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# Draft methodology for calculating Scheduled Exchanges resulting from single day-ahead coupling

04/10/2016

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## DISCLAIMER

This document is released on behalf of relevant transmission system operators (“TSOs”) only for the purposes of the public consultation on the proposal of a methodology for calculating Scheduled Exchanges resulting from single day-ahead coupling in accordance with Article 43 of the Commission Regulation (EU) No 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (“Regulation 2015/1222”). This version of the Scheduled Exchange Calculation Methodology does not in any case represent a firm, binding or definitive TSOs’ position on the content.

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TSOs which intend to calculate Scheduled Exchanges resulting from single day-ahead coupling, taking into account the following:

### Whereas

1. This document is a common proposal developed by the Transmission System Operators (hereafter referred to as “TSOs”), which intend to calculate Scheduled Exchanges resulting from single day-ahead coupling, for a methodology for calculating Scheduled Exchanges resulting from the single day-ahead coupling (“hereafter referred to as ”DA Scheduled Exchange Calculation Methodology”) in accordance with Article 43 of Commission Regulation (EU) 2015/1222 establishing a guideline on Capacity Allocation and Congestion Management (hereafter referred to as ”Regulation 2015/1222”). This proposal is hereafter referred to as ”DA Scheduled Exchange Calculation Methodology Proposal”.
2. The DA Scheduled Exchange Calculation Methodology Proposal, in line with Article 45 of Regulation 2015/1222, accommodates situations where there are more than one Nominated Electricity Market Operator (hereafter referred to as “NEMO”) designated and/or offering day-ahead trading services in a particular geographic area. In addition, according to Article 4(1) of Regulation 2015/1222, multiple NEMOs can be designated to perform single day-ahead coupling in a Member State. For each NEMO, a NEMO Trading hub shall be defined. Where multiple NEMOs operate within a geographic area, there shall be multiple NEMO Trading hubs in that geographic area.
3. The DA Scheduled Exchange Calculation Methodology Proposal takes into account the general principles, goals and other methodologies reflected in Regulation 2015/1222. The goal of Regulation 2015/1222 is the coordination and harmonisation of capacity calculation and allocation in the day-ahead and intraday cross-border markets.
4. The DA Scheduled Exchange Calculation Methodology shall serve as a basis for a common calculation principle applied by the Scheduled Exchange Calculator(s) who is (are) responsible for the calculation of Scheduled Exchanges resulting from single day-ahead coupling as per Article 49 of Regulation 2015/1222.
5. The DA Scheduled Exchange Calculation Methodology Proposal shall consider situations where the Bidding Zone is equal to the Scheduling Area, as well as where there are multiple Scheduling Areas within a Bidding Zone.
6. According to Article 9(9) of Regulation 2015/1222, the proposed timescale for the implementation of the proposed DA Scheduled Exchange Calculation Methodology shall be included and can be found in Article 8 of the DA Scheduled Exchange Calculation Methodology Proposal.
7. According to Article 9(9) of Regulation 2015/1222, the expected impact of the proposed DA Scheduled Exchange Calculation Methodology shall be described.

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- