiving orders from market participants, having overall responsibility for matching and allocating orders in accordance with the single day-ahead and intraday coupling results, publishing prices and settling and clearing the contracts resulting from the trades according to relevant participant agreements and regulations"*.

[3] The implementation of market coupling at the Swiss border on the daily and intraday timeframes has been suspended while resolving political obstacles that prevent the finalization of a bilateral agreement on electricity between Switzerland and the European Union. This condition is necessary pursuant to the CACM regulation for Switzerland (see Article 1 of the CACM regulation).

[4] See https://www.epexspot.com/en/market-coupling/pcr or http://nordpoolspot.com/How-does-it-work/Integrated-Europe/Price-coupling-of-regions/.

The tasks and missions of the NEMO defined in the CACM regulations include the tasks related to the operation of markets, and also those specific to the function of the Market coupling operator (hereinafter "MCO")[5]. A summary of these tasks is listed in appendices 1 and 2.

2.2. Scope of the Technical Solution

2.2.1. NEMO tasks taken into account

The Technical Solution for hosting several NEMO in France details the points necessary to allow the NEMO to perform the following tasks under the CACM regulation (see details in Appendices 1 and 2):

- NEMO_1: tasks related to the MCO, are detailed as follows
  - NEMO_1 / MCO_2: taking into account the cross-zonal capacity constraints sent by the TSOs.
  - NEMO_1 / MCO_3: execution of the market coupling algorithm,
- NEMO_4: anonymization and transmission of the order books for the market coupling,
- NEMO_7: tasks related to the transfer of net positions between the different Central Counter Parties.

This involves tasks for the market coupling process in which the NEMO act in cooperation with the TSO.

2.2.2. Concerned mechanism

The elements presented in this document apply to the mechanisms and projects contributing to the target models of implicit cross-zonal capacity allocation set by the CACM regulation:

- Unique day-ahead market coupling solution (hereinafter "day-ahead market coupling solution"), as implemented by the project "coupling of the Northwest Europe Region"[6] in 2014, extended to the borders of France - Spain and France – Italy, in which all the French NEMO (as designated on the date of this document) participate,

[5] According to the article 7(3) of the CACM regulation, all the NEMO must submit to all regulatory authorities and to the Energy Regulators' Cooperation Agency a plan indicating the methods for implementation and joint exercise of the MCO functions within eight months after the entry into force of the CACM Regulation, or before 15.04.2016.

[6] At this time this project has not yet been formally approved by the national regulation authorities concerned as the unique day-ahead market coupling solution.

- Unique intraday market coupling solution (hereinafter "intraday market coupling solution"), as implemented after the XBID project[7], in which all the French NEMO (as designated on the date of this document) participate.

The information about the day-ahead and intraday market coupling solutions presented in the Technical Solution are the ones known on the date of this document and should therefore not be considered as a submission for approval of these solutions.

For these mechanisms, the participation of the French NEMO will be guaranteed by the implementation of the Multi-NEMO Arrangements described in this document.

The other transitional mechanisms implemented before the target models are not affected by the Multi-NEMO Arrangements: for these mechanisms, the French NEMO are invited to contact RTE to express interest in participating in corresponding projects. The effective participation of interested NEMO will then be based on existing technical and time constraints associated with these projects.

2.2.3. Elements not covered

The Multi-NEMO Arrangements does not deal with the following points:

- Details of the day-ahead and intraday market coupling solutions,
- Details of sharing and recovering of the national costs.

The following elements will be described during the implementation of the Multi-NEMO Arrangements, and are thus not detailed in this document:

- Details of the necessary contracts with RTE at the French level,
- Details of the regional contracts between the TSOs, NEMO and the other participants involved in the market coupling solutions,
- Details of the definition process of the entities involved in the exchanges and transfers of energy,
- New version of the market rules impacted by the Multi-NEMO Arrangements,
- Detailed planning for implementing the Multi-NEMO Arrangements, including regional level with the other TSOs, NEMO and the other participants involved in the market coupling solutions.

[7] At this time this project has not yet been formally approved by the national regulation authorities concerned as the unique intraday market coupling solution.

2.3. Definitions

In this document, the terms and abbreviations used are those of the CACM regulation. The following list defines the terms specific to the Technical Solution:

Bidding Zone: largest geographical area within which market participants are able to exchange energy without capacity allocation[8]; there is only one Bidding Zone in France (hereinafter "France Bidding Zone").

Hub: For a Bidding Zone, a Hub is the set of orders submitted by the market participants to a given NEMO.

Multi-NEMO Arrangements (or "MNA"): RTE proposal for a Technical Solution for hosting multiple NEMO in France, laid out in this document ("Technical Solution").

Reference Spot Price: reference price calculated by RTE, based on the day-ahead timeframe of the organized reference electricity market in France, defined as the average of prices determined by each NEMO in each Hub weighted by the volumes of buys and sells across all Hubs (see details in §3.4.2).

Technical Solution: this document, which lays out in the RTE proposal for the Multi-NEMO Arrangements.

Zonal Central Counter Party (or "ZCCP"): role assigned to the Central Counter Parties involved in the energy exchanges within France Bidding Zone (see §3.5.1).

2.4. Reference documents

[Ref.]	Title	Description
[1]	Deliberation of the Energy Regulatory Commission of 3 December 2015	Deliberation on the designation of day-ahead and intraday market operators of electricity in France
[2]	CACM regulation	CACM regulation
[3]	Rules relative to Programming, the Balancing Mechanism and Recovery of Balancing Charges	Version applicable as of 1 April 2016
[4]	Rules on the Balance Responsible Entity system, Chapters A to D	Version applicable as of 1 April 2016
[5]	Ancillary Services Rules (French version)	Version applicable as of 1 January 2016

Table 1: reference documents

[8] Definition from the EU Regulation 543/2013 of the Commission of 14 June 2013 concerning the submission and publication of data on electricity markets, and amending Appendix I to the regulation (EC) 714/2009 of the European Parliament and Council.

2.5. Amendments

According to article 9(13) of the CACM regulation, RTE may request amendments of the Multi-NEMO Arrangements, especially in case of modifications of the technical, contractual or regulatory framework of the relevant mechanisms.

3. Description of the Multi-NEMO Arrangements

The proposal of RTE aims for the following points:

- Technical and financial efficiency,
- Application of requirements and definitions of the regulations in force,
- Harmonization between day-ahead and intraday timeframes,
- Applicable solution regardless of the number of NEMO operating in France,
- As far as possible, and considering the existing arrangements in these countries when practicable, definition of principles able to be applied in other countries[9].

For each of the following topics, the document details the principles of the Multi-NEMO Arrangements and the corresponding requirements to be met by the French NEMO (these principles and requirements are listed in appendix 3):

- Bidding Zones and Hubs,
- Data exchanges between RTE and the NEMO,
- Cases of decoupling,
- Reference Spot Price (day-ahead timeframe),
- Exchanges and transfers of energy,
- Contractual architecture
- Rules applicable to the market coupling processes.

Unless explicitly stated otherwise, the principles and requirements listed below apply to both day-ahead and intraday timeframes.

3.1. Bidding Zones and Hubs

In order to enable the execution of market coupling, it is necessary that the NEMO transmit the orders from their power exchange members to the coupling algorithm.

3.1.1. Configuration of the Bidding Zone in France

With the arrival of several NEMO able to operate within the France Bidding Zone, it is necessary to define a concept for specifically identifying the orders from the members of the power exchange operated by a given NEMO: this is a Hub.

[9] While the requirements of the CACM regulation for the definition of the technical solutions has bearing only at the local level, RTE has undertaken a work of coordination with its counterparts in the capacity calculation regions where several NEMO have been designated, and in order to agree on several principles. Note that because of the short deadlines imposed by the CACM regulation, work on the Technical Solution with the French NEMO was prioritized compared to coordination with other TSO.

Principle 1: France Bidding Zone is divided into as many Hubs as there are NEMO.

This defines the modeling of multiple NEMO in Bidding Zone France from a business point of view[10].

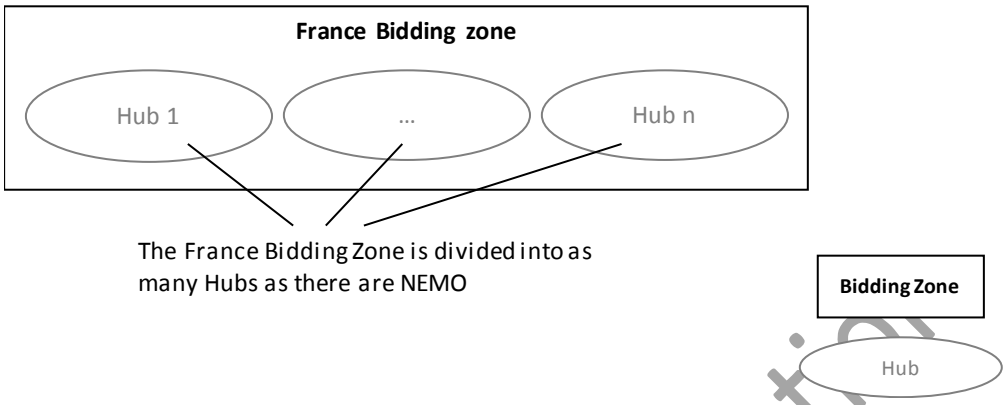

Figure 1: configuration of the France Bidding Zone

The concept of Hub enables keeping the definition of the Bidding Zone unchanged and can be broken down regardless of the number of NEMO operating in France, for both day-ahead and intraday timeframes.

It does not require any geographical distribution of the activities of the NEMO (i.e. association of each NEMO to a given set of borders), which would then determine the modalities for exchanges and transfers of energy and could yield technical constraints, especially in the case when the implicit allocation is performed through an auction (day-ahead market coupling solution).

Requirement 1: According to the list of tasks defined by the CACM regulation for NEMO, the transmission of orders from the members of the power exchanges operated by the French NEMO to the market coupling algorithm is the responsibility of each NEMO.

This allows each NEMO to keep control of the data relative to the orders of its power exchange members which are transmitted to the algorithm.

3.1.2. Market coupling on day-ahead timeframe

In its current state of implementation, the day-ahead market coupling solution does not allow sending order books of several NEMO for the France Bidding Zone (unlike the single intraday market coupling solution, the day-ahead market coupling solution has no shared order book).

[10] This principle does not presume of the exact technical implementation done on the market coupling systems.

Requirement 2: the day-ahead market coupling algorithm must enable each NEMO to send its Hub's order book, and consider that there is no exchange limitation for matching of the orders transmitted by the French NEMO. It must provide as output one single price and net position for the France Bidding Zone per market time unit.

NEMO will implement necessary modifications of the market coupling algorithm to allow sending of several order books for France Bidding Zone.

3.1.3. Market coupling on intraday timeframe

In the intraday market coupling solution, the sharing of the NEMO order books is directly provided by the shared order book function (hereinafter "SOB"): all of the NEMO use a single order book which directly collects the orders transmitted by the market participants. Each order is associated with a given operator and Bidding Zone.

Requirement 3: orders considered by the intraday market coupling algorithm are grouped by the NEMO in a shared order book. The intraday market coupling algorithm must consider that there is no exchange limitation for continuous matching of the orders transmitted by the French NEMO. It must provide as output one single net position for the France Bidding Zone per market time unit.

3.2. Data exchanges between RTE and the NEMO

3.2.1. General principles

Principle 2: to ensure the most technically efficient solution, RTE will favor as much as possible the use of standard file formats and exchange protocols, as defined by the ENTSO-E for data exchange between the electricity market participants.

In particular, the identification of exchanged data relies on a centralized coding at the ENTSO-E[11] level, which notably defines the codes for the Bidding Zones or the market participants.

Requirement 4: the NEMOS must use the file formats and exchanges protocols requested by RTE. For data exchanges using the ENTSO-E standards, the NEMO must use the identification codes defined by ENTSO-E.

[11] See https://www.entsoe.eu/data/energy-identification-codes-eic/eic-documentation/Pages/default.aspx
See also the modeling of data exchanges between the electricity market participants: https://www.entsoe.eu/publications/electronic-data-interchange-edi-library/work%20products/harmonised_electricity_role_model/Pages/default.aspx

The details on file formats and exchanges protocols established between RTE and the NEMO will be determined during the implementation phase of the Multi-NEMO Arrangements.

3.2.2. Market coupling on day-ahead timeframe

General principles of data exchange in the day-ahead market coupling solution

The PCR solution is organized in a decentralized manner: it includes a "PMB" system (for "PCR Matcher and Broker") for each participating power exchange. Each PMB hosts the market coupling algorithm, and also collects the input data required for the latter (order book, cross-zonal capacity and allocation constraints). The PMB are directly interfaced with the power exchange trading platforms, which receive the buy and sell orders from the market participants. They are connected by a private network to form the PCR solution.

Thus, the TSO computer systems are not directly connected to the PMB, but must go through those of the NEMO for provision of input data (available cross-zonal capacity and allocation constraints) and output data (results and validation by the TSOs against input data) of the algorithm.

The diagram below shows the simplified view of the data exchanges between the TSOs and the NEMO in the day-ahead market coupling solution. The roles of Central Counter Parties and Shipping Agents are detailed in §3.5.1.

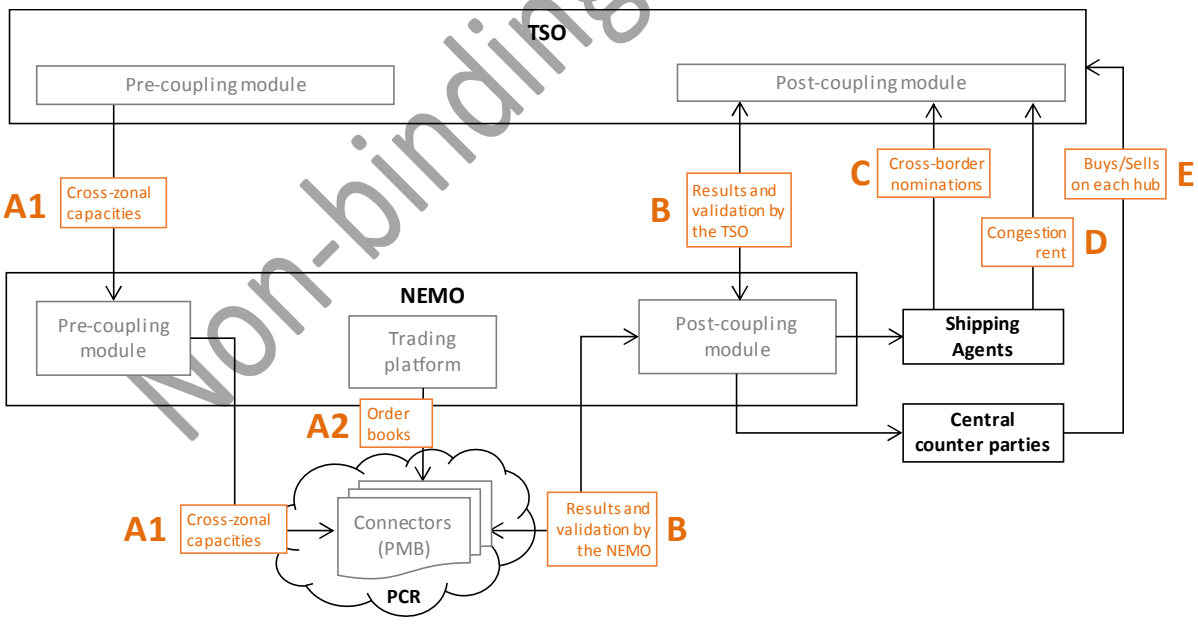

Figure 2: diagram of data exchanges in the day-ahead market coupling solution

Principle 3: for the day-ahead market coupling solution, the data exchanges between RTE and the market coupling system relating to input and output data of the day-ahead market coupling algorithm will be done according to the existing PCR architecture, which is to say that the data will be transferred via the NEMO systems.

Current data exchanges

On each border, the data exchanges between RTE and the market coupling system relating to input and output data of the market coupling algorithm are done via the systems of power exchanges.

The establishment of the "*flow-based*" approach for the day-ahead market coupling of the CWE region required a centralized mode of exchange between TSOs and the power exchanges for input and output of the algorithm. In fact, the "*flow-based*" method implies that a single set of parameters is determined for all the borders of the CWE region to describe the cross-zonal capacities available for market coupling (and not a set of distinct values per border, as with the "ATC" method). Exchange of the cross-zonal capacities and the validation of the results of the market coupling are thus done centrally by the TSOs (through a common system implemented by the TSOs) and the power exchanges thanks to a single exchange point.

Given that the CACM regulation is the establishment of a method of coordinated cross-zonal capacity calculation per capacity calculation region, RTE considers that the principle established in the CWE region will have to be generalized to other capacity calculation regions (hereinafter "CCR").

Specificity of data exchanges on the IFA border

On the date of this document, the data exchanges relating to the IFA border between TSOs (RTE and National Grid Interconnector Ltd, hereinafter "NGIC") and the concerned power exchanges are made thanks to a specific solution (hereinafter "IFA interface").

The primary missions of the IFA interface operator regarding the data exchanges involving RTE are as follows:

- Sending of IFA cross-zonal capacities available for the day-ahead market coupling. The IFA interface operator receives from RTE and NGIC the data on IFA (thanks to a common system put in place by RTE and NGIC), then transmits it to PCR,
- The verification of the results determined by the market coupling algorithm for IFA against cross-zonal capacities as communicated by RTE and NGIC, along with the allocation constraints (loss factor),
- Sending the final market coupling results to RTE and NGIC (IFA cross-border schedules and the French and Great Britain day-ahead prices). The IFA interface operator receives the results and sends them to RTE and NGIC.

In the current state, the data exchanges between RTE and the market coupling system for input and output data of the algorithm on the IFA border are thus made via the PMB of the IFA interface operator. RTE considers that the IFA interface is an enduring solution from the point of view of the implementation horizon of Multi-NEMO Arrangements.

Synthesis

Requirement 5: data exchanges between RTE and the market coupling system for input and output data of the day-ahead market coupling algorithm will be made through a single access point for each capacity calculation region (in coordination with the other TSO, when possible). NEMO will use this single access point on a rotating basis. The technical provisions for data exchanges between RTE and this unique access point will be set in coordination with NEMO (and with the other TSO, when relevant).

For a given capacity calculation region:

- The input data of the market coupling algorithm are sent by RTE, in coordination with the other TSO, when possible, to the single access point,
- NEMO use the single access point on a rotating basis[12] to retrieve these data to perform OCM operations, as further specified in the regional operational contracts,
- The output data of the market coupling algorithm (results) are sent to RTE, through the single access point,
- The validation of the results is sent by RTE, in coordination with the other TSO when possible, to the single access point.

Due to the maintenance of IFA interface in view of the implementation of the CACM regulation, a specific requirement is made on this border.

Requirement 5 bis: on the IFA border, the data exchanges between the TSOs (RTE and NGIC) and the market coupling system for input and output data of the day-ahead market coupling solution algorithm is made via the IFA interface.

This last requirement is in conformity with the preceding one insofar as the IFA interconnection is part of a "Channel" specific region[13]. It will be adapted to future developments of the IFA interface solution in the corresponding capacity calculation region.

These requirements are summarized in the diagram below:

[12] Other modalities will need to be established by NEMO to perform this task if necessary for technical or contractual reasons.

[13] According to the proposal of the ENTSO-E on the definition of the capacity calculation regions on the date of this document.

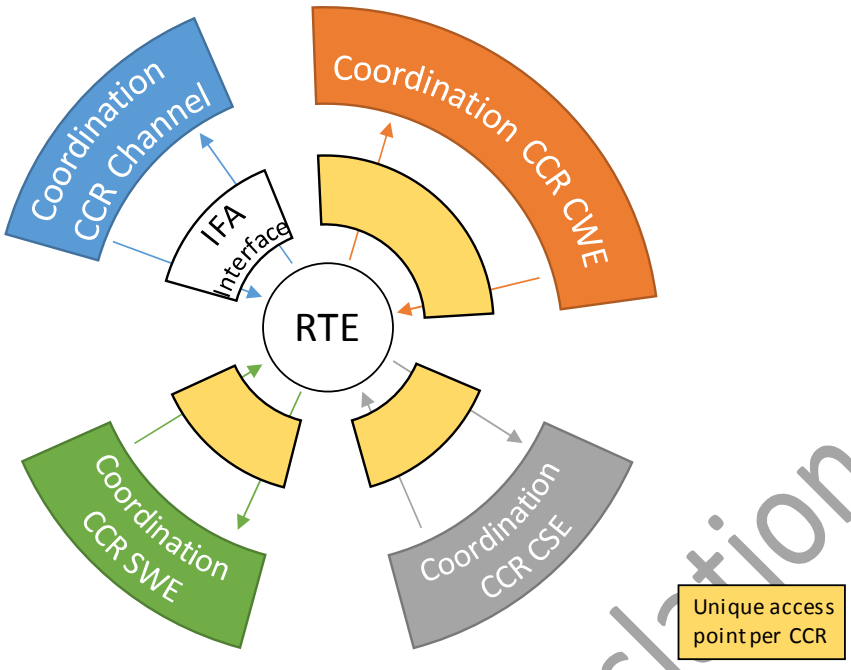

Figure 3: summary of requirements for the day-ahead market coupling data exchange (1)

The following diagram displays the corresponding details on the data exchanges:

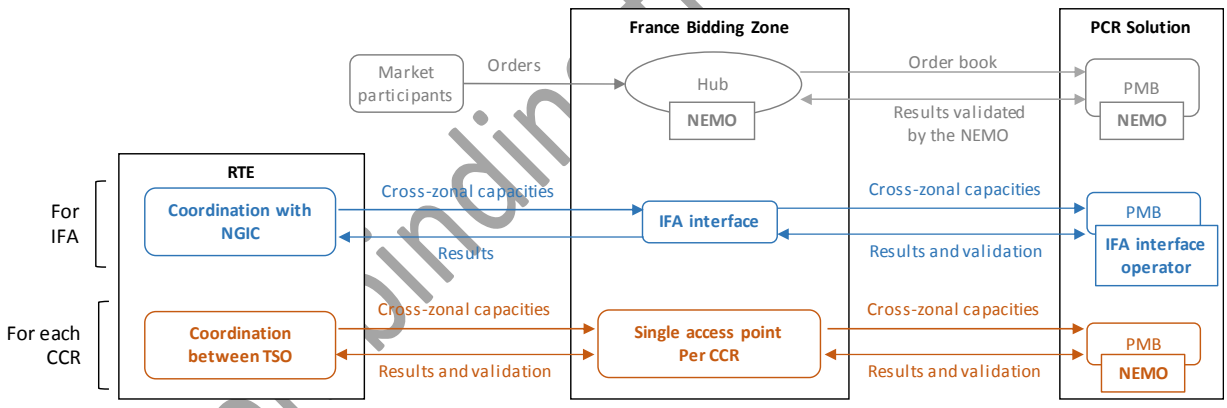

Figure 4: summary of requirements for the day-ahead market coupling data exchange (2)

3.2.3. Market coupling on intraday timeframe

In the intraday market coupling solution, the TSO's computer systems can communicate directly with the market coupling system to send the input data (relating to the cross-zonal capacity and allocation constraints) and receive the results (cross-border schedules), and this without passing through the systems of the NEMO.

The central system implementing the intraday market coupling solution is essentially composed of three modules:

- "*Capacity Management Module*" (hereinafter "CMM"): this module receives the cross-zonal capacities determined by the TSO and manages the utilization of these by the continuous implicit allocation mechanism,
- "*Shared Order Book*" (hereinafter "SOB"),
- "*Shipping Module*" (hereinafter "SM"): this module determines the amounts of energy transferred between the different Bidding Zones by the Shipping Agents.

The diagram below shows the simplified view of the data exchanges between the TSOs and the NEMO in the intraday market coupling solution. The roles of Central Counter Parties and Shipping Agents are detailed in §3.5.1.

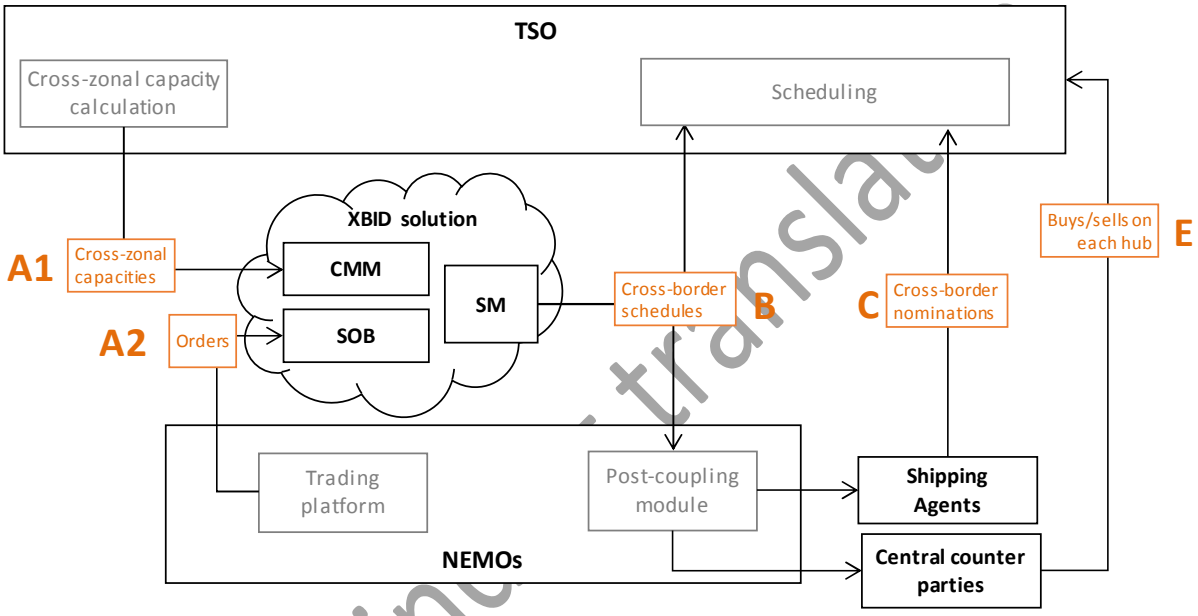

Figure 5: diagram of data exchange in the intraday market coupling solution

Principle 4: data exchanges between RTE and the market coupling system for input and output data of the intraday matching algorithm of the market coupling solution will be made directly between RTE computer systems and the market coupling system (in coordination with the other TSO when possible).

3.2.4. Data exchanges after the market coupling

Cross-border nominations (see "C" flow)

Each Shipping Agent must send the cross-border nominations to RTE (see §3.5.4).

Congestion income (see "D" flow, day-ahead market coupling)

The Shipping Agents transfer the congestion income to the relevant TSO or to the entity acting on behalf of the TSO (see §3.5.1), which can yield data exchanges, when relevant.

Buy and Sell Volumes (see "E" flow)

In order to achieve physical settlement of the balance responsible entities (hereinafter "BR") on the day-ahead and intraday markets, RTE must receive the volume of buys and sells by BR for each Hub.

The Central Counter Parties nominate these volumes to RTE for clearing and settlement of buys and sells of energy on each Hub.

Requirement 6: the Central Counter Party associated with each NEMO must transmit to RTE the buys and sells data by balance responsible entity on its Hub, corresponding to the matched orders determined at the end of the market coupling process, as well as to the exchanges and transfers of energy within France Bidding Zone and with other Bidding Zones. For each Hub and each market time unit, the sum of all volumes of buys and sells transferred to RTE must be balanced (i.e. equal to zero).

The balance constraints for buys and sells for each Hub ensues from the exchanges and transfers of energy principles described in §3.5.

Each NEMO must also send to RTE the data necessary for the determination of Reference Spot Price in the France Bidding Zone (see §3.4.2).

3.3. Cases of decoupling

The purpose of this section is to present the various possible decoupling cases for the France Bidding Zone and its consequences[14].

3.3.1. France partly decoupled

This is the result of a decoupling situation on one or more borders between France and its neighboring countries without necessarily decoupling of the France Bidding Zone on all its borders.

In this case, the backup solutions for the explicit allocation of cross-zonal capacities are activated on the decoupled borders.

Requirement 7: in the event of a partial market decoupling of France, the Market coupling algorithm must consider that there is no exchange limitation for matching of the orders transmitted by the French NEMO. For day-ahead market coupling, it must provide as output one single price and net position in the France Bidding Zone per market time unit.

[14] The detailed description of the various cases of decoupling and backup procedures applied are defined in the relevant market coupling solutions.

3.3.2. France fully decoupled

This situation results from decoupling of all of the France Bidding Zone: the orders from the France Bidding Zone are therefore no longer matched with orders in the other Bidding Zones. The total decoupling of France may be the result of a local problem specific to France, or a global problem causing the total decoupling of several Bidding Zones.

In this case, the backup solutions for the explicit allocation of cross-zonal capacities are activated on all the French borders.

Requirement 8: in the event of a full decoupling of France on day-ahead timeframe, the prices of each Hub are determined by each NEMO.

Backup solutions enabling the local market coupling of Hubs in France by the French NEMO in this case could be examined later (this is outside the scope of the Multi-NEMO Arrangements on the date of this document).

3.3.3. Market coupling of France with a part of the NEMO

This case is specific to the situation where several NEMOS are active in France.

It corresponds to the situation where a technical problem prevents at least one of NEMO from participating in the market coupling process. For example, this event may occur if one of the NEMO is unable to transmit the orders from its power exchange members to the market coupling algorithm.

In this situation, the bids from the power exchange members of the non-coupled NEMO are isolated. Furthermore, in the day-ahead timeframe, these power exchange members do not have access to the cross-zonal capacities used for market coupling.

Requirement 9: it is the responsibility of each NEMO to ensure access to the market coupling to its power exchange members, and to use its best efforts to avoid side effects of the technical failure of one NEMO which would prevent the power exchange members of the other NEMO to participate to the market coupling.

Requirement 9 bis: in the event of non-participation of one (or more) NEMO in the day-ahead market coupling, this(these) NEMO determines locally the Hub price of its Hub. This means that the day-ahead market coupling algorithm has to only consider the orders transmitted by other French NEMO, and must provide as an output one single price and net position in the France Bidding Zone per market time unit.

In the event of partial market decoupling AND a market coupling with a part of the NEMO, the principles mentioned in §3.3.1 also apply.

3.4. Price references (day-ahead timeframe)

3.4.1. Types of prices

In the day-ahead market coupling sessions taking place nominally, the price of all Hubs is identical in the Bidding Zone France.

In certain cases of decoupling (France totally decoupled or market coupling of France with a part of the NEMO), the existence of several power exchange operators in the France Bidding Zone may imply determining different prices per Hub[15].

Three types of prices are thus defined for the France Bidding Zone:

1- The price determined by the day-ahead market coupling algorithm for the France Bidding Zone (hereinafter "day-ahead market coupling price"),

2- The price of each Hub, equal to the day-ahead market coupling price for the France Bidding Zone, except under certain cases of decoupling:

Requirement 10: for day-ahead timeframe, each NEMO owns the price determined on its Hub from the day-ahead market coupling, and its responsibility for publication. Except in the event of market decoupling of all of France or the market coupling of France with a part of the NEMO, the price of each Hub is necessarily equal to the price determined by the day-ahead market coupling algorithm for France.

3- The Reference Spot Price for the France Bidding Zone (hereinafter "Reference Spot Price"), is equal to the day-ahead market coupling price for the France Bidding Zone, except under certain cases of decoupling. This price is unique for the France Bidding Zone.

Principle 5: for day-ahead timeframe, RTE is responsible for determining and publishing the Reference Spot Price for the France Bidding Zone. Except in the event of full decoupling of France or the market coupling of France with a part of the NEMO, the Reference Spot Price is equal to the day-ahead market coupling price for France Bidding Zone.

3.4.2. Reference Spot Price

Let be, for a Hub and a given market time unit:

[15] The calculation of prices on each Hub includes local rounding operations, which may occasionally yield differences with the unrounded price provided as output of the day-ahead market coupling algorithm, these differences remaining only within a technical tolerance range. The handling of such differences will be detailed during the implementation phase of Multi-NEMO Arrangements.

- $Buys_h$: volume of the power exchange members buy bids selected by the market coupling on h for this market time unit,
- $Sells_h$: volume of the power exchange members sell offers selected by the market coupling on h for this market time unit,
- $Price_h$: price of h for this market time unit.

Principle 6: for a given market time unit, the Reference Spot Price of the France Bidding Zone for day-ahead timeframe is defined as the average price of the Hubs, weighted by the volume of buys and sells of the power exchange members on this Hub.

The following formula is thus applied in case the prices of each Hub are not identical for France Bidding Zone:

$$Price_{FR} = \frac{\sum_{h \in hubs}[(Buys_h + Sells_h) \times Price_h]}{\sum_{h \in hubs}[Buys_h + Sells_h]}$$

Requirement 11: for the day-ahead timeframe, in addition to the output of the day-ahead market coupling algorithm, each NEMO must provide RTE with the data from its Hub necessary for the Reference Spot Price determination in the France Bidding Zone.

3.4.3. Summary

The table below shows the different uses of the three types of price:

Type of price	Uses
Day-ahead market coupling price	Determination of congestion income
Price of each Hub	Settlement of offers on each Hub Publication
Reference Spot Price	Market rules Publication

Table 2: uses of the three types of price

The table below shows the different specific cases for determining the price of each Hub and the Reference Spot Price:

Case	Price on each Hub	Reference Spot Price
Nominal	Day-ahead market coupling price	Day-ahead market coupling price
France partly decoupled	Day-ahead market coupling price	Day-ahead market coupling price
France totally decoupled	Price determined by each NEMO[16]	Average price of Hubs, weighted by volumes of buys and sells of the power exchange members

[16] In case a backup solution enabling the local coupling of Hubs in France is implemented, there will be a single price for the France Bidding Zone.

Case	Price on each Hub	Reference Spot Price
Market coupling of France with a part of the NEMO	For the coupled NEMO : price determined by the day-ahead market coupling algorithm Else, price determined by each uncoupled NEMO	Average price of Hubs, weighted by volumes of buys and sells of the power exchange members

Table 3: cases for determining the day-ahead prices

3.4.4. Impact on the market rules

This paragraph shows the impact of prices defined in §3.4.1 on the market rules in force on the date of this document. Some rules make in fact reference to the sole market operator established in France prior to the designation of NEMO in the CACM regulation (hereinafter "historical operator"[17]).

The detailed modifications will be defined in the effective market rules updates (see §4.2).

Rules relative to Programming, the Balancing Mechanism and Recovery of Balancing Charges (see [3])

The rules relative to balancing mechanism refers to historical operator several times. The main impact concerns the definition of the price of the imbalance settlement for a balance responsible entity.

The method currently in force until 1st January 2017 defines the imbalance settlement price of a balance responsible entity according to the system's trend and the imbalance of this participant, and uses the spot price of the historical operator in certain combinations of trends ("price matrix").

Starting from 1st January 2017, RTE proposes in the rules [3] to change the pricing method to move towards a method that no longer uses the spot price of the historical operator, in anticipation of the network code "Electricity Balancing".

Given the assumption that the Multi-NEMO Arrangements are implemented after the next update of version of rules [3] in 2017 (see planning in §4.3), the definition of the imbalance settlement price of a balance responsible entity will not use the spot price of the historical operator anymore. In the rules update, it will be thus only necessary to update the definition of the reference price according to the definition given in the present document, for the other uses of this price in the rules.

[17] This operator is EPEX SPOT.

Moreover, management of the case of late delivery of the market coupling results should be reviewed to take into account the process established for communicating results by the NEMO to RTE for each Hub.

Rules on the Balance Responsible Entity system, Chapters A to D (see [4])

So far, the processes of spatial and temporal reconciliation of imbalances of a balance responsible entity and management of unscheduled unavailability of the Upstream Network have been using the spot price of the historical operator as the reference spot price for evaluating the compensation for the balance responsible entity.

Thus it will be necessary to redefine the reference spot price in conformity with the Multi-NEMO Arrangements.

Ancillary Services Rules (see [5])

Modifications to be made on the rules consist in eliminating:

- the reference to the spot price determined by the historical operator (used among others for the price of compensation for activated reserves, the daily cross-border schedule limit and the amount of Compensation related to a negative Reserve Balance), which must be replaced by the Reference Spot Price and the associated definition in accordance with the Multi-NEMO Arrangements,
- The reference to the historic operator, which must be replaced by a generic reference to the NEMO operating in France.

3.5. Exchanges and transfers of energy

3.5.1. Types of settlement

The energy transfers between France and other Bidding Zones, determined by the market coupling processes, result in settlements that are of two different types:

- Physical settlement: performance of the exchange of energy, which is linked to the responsibility of a balance perimeter,
- Financial settlement: financial settlement of exchanged energy, which requires collaterals between the involved entities.

Principle 7: The related to financial and physical settlements are performed by the NEMOs.

3.5.2. Tasks related to financial and physical settlements

The energy transfers between France and other Bidding Zones, determined by the market coupling processes, result in financial and physical settlements at several levels:

On each Hub (or "Intra-Hub")

The Central Counter Party[18] (hereinafter "CCP") of each Hub is charged with the financial settlement of the market participants buys and sells orders selected by the coupling process: it is the financial intermediary between the buyers and the sellers.

The financial settlement between the power exchange members and their Central Counter Party on each Hub are organized by the Central Counter Parties and their respective clearing/settlement banks.

Principle 8: the delivery of energy exchanged by power exchange members on each Hub is carried out by RTE, which performs the physical settlement with each relevant actor according to information transmitted for each Hub by the corresponding Central Counter Party.

Given that all the Bidding Zones are coupled, the buys and sells volumes of the power exchange members of each Hub are not necessarily balanced, which is possible through:

- Energy exchanges between Hubs,
- Energy transfers between Bidding Zones.

At the end of the physical and financial settlement process associated with the market coupling, each CCP must be balanced: on each Hub, the volume of the quantities bought must equal the volume of quantities sold. These volumes are thus both derived from:

- The power exchange members bids selected by the market coupling,
- The energy exchanges with Shipping Agents or other Hubs (see below).

On France Bidding Zone (or "Intra-zonal")

In order to allow the energy transfers between coupled Bidding Zones, the Central Counter Parties are in charge of implementing energy exchanges (or "intra-zonal exchanges"):

- Between Hubs, where required,
- With Shipping Agents, which must register on the Hubs the buys and sells orders corresponding to energy to be transferred per border (see hereafter).

In this document, the Central Counter Party(ies) involved in these tasks will be referred to as "Zonal Central Counter Parties" (hereinafter "ZCCP"). The resulting financial clearing and settlements are done between Central Counter Parties on one hand, and between Zonal Central Counter Parties and Shipping Agents on the other hand.

[18] In this document, this term is always used with the same meaning as in the CACM Regulation. Therefore it doesn't necessary imply that CCP and NEMO are separate entities.

Principle 9: the delivery of energy exchanged between Zonal Central Counter Parties and Shipping Agents on France Bidding Zone is carried out by RTE, which performs the physical settlement with the relevant entities according to information transmitted for each Hub by the corresponding Central Counter Party.

Between France Bidding Zone and the other Bidding Zones (or "cross-border")

In order to allow the energy transfers with other coupled Bidding Zones (or "cross-zonal transfers"), the Central Counter Parties are in charge of organizing the energy transfers with the Central Counter Parties of the other Bidding Zones, as well as the corresponding financial settlement.

In this document, the entity(ies) performing this task will be referred to as « Shipping Agents » (hereinafter « SA »). The resulting financial clearing and settlements are done between Shipping Agents.

Principle 10: the delivery of energy transferred by Shipping Agents with other coupled Bidding Zone is carried out by RTE, which performs the physical settlement with the Shipping Agents according to cross-border nominations they transmit to RTE.

When the implicit allocation is performed through an auction (day-ahead market coupling), in case of different prices on coupled Bidding Zones between which the energy is transferred, the Shipping Agents collect the congestion income resulting from price difference and transferred energy volume. This congestion income is transferred to the relevant TSO or to the entity acting on behalf of the TSO. The corresponding financial settlements are defined in regional contracts between TSO (or to the entity acting on behalf of the TSO) and Shipping Agents (see §3.6.2).

Principle 11: for the day-ahead market coupling, in case of different prices on the Bidding Zones, the financial settlement of the energy transfer with other coupled Bidding Zones is associated with a transfer of the congestion income by the Shipping Agents to the TSO (or to the entity acting on behalf of the TSO).

Illustrative example

The figure below shows the tasks previously detailed. It uses the simplified example of day-ahead market coupling between two Bidding Zones of bids A and B each composed of a single Hub and TSO. In each Bidding Zone, there is only one Central Counter Party which is thus the same as the Zonal Central Counter Party.

For illustration purposes, different entities have been defined as Shipping Agent on each Bidding Zone, they perform the transfer in the direction A to B in relation to one another.

The quantity of energy transferred from Bidding Zone A to Bidding Zone B corresponds to the difference between the selected buys and sells orders in each Bidding Zone. In the example, the

Shipping Agent of Bidding Zone A buys the energy from the Central Counter Party of Bidding Zone A and the Shipping Agent of Bidding Zone B sells this energy to the Central Counter Party in Bidding Zone B. Specific financial settlement modalities may be implemented, when relevant, between the two entities defined as Shipping Agents.

This example highlights the need for specific management of energy exchanges between the Central Counter Parties and Shipping Agents in a Bidding Zone where multiple NEMO (and thus multiple Central Counter Parties) operate, which is possible thanks to the Zonal Central Counter Parties.

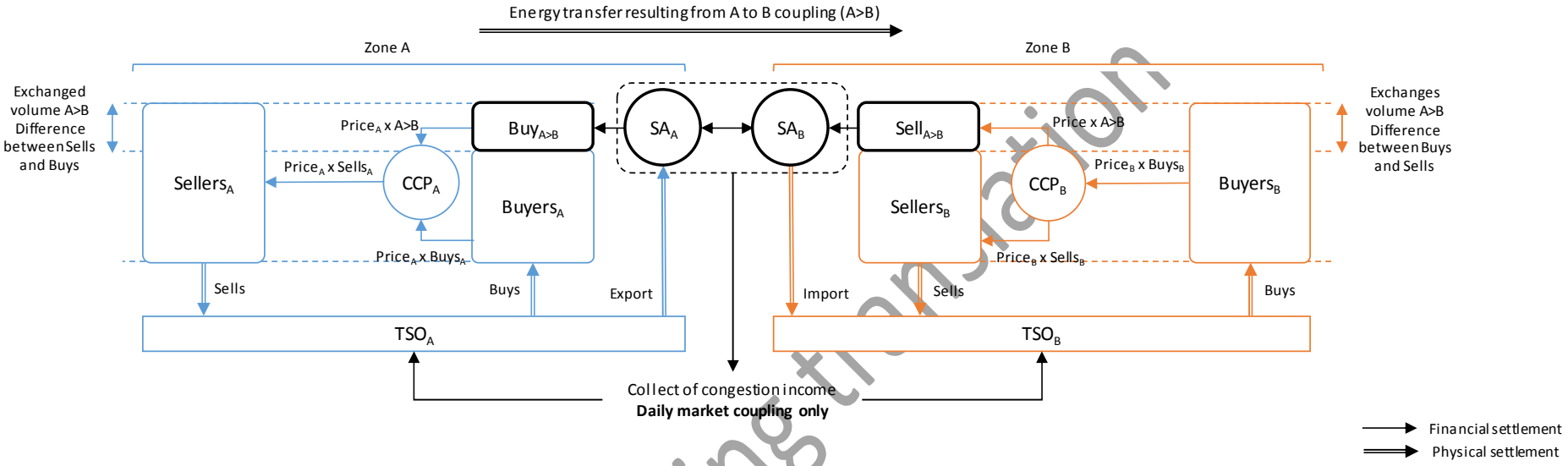

Figure 6: example illustrating the principles of day-ahead physical and financial exchanges

3.5.3. Details of intra-zonal settlement

Requirement 12: for each timeframe, each Shipping Agent must buy or sell on the Hubs associated to the Zonal Central Counter Parties the energy volume that it must export or import. In total, these power quantities bought or sold by the Shipping Agents corresponds to the net position of the France Bidding Zone (up to a certain technical tolerance due to energy rounding).

The corresponding energy movements will be imputed in a dedicated balance perimeter by Shipping Agent which management will be contractualized with RTE.

On each relevant Hub, the corresponding buys and sells of energy by the Shipping Agents are recorded by the Zonal Central Counter Party which transmits these to RTE within the list of buys and sells volumes on this Hub (see §3.2.4).

Requirement 13: for each timeframe, the energy exchanges within France Bidding Zone will be performed by the Zonal Central Counter Parties which will buy (respectively sell) on the other Hubs the quantity of energy corresponding to the balance between buys and sells of their Hub where relevant.

The corresponding energy movements will be imputed in a dedicated balance perimeter by Zonal Central Counter Party whose management will be contractualized with RTE.

On each relevant Hub, the buys and sells of energy corresponding to energy exchanges are recorded by the corresponding Central Counter Party which transmits these to RTE within the list of buys and sells volumes on this Hub (see §3.2.4).

Following these operations, the balance of buys and sells is balanced on all Hubs.

Principle 12: for each timeframe, the energy exchanged by the Zonal Central Counter Parties within France Bidding Zone will be determined according to the Scheduled Exchanges Resulting from Market Coupling, which will have to be calculated at a Hub level[19].

Applicable French contractual framework for energy exchanges in the France Bidding Zone is given in §3.6.1.

Elements related to the definition of entities acting as Zonal Central Counter Parties are given in §4.1.1.

[19] The calculation of Scheduled Exchanges Resulting from Market Coupling at a Hub level within each bidding zone will be developed during the implementation phase of the day-ahead and intraday market coupling solutions in accordance with the Methodologies for calculating scheduled exchanges resulting from single day-ahead and intraday coupling, pursuant to Articles 43 and 56 of the CACM Regulation.

3.5.4. Details of cross-border settlement

Requirement 14: for each timeframe, each Shipping Agent will register with RTE the cross-border nominations according to the energy volumes that it must export or import, pursuant to modalities defined between RTE and each Shipping Agent.

The corresponding energy movements will be imputed in a dedicated balance perimeter by Shipping Agent which management will be contractualized with RTE.

Where relevant, the congestion income associated to the energy transfer will be transferred by the Shipping Agents to the relevant TSO (or to the entity acting on behalf of the TSO).

On the balance perimeter of each Shipping Agent, the quantity of energy bought and/or sold with the Zonal Central Counter Parties is thus balanced with the cross-border nominations.

Principle 13: for each timeframe, the energy volumes transmitted in the cross-border nominations of the Shipping Agents will be determined according to the Scheduled Exchanges Resulting from Market Coupling, which will have to be calculated at a Hub level[20].

The limitations applicable to the definition of Shipping Agents will be established according to the constraints linked to calculation of scheduled exchanges resulting from market coupling, where relevant. Depending on the cases, it could be necessary to limit the number of Shipping Agents defined for a given border and direction.

Applicable French contractual framework for energy transfers with other Bidding Zones is given in §3.6.1.

Elements related to the definition of Shipping Agents are given in §4.1.2.

3.5.5. Management of exchanges and transfers of energy in case of decoupling

France partly decoupled

The transfer of power is only performed on coupled borders (see §3.3.1): the Shipping Agents defined on the coupled borders perform the energy transfers with the other Shipping Agents, and the corresponding financial settlement.

[20] The calculation of Scheduled Exchanges Resulting from Market Coupling at a Hub level between bidding zones will be developed during the implementation phase of the day-ahead and intraday market coupling solutions in accordance with the Methodologies for calculating scheduled exchanges resulting from single day-ahead and intraday coupling, pursuant to Articles 43 and 56 of the CACM Regulation.

France fully decoupled

With France totally decoupled, there is no more energy exchanges or transfers between Zonal Central Counter Parties or between Zonal Central Counter Parties and Shipping Agents in the France Bidding Zone (see §3.3.2).

Only the Central Counter Parties ensure their role for each Hub: given that these are isolated, the volume of buys and sells are identical[21].

Market coupling of France with a part of the NEMO

The energy transfer with the other Bidding Zone is made from the coupled Hubs only.

The Zonal Central Counter Parties have thus to perform energy exchanges

- between coupled Hubs when relevant,
- with Shipping Agents defined on coupled borders.

The uncoupled Hubs (on which a different price will be calculated in day-ahead timeframe) do not participate in the market coupling and therefore are not involved in the corresponding exchanges and transfers of energy.

Requirement 15: except in the case of the total decoupling of France, the defined Zonal Central Counter Parties and Shipping Agents must ensure the exchanges of energy between coupled Hubs and the energy transfers on coupled borders.

3.5.6. Energy rounding management

Since rounding may occur in the various stages of the calculation of the market coupling data output, the sum of the scheduled exchanges resulting from the market coupling is not necessarily strictly equal to the net position for a given Bidding Zone. This means that the balance between the buys and sells recorded by the Zonal Central Counter Parties might not strictly be equal to zero.

Requirement 16: for each timeframe, the Zonal Central Counter Parties will record the buys and sells of residual disparities, if any, on their Hubs to guarantee the exact balance of the buys and sells. The corresponding quantities will be imputed in a dedicated balance perimeter whose management terms will be contractualized with RTE.

[21] If a backup solution would enable the local market coupling of Hubs in France by the French NEMO, the Zonal Central Counter Parties would perform energy exchanges between Hubs, where relevant.

In order to simplify the management of physical settlement by RTE, one single balance perimeter will be used for imputation of residual disparities[22].

3.5.7. Details of energy movements

Requirement 17: The sum of buys and sells volumes on all Hubs after the energy exchanges in the France Bidding Zone and the energy transfers with other Bidding Zones is balanced (i.e. equal to zero).

Illustrative example

The diagram on the following page give an example for exchanges and transfers of energy between Central Counter Parties, Zonal Central Counter Parties and Shipping Agents. For illustration purposes, it uses the example of a Bidding Zone with three NEMO, two Zonal Central Counter Parties and two different Shipping Agents:

- $ZCCP_1$ exchanges energy with CCP_2 and $ZCCP_3$,
- SA_1 performs the energy transfer in export, in conjunction with the SA defined for the import direction in the neighboring Bidding Zones, which is the same in the example. It buys its energy on Hub 1,
- The SA_2 performs the transfer in import, in conjunction with the SA defined for the export direction in the neighboring Bidding Zones, which is the same in the example. It sells its energy on Hub 3.

[22] Depending on technical and contractual feasibility by RTE, and according to possible constraints expressed by NEMO, one balance perimeters could however be used for each Zonal Central Counter Party. This topic will be detailed and addressed during the implementation phase of the Multi-NEMO Arrangements.

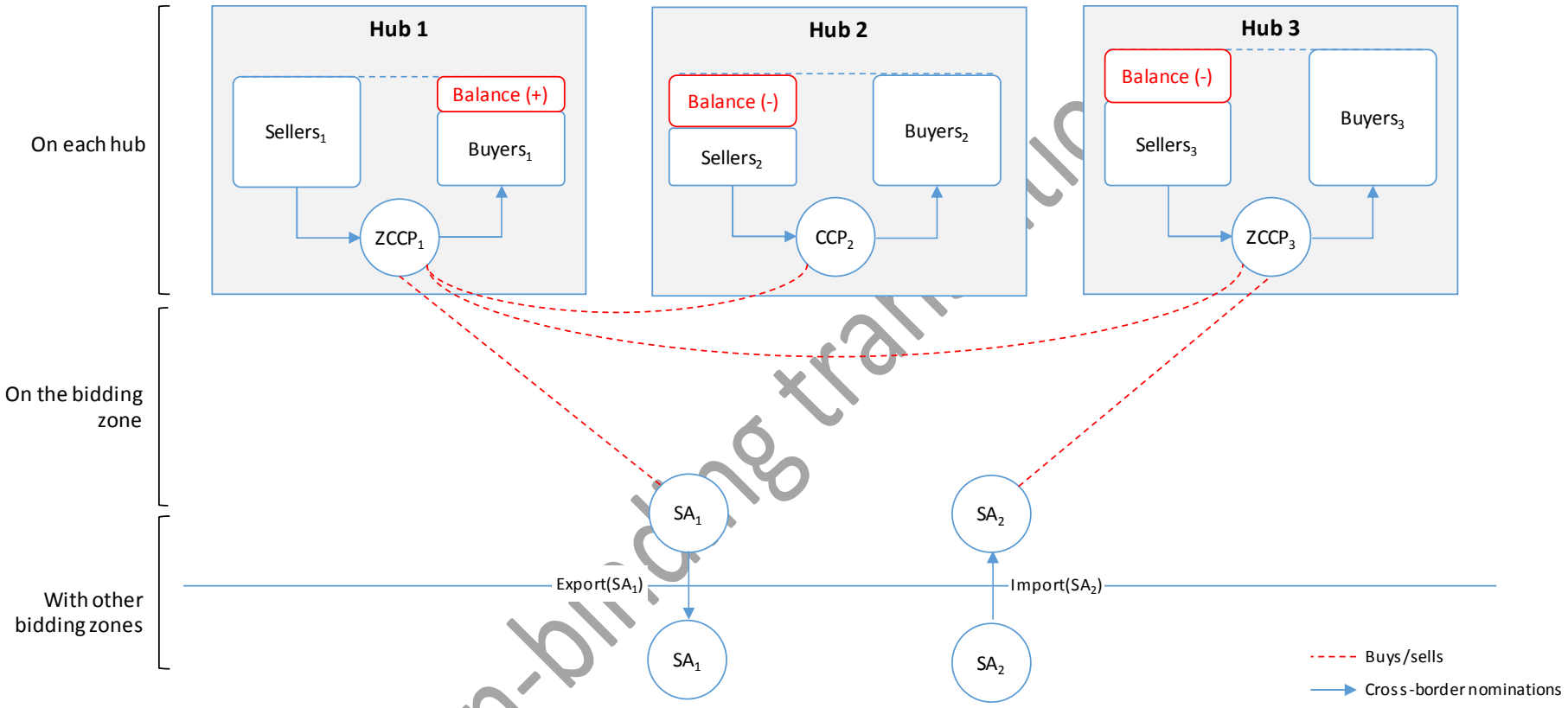

Figure 7: example of energy exchanges and transfers between the CCP, ZCCP and SA

Buys and sells recorded on a Hub for each timeframe

For a given Hub:

Participant	Buy	Sale
Power Exchange Members	Buy orders selected after the market coupling	Sell orders selected after the market coupling
ZCCP	Buy order corresponding to the balance sells and buys	Sell order corresponding to the balance between buys and sells

Table 4: list of buys and sells recorded on the Hub of a CCP

For a Hub corresponding to a Zonal Central Counter Party:

Participant	Buy	Sale
Power Exchange Members	Buy orders selected after the market coupling	Sell orders selected after the market coupling
ZCCP of the Hub	Buy order corresponding to the quantity sold on the other Hubs	Sell order corresponding to the quantity bought on the other Hubs
Other ZCCP	Buy order	Sell order
Export Shipping Agent	Buy orders corresponding to the quantities to be exported from the Bidding Zone France	
Import Shipping Agent		Sell orders corresponding to the quantities to be imported to the Bidding Zone France
ZCCP of the Hub	Buy order corresponding to the residual disparities between the sells and buys on the Hub, if any	Sell order corresponding to the residual disparities between the buys and sells on the Hub, if any

Table 5: list of buys and sells recorded on the Hub of a ZCCP

Energy movements on balance perimeters for each timeframe

Principle 14: the perimeters used by the entities defined as Zonal Central Counter Parties and Shipping Agents for the power transfers are different per timeframe, and framed by specific contractual terms.

The energy movements of energy of entities defined as Zonal Central Counter Parties and Shipping Agents will be imputed in following balance perimeters:

Participant	Perimeter
Each entity defined as Shipping Agent	Balance perimeter used for the energy transfers with other Bidding Zones
Each entity defined as Zonal Central Counter Party	Balance perimeter used for the energy exchanges with other Hubs in the French Bidding Zone

Participant	Perimeter
All the Zonal Central Counter Parties	Specific balance perimeter used for energy rounding management[23]

Table 6: balance perimeters used by ZCCP and SA

In order to simplify the management of physical settlement by RTE, a given entity defined as Shipping Agent will use the corresponding balance perimeter also for the energy transfer within France Bidding Zone if it is defined as Zonal Central Counter Party as well, with the same contractual terms[24]. The balance perimeter used for energy rounding management is specific in all cases.

The energy movements imputed on the balance perimeter of each Zonal Central Counter Party are as follows:

Movement	Injection	Withdrawal
Buys on the other Hubs	Buy orders corresponding to the positive difference between the sells and buys of the power exchange members of the other Hubs	
Sells on the other Hubs		Sell orders corresponding to the positive difference between the buys and sells of the power exchange members of the other Hubs
Buys on the Hub of the ZCCP	Buy orders corresponding to the quantity sold on the other Hubs	
Sales on the Hub of the ZCCP		Sell orders corresponding to the quantity bought on the other Hubs

Table 7: power movements recorded on the balance perimeter of the ZCCP

The energy movements imputed on the balance perimeter of each Shipping Agent are as follows:

[23] Depending on technical and contractual feasibility by RTE, and according to possible constraints expressed by NEMO, different balance perimeters could be still used in this case. This topic will be detailed and addressed during the implementation phase of the Multi-NEMO Arrangements.

[24] Depending on technical and contractual feasibility by RTE, and according to possible constraints expressed by NEMO, different balance perimeters could be still used in this case. This topic will be detailed and addressed during the implementation phase of the Multi-NEMO Arrangements.

Movement	Injection	Withdrawal
Buys/Sells on the Hubs	Quantity to be exported from Bidding Zone France	Quantity to be imported to Bidding Zone France
Exports/Imports	Quantity to be imported per border to Bidding Zone France	Quantity to be exported per border from Bidding Zone France

Table 8: power movements on the balance perimeter of the Shipping Agents

The energy movements imputed on the balance perimeter used for energy rounding management are as follows:

Movement	Injection	Withdrawal
Buys of residual disparities	Buy orders corresponding to the residual disparities between the sells and buys on the Hub, if any	
Sales of residual disparities		Sell orders corresponding to the residual disparities between the buys and sells on the Hub, if any

Table 9: power movements on the balance perimeter for energy rounding management

Only remaining imbalances between sum of the scheduled exchanges resulting from the market coupling and the net position of Bidding Zone France are imputed to the balance perimeter used for energy rounding management (see §3.5.6).

3.5.8. Involved entities

The figure hereafter synthetizes the entities involved in each task described in §3.5.1 following principles and requirements described in the previous chapters:

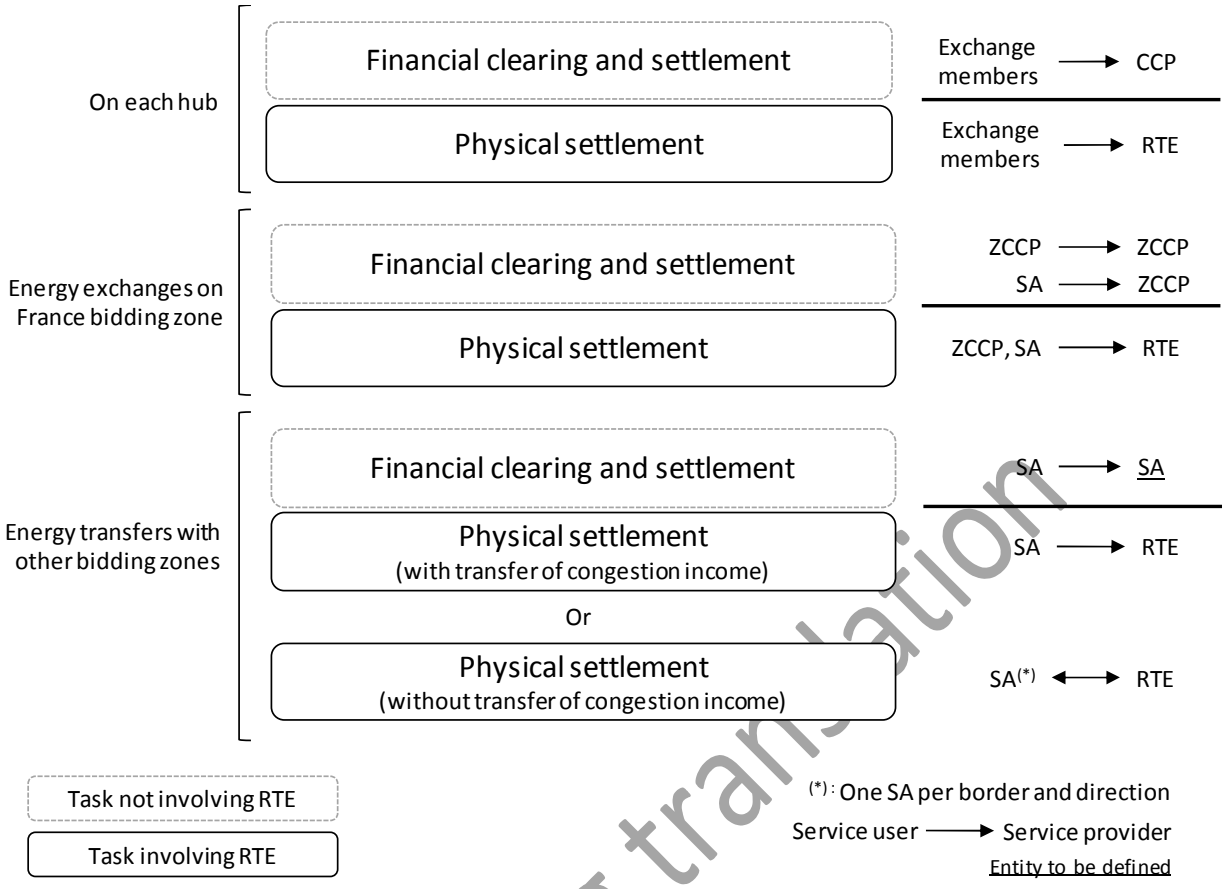

Figure 8 : entities involved in energy exchanges and transfers

The transfer of congestion income is associated to energy transfer for day-ahead market coupling, for which one Shipping Agent has to be defined per border and direction.

3.6. Contractual architecture

3.6.1. At the French level

The contracts listed below are to be signed between RTE and the NEMO (and/or the Central Counter Parties and/or the entities defined as Shipping Agents)[25]. Terms for financial cooperation in these contracts will have to be set following agreements on cost sharing and recovery of national costs. The later agreements will have to be agreed between relevant parties and CRE, according to dispositions of CACM regulation.

[25] The contracts to be established between the NEMO and/or the entities defined as Shipping Agents or Central Counter Party are not listed.

Day-ahead market coupling

The following contracts are required:

Contract	Signatories	Contents
Contract for operational and financial cooperation	RTE, each NEMO	Terms for local operational and financial cooperation between RTE and each NEMO for the processes concerned, in particular for the transmission of price data
Contract for operational and financial cooperation	RTE, each CCP[26]	Terms for local operational and financial cooperation between RTE 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, if any (for a ZCCP)
Contract for energy rounding management	RTE, all entities defined as ZCCP for day-ahead timeframe	Terms for local operational and financial cooperation between RTE and the Zonal Central Counter Parties for managing energy rounding
Contract for cross-border nomination	RTE, each entity defined as SA for day-ahead timeframe	Contractual and operational terms for cross-border nomination performed for the day-ahead market coupling
Contract for the use of market data	RTE, each NEMO	Terms of use for the matched volumes and prices calculated by each NEMO on its Hub

Table 10: list of local contracts for day-ahead market coupling

For day-ahead market coupling, the Shipping Agents are the only actors performing cross-border nominations for the transfer of energy on the coupled borders, the market participants performing no cross-border nomination at this timeframe thanks to the market coupling. Thus, entities involved in these transfers (ZCCP and SA) will:

- apply specific cross-border nominations modalities (see "contract for cross-border nomination"), but no participation agreement in the rules on access to the French public power transmission system for imports and exports (hereinafter "AP ITR"),
- use balance perimeter according to specific modalities (see "contract for operational and financial cooperation"), but no agreement of participation in the rules relating to the balance responsibility entity system (hereinafter "AP RE").

[26] If this is a separate entity for a given NEMO, else only one contract for operational and financial cooperation could be defined.

In addition to the above listed contracts, a contract for operational and financial cooperation could be defined between RTE and all the French NEMO[27]: this all-party contract could indeed group common technical and financial modalities applicable to day-ahead market coupling.

Intraday market coupling

The following contracts are required:

Contract	Signatories	Contents
Contract for operational and financial cooperation	RTE, each NEMO	Terms for local operational and financial cooperation between RTE and each NEMO for the processes concerned This contract can possibly be the same as for day-ahead timeframe
Contract for operational and financial cooperation	RTE, each CCP[28]	Terms for local operational and financial cooperation between RTE and each CCP for the processes concerned, in particular for: - the transmission of buy and sell orders, - the physical settlement of energy exchanges, if any (for a ZCCP) This contract can possibly be the same as for day-ahead timeframe
Contract for energy rounding management	RTE, all entities defined as ZCCP for intraday timeframe	Terms for local operational and financial cooperation between RTE and the Zonal Central Counter Parties for managing energy rounding
AP RE	RTE, each entity defined as SA for intraday timeframe	Participation Agreement as Balance Responsible[29] for the balance perimeter of cross-border nomination performed for intraday market coupling, this balance perimeter is used also if the entity is defined as ZCCP, when relevant
AP ITR	RTE, each SA defined for intraday timeframes	Participation agreement in the rules on access to the French public power transmission system for imports and exports[30] for cross-border nomination performed for intraday market coupling

Table 11: list of local contracts for intraday market coupling

[27] This point will be addressed during the implementation phase of the Multi-NEMO Arrangements.

[28] If this is a separate entity for a given NEMO, else only one contract for operational and financial cooperation could be defined.

[29] In accordance with the current version of the Rules on the Balance Responsible Entity System.

[30] In accordance with the current version of the Access Rules for the French Public Transport Network of Imports and Exports.

For intraday market coupling, the Shipping Agents are not the only actors performing cross-border nominations for the energy transfer, due to the possibility of explicit allocation in parallel. Consequently, the Shipping Agents shall apply the Rules on the Balance Responsible Entity System and Access Rules for the French Public Transport Network of Imports and Exports the same way as the other market participants using the intraday explicit allocation process.

In addition to the above listed contracts, a contract for operational and financial cooperation could be defined between RTE and all the French NEMO[31]: this all-party contract could indeed group common technical and financial modalities applicable to intraday market coupling.

3.6.2. At the regional level

The contracts listed below are to be signed between RTE, the French NEMO (and/or the Central Counter Parties and/or the entities defined as Shipping Agents) as well as other TSOs and other NEMO.

Given that these contracts are not uniquely specified by RTE, the list below is provided for information purposes only[32].

Day-ahead market coupling

- Contracts setting the daily market coupling modalities between TSO and NEMO between all regions,
- Contracts setting the daily market coupling modalities between TSO and NEMO for a given region,
- Contracts setting the common and regional cost sharing between TSO and NEMO, according to dispositions of CACM regulation,
- Contracts setting the modalities of collect and transfer of congestion income following daily market coupling between the relevant TSO or to the entity acting on behalf of the TSO.

Intraday market coupling[33]

- Contracts setting the intraday market coupling modalities between TSO and NEMO between all regions,

[31] This point will be addressed during the implementation phase of the Multi-NEMO Arrangements.
[32] Note that all existing versions of these contracts have in any case to be reviewed in order to take into account the provisions of the CACM regulation.
[33]For the intraday market coupling, these regional contracts have not been created yet, contrary to the regional contracts in force for the daily market coupling (as concluded before designation of the NEMO).

- Contracts setting the intraday market coupling modalities between TSO and NEMO for a given region,
- Contracts setting the common and regional cost sharing between TSO and NEMO.

3.7. Rules applicable to the market coupling processes

The execution of day-ahead and intraday market coupling processes relies on the regional procedures established between the NEMO and the TSOs.

Requirement 18: to participate in the market coupling process, the NEMO must respect the corresponding rules defined at the regional level between the TSOs and the NEMO.

For day-ahead timeframe, these procedures have been defined within the framework of the projects for implementing the day-ahead market coupling solution.

For intraday timeframes, these procedures will be defined within the XBID project.

Principle 15: concerning the existing market coupling process (like the day-ahead market coupling), RTE can provide the details of applicable procedures corresponding to the French NEMO upon request.

4. Elements associated with the Multi-NEMO Arrangements

The following chapters give an overview on the topics to be addressed once the Technical Solution is approved by CRE, in order to allow the implementation of the Multi-NEMO Arrangements.

4.1. Definition of entities involved in the exchanges and transfers of energy

4.1.1. Intra-zonal settlement

Multi-NEMO arrangements allow one or several Zonal Central Counter Party(ies) to operate on the France Bidding Zone, all Central Counter Parties not being necessary zonal ones.

In the case where only certain Central Counter Party(ies) would be defined as zonal ones for one or both timeframe(s), the NEMO would establish relevant arrangements, which could pose problems regarding the competition laws. Failing that, a transparent and non-discriminatory designation process would have to be carried out after the approval of the Technical Solution. RTE however points out that modalities (technical or legal) needed to perform such a process, which feasibility remains to be assessed, is still to be defined. Especially, without need particular to Zonal Central Counter Parties tasks for intra-zonal energy exchanges (see §3.5.1), RTE considers that without any legal basis, it would have difficulty to be the entity in charge of the designation of the Zonal Central Counter Party(ies): no service is rendered to RTE in this context, it is more about a service rendered by RTE to the NEMO and market participants (physical settlement).

Since this scenario seems too complex to implement, it is preferable to define each Central Counter Party as Zonal Central Counter Party for each timeframe: there is thus no need of a designation process as such.

Principle 16: Each NEMO shall designate the entity in charge of the tasks defined for Zonal Central Counter Parties for each timeframe in the Multi-NEMO Arrangements. By default, each entity acting as Central Counter Party will be considered as a Zonal Central Counter Party, unless the relevant NEMO designates another entity.

French NEMO have to settle arrangements between Zonal Central Counter Parties and Shipping Agents applicable to energy exchanges on the France Bidding Zone[34]. The corresponding contractual framework, which will be defined among NEMO only without any action of RTE, will determine among others, applicable terms and conditions, and allow for a Central Counter Party

[34] The determination of these modalities will take into account the associated financial constraints, when relevant.

associated to a new NEMO in the Bidding Zone France to join in a non-discriminatory and cost-efficient manner.

4.1.2. Cross-border settlement

Multi-NEMO arrangements as defined in the §3 allow possibly one or several entities to be defined as Shipping Agent on the French borders, without having necessary correspondence between the numbers of these entities and the French borders.

According to the same principles as for the intra-zonal settlements, each Central Counter Party is defined by default as Shipping Agent.

Principle 17: Each NEMO shall designate the entity in charge of the tasks defined for Shipping Agents for each timeframe in the Multi-NEMO Arrangements. By default, each entity acting as Central Counter Party will be considered as a Shipping Agent, unless the relevant NEMO designates another entity.

French NEMO have to settle arrangements between Shipping Agents applicable to energy transfers with other Bidding Zones[35] in coordination with the other Bidding Zones on each border, while taking into account:

- The configuration on the other Bidding Zone, especially in case of legal national monopoly,
- The modalities of definition of entities and the possible constraints related to the Multi-NEMO Arrangements defined in the other Bidding Zone,
- When relevant (see §3.5.3), the constraints applicable to the definition of Shipping Agents.

The corresponding contractual framework, which will be defined without any action of RTE, will determine among others, applicable terms and conditions, and allow for a new entity to join in a non-discriminatory and cost-efficient manner.

Pursuant to article 68(6) of CACM regulation, if no such arrangement can be concluded between NEMO, CRE would have to set the modalities of energy transfers, in coordination with the neighboring regulatory authorities.

4.2. Amendment of the market rules

The modifications corresponding to the impacts identified in the market rules (see §3.4.4) will be implemented in the versions of the rules to be submitted by RTE for approval by CRE pursuing

[35] The determination of these modalities will take into account the associated financial constraints, when relevant.

(respectively) articles L. 321.-9 (for the market rules [3]) and L. 321-11 (for the market rules [4] and [5]) of the "Code de l'énergie" once the Technical Solution has been approved by the CRE, and before it is effectively implemented.

4.3. Implementation planning

Implementation of a Technical Solution for hosting several NEMO will be done at multiple levels.

At the French level, the starting point for the implementation tasks is the approval of the Technical Solution by the CRE[36].

The first impact analysis conducted by RTE shows the need to update RTE IT systems. A priori, and only from the perspective of the local project, this task appears more significant than the establishment of local contracts between RTE, the French NEMO and related CCPs. The completion dates for the following stages are to be determined:

- Definition of entities involved in exchanges and transfers of energy, this will condition the establishment of national and regional contracts,
- Performance of tests with the other participating parties (on national and regional levels).

On the local level in the other countries concerned by hosting multiple NEMO, the start of implementation will also be contingent on local approval of the technical solutions, which could potentially be done after France.

At the NEMO level, the start of the implementation will be contingent on the validation of the common plan for implementing the MCO function of the NEMO by all regulators.

At the regional level, the start is contingent on the elements specified above.

The overall planning is thus linked to the progress of the implementation of all previously identified levels, which are not within the sole control of RTE, and depend on external stakeholders. According to RTE estimate, the dimensioning element for the overall planning is in the regional implementation and in particular in discussions related to sharing and recovery of costs and modifications of regional contracts when relevant.

The diagram below shows an estimate of the implementation planning based on a first impact analysis at RTE level. Its purpose is mainly to present in diagram form, for each level, the tasks to be performed from a macroscopic point of view, along with the sequence between them. It does not seem possible, from a single RTE point of view, to specify an estimate for the final implementation date.

[36] It is assumed that the Technical Solution will be approved by the CRE by 14.10.2016.

Thus it will be necessary, once all the prerequisites are validated, to update this implementation plan with all the participating parties.

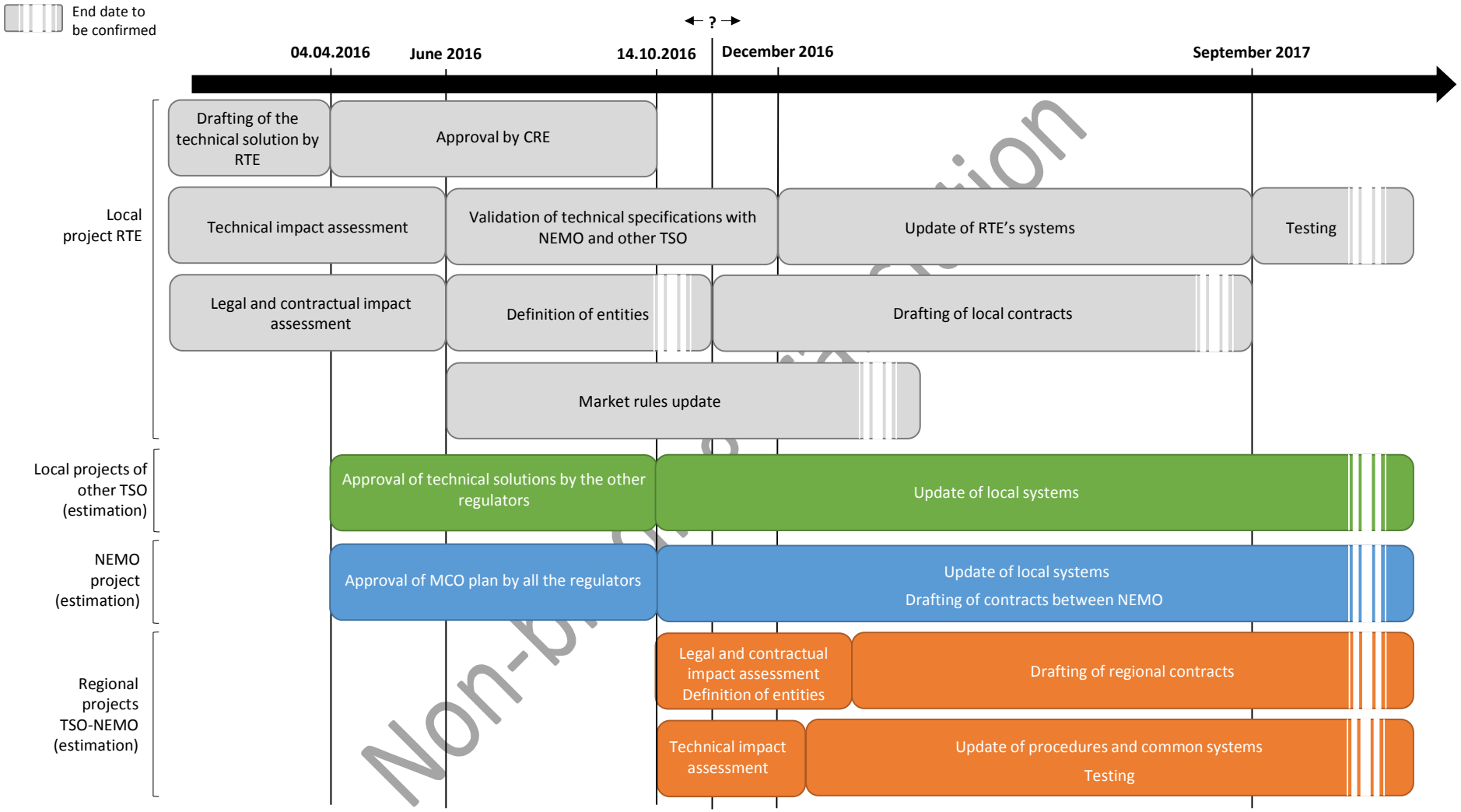

Figure 9: estimated implementation planning

5. Appendices

Appendix 1: list of tasks related to the NEMO described in CACM regulation taken into account in the Multi-NEMO Arrangements

Appendix 2: list of tasks related to exercising the MCO functions described in CACM regulation taken into account in the Multi-NEMO Arrangements

Appendix 3: list of principles and requirements of the Multi-NEMO Arrangements

Appendix 1

List of tasks related to the NEMO of CACM regulation taken into account in the Multi-NEMO Arrangements:

Task	Function	Details (Article 7.1 of the CACM regulation)
NEMO_1	Tasks related to the market Coupling Operator (MCO)	(a) implementing the MCO functions set out in paragraph 2 in coordination with other NEMOs;
NEMO_2	*Establishment of requirements of market coupling and algorithm* ***(out of scope)***	*(b) establishing collectively the requirements for the single day-ahead and intraday coupling, requirements for MCO functions and the price coupling algorithm with respect to all matters related to electricity market functioning in accordance with paragraph 2 of this Article, and Articles 36 and 37;*
NEMO_3	*Definition of min/max prices* ***(out of scope)***	*(c) determining maximum and minimum prices in accordance with Articles 41 and 54;*
NEMO_4	Anonymization and transmission of order books	(d) making anonymous and sharing the received order information necessary to perform the MCO functions provided for in paragraph 2 of this Article and Articles 40 and 53;
NEMO_5	*Verification of market coupling results (price/allocation of orders, etc.)* ***(out of scope)***	*(e) assessing the results calculated by the MCO functions set out in paragraph 2 of this Article allocating the orders based on these results, validating the results as final if they are considered correct and taking responsibility for them in accordance with Articles 48 and 60;*
NEMO_6	*Publication of results to market participants* ***(out of scope)***	*(f) informing the market participants on the results of their orders in accordance with Articles 48 and 60;*
NEMO_7	Transfer of net position between Central Counter Parties	(g) acting as central counter parties for clearing and settlement of the exchange of energy resulting from single day-ahead and intraday coupling in accordance with Article 68(3);
NEMO_8	*Establishment of backup procedures* ***(out of scope)***	*(h) establishing jointly with relevant NEMOs and TSOs back-up procedures for national or regional market operation in accordance with Article 36(3) if no results are available from the MCO functions in accordance with Article 39(2), taking account of fallback procedures provided for in Article 44;*

Task	Function	Details (Article 7.1 of the CACM regulation)
NEMO_9	*Provision of information for operating costs for cost recovery* ***(out of scope)***	*(i) jointly providing single day-ahead and intraday coupling cost forecasts and cost information to competent regulatory authorities and TSOs where NEMO costs for establishing, amending and operating single day-ahead and intraday coupling are to be covered by the concerned TSOs' contribution in accordance with Articles 75 to 77 and Article 80;*
NEMO_10	Cooperate with TSO to establish Multi-NEMO Arrangements	(j) Where applicable, 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.

Appendix 2

List of tasks related to exercising the MCO functions of the CACM regulation taken into account in the Multi-NEMO Arrangements:

Task	Function	Details (Article 7.2 of the CACM regulation)
OCM_1	*Maintenance of algorithm, systems and procedures* ***(out of scope)***	(a) developing and maintaining the algorithms, systems and procedures for single day-ahead and intraday coupling in accordance with Articles 36 and 51;
OCM_2	Processing cross-zonal capacities sent from TSO to NEMO	(b) processing input data on cross-zonal capacity and allocation constraints provided by coordinated capacity calculators in accordance with Articles 46 and 58;
OCM_3	Execution of coupling algorithm	(c) operating the price coupling and continuous trading matching algorithms in accordance with Articles 48 and 60;
OCM_4	*Verification of market coupling results (price/allocation of orders, etc.)* ***(out of scope)***	(d) validating and sending single day-ahead and intraday coupling results to the NEMOs in accordance with Articles 48 and 60.

Appendix 3

List of principles and requirements of the Multi-NEMO Arrangements:

Bidding Zones and Hubs

Principles	Requirements
Principle 1: France Bidding Zone is divided into as many Hubs as there are NEMO.	**Requirement 1**: According to the list of tasks defined by the CACM regulation for NEMO, the transmission of orders from the members of the power exchanges operated by the French NEMO to the market coupling algorithm is the responsibility of each NEMO. **Requirement 2**: the day-ahead market coupling algorithm must enable each NEMO to send its Hub's order book, and consider that there is no exchange limitation for matching of the orders transmitted by the French NEMO. It must provide as output one single price and net position for the France Bidding Zone per market time unit. NEMO will implement necessary modifications of the market coupling algorithm to allow sending of several order books for France Bidding Zone. **Requirement 3**: orders considered by the intraday market coupling algorithm are grouped by the NEMO in a shared order book. The intraday market coupling algorithm must consider that there is no exchange limitation for continuous matching of the orders transmitted by the French NEMO. It must provide as output one single net position for the France Bidding Zone per market time unit.

Data exchanges between RTE and the NEMO

Principles	Requirements
Principle 2: to ensure the most technically efficient solution, RTE will favor as much as possible the use of standard file formats and exchange protocols, as defined by the ENTSO-E for data exchange between the electricity market participants.	**Requirement 4**: the NEMOS must use the file formats and exchanges protocols requested by RTE. For data exchanges using the ENTSO-E standards, the NEMO must use the identification codes defined by ENTSO-E.
Principle 3: for the day-ahead market coupling solution, the data exchanges between RTE and the market coupling system relating to input and output data of the day-ahead market coupling algorithm will be done according to the existing PCR architecture, which is to say that the data will be transferred via the NEMO systems.	**Requirement 5**: data exchanges between RTE and the market coupling system for input and output data of the day-ahead market coupling algorithm will be made through a single access point for each capacity calculation region (in coordination with the other TSO, when possible). NEMO will use this single access point on a rotating basis. The technical provisions for data exchanges between RTE and this unique access point will be set in coordination with NEMO (and with the other TSO, when relevant). **Requirement 5 bis**: on the IFA border, the data exchanges between the TSOs (RTE and NGIC) and the market coupling system for input and output data of the day-ahead market coupling solution algorithm is made via the IFA interface.
Principle 4: data exchanges between RTE and the market coupling system for input and output data of the intraday matching algorithm of the market coupling solution will be made directly between RTE computer systems and the market coupling system (in coordination with the other TSO when possible).	

Principles	Requirements
	Requirement 6: the Central Counter Party associated with each NEMO must transmit to RTE the buys and sells data by balance responsible entity on its Hub, corresponding to the matched orders determined at the end of the market coupling process, as well as to the exchanges and transfers of energy within France Bidding Zone and with other Bidding Zones. For each Hub and each market time unit, the sum of all volumes of buys and sells transferred to RTE must be balanced (i.e. equal to zero).

Cases of decoupling

Requirements
Requirement 7: in the event of a partial market decoupling of France, the Market coupling algorithm must consider that there is no exchange limitation for matching of the orders transmitted by the French NEMO. For day-ahead market coupling, it must provide as output one single price and net position in the France Bidding Zone per market time unit. Requirement 8: in the event of a full decoupling of France on day-ahead timeframe, the prices of each Hub are determined by each NEMO.
Requirement 9: it is the responsibility of each NEMO to ensure access to the market coupling to its power exchange members, and to use its best efforts to avoid side effects of the technical failure of one NEMO which would prevent the power exchange members of the other NEMO to participate to the market coupling. **Requirement 9 bis**: in the event of non-participation of one (or more) NEMO in the day-ahead market coupling, this(these) NEMO determines locally the Hub price of its Hub. This means that the day-ahead market coupling algorithm has to only consider the orders transmitted by other French NEMO, and must provide as an output one single price and net position in the France Bidding Zone per market time unit.

Price references (day-ahead timeframe)

Principles	Requirements
	Requirement 10: for day-ahead timeframe, each NEMO owns the price determined on its Hub from the day-ahead market coupling, and its responsibility for publication. Except in the event of market decoupling of all of France or the market coupling of France with a part of the NEMO, the price of each Hub is necessarily equal to the price determined by the day-ahead market coupling algorithm for France.
Principle 5: for day-ahead timeframe, RTE is responsible for determining and publishing the Reference Spot Price for the France Bidding Zone. Except in the event of full decoupling of France or the market coupling of France with a part of the NEMO, the Reference Spot Price is equal to the day-ahead market coupling price for France Bidding Zone. **Principle 6**: for a given market time unit, the Reference Spot Price of the France Bidding Zone for day-ahead timeframe is defined as the average price of the Hubs, weighted by the volume of buys and sells of the power exchange members on this Hub.	**Requirement 11**: for the day-ahead timeframe, in addition to the output of the day-ahead market coupling algorithm, each NEMO must provide RTE with the data from its Hub necessary for the Reference Spot Price determination in the France Bidding Zone.

Exchanges and transfers of energy

Principles	Requirements
Principle 7: The related to financial and physical settlements are performed by the NEMOs.	
Principle 8: the delivery of energy exchanged by power exchange members on each Hub is carried out by RTE, which performs the physical settlement with each relevant actor according to information transmitted for each Hub by the corresponding Central Counter Party.	
Principle 9: the delivery of energy exchanged between Zonal Central Counter Parties and Shipping Agents on France Bidding Zone is carried out by RTE, which performs the physical settlement with the relevant entities according to information transmitted for each Hub by the corresponding Central Counter Party.	**Requirement 12**: for each timeframe, each Shipping Agent must buy or sell on the Hubs associated to the Zonal Central Counter Parties the energy volume that it must export or import. In total, these power quantities bought or sold by the Shipping Agents corresponds to the net position of the France Bidding Zone (up to a certain technical tolerance due to energy rounding). The corresponding energy movements will be imputed in a dedicated balance perimeter by Shipping Agent which management will be contractualized with RTE. **Requirement 13**: for each timeframe, the energy exchanges within France Bidding Zone will be performed by the Zonal Central Counter Parties which will buy (respectively sell) on the other Hubs the quantity of energy corresponding to the balance between buys and sells of their Hub where relevant. The corresponding energy movements will be imputed in a dedicated balance perimeter by Zonal Central Counter Party whose management will be contractualized with RTE.

Principles	Requirements
Principle 10: the delivery of energy transferred by Shipping Agents with other coupled Bidding Zone is carried out by RTE, which performs the physical settlement with the Shipping Agents according to cross-border nominations they transmit to RTE. **Principle 11**: for the day-ahead market coupling, in case of different prices on the Bidding Zones, the financial settlement of the energy transfer with other coupled Bidding Zones is associated with a transfer of the congestion income by the Shipping Agents to the TSO (or to the entity acting on behalf of the TSO). **Principle 12**: for each timeframe, the energy exchanged by the Zonal Central Counter Parties within France Bidding Zone will be determined according to the Scheduled Exchanges Resulting from Market Coupling, which will have to be calculated at a Hub level. **Principle 13**: for each timeframe, the energy volumes transmitted in the cross-border nominations of the Shipping Agents will be determined according to the Scheduled Exchanges Resulting from Market Coupling, which will have to be calculated at a Hub level . The limitations applicable to the definition of Shipping Agents will be established according to the constraints linked to calculation of scheduled exchanges resulting from market coupling, where relevant. Depending on the cases, it could be necessary to limit the number of Shipping Agents defined for a given border and direction.	**Requirement 14**: for each timeframe, each Shipping Agent will register with RTE the cross-border nominations according to the energy volumes that it must export or import, pursuant to modalities defined between RTE and each Shipping Agent. The corresponding energy movements will be imputed in a dedicated balance perimeter by Shipping Agent which management will be contractualized with RTE. Where relevant, the congestion income associated to the energy transfer will be transferred by the Shipping Agents to the relevant TSO (or to the entity acting on behalf of the TSO).
	Requirement 15: except in the case of the total decoupling of France, the defined Zonal Central Counter Parties and Shipping Agents must ensure the exchanges of energy between coupled Hubs and the energy transfers on coupled borders.

Principles	Requirements
	Requirement 16: for each timeframe, the Zonal Central Counter Parties will record the buys and sells of residual disparities, if any, on their Hubs to guarantee the exact balance of the buys and sells. The corresponding quantities will be imputed in a dedicated balance perimeter whose management terms will be contractualized with RTE.
Principle 14: the perimeters used by the entities defined as Zonal Central Counter Parties and Shipping Agents for the power transfers are different per timeframe, and framed by specific contractual terms.	**Requirement 17**: The sum of buys and sells volumes on all Hubs after the energy exchanges in the France Bidding Zone and the energy transfers with other Bidding Zones is balanced (i.e. equal to zero).

Rules applicable to the market coupling processes

Principles	Requirements
Principle 15: concerning the existing market coupling process (like the day-ahead market coupling), RTE can provide the details of applicable procedures corresponding to the French NEMO upon request.	**Requirement 18**: to participate in the market coupling process, the NEMO must respect the corresponding rules defined at the regional level between the TSOs and the NEMO.

Definition of entities involved in the exchanges and transfers of energy

Principles	Requirements
Principle 16: Each NEMO shall designate the entity in charge of the tasks defined for Zonal Central Counter Parties for each timeframe in the Multi-NEMO Arrangements. By default, each entity acting as Central Counter Party will be considered as a Zonal Central Counter Party, unless the relevant NEMO designates another entity. **Principle 17**: Each NEMO shall designate the entity in charge of the tasks defined for Shipping Agents for each timeframe in the Multi-NEMO Arrangements. By default, each entity acting as Central Counter Party will be considered as a Shipping Agent, unless the relevant NEMO designates another entity.	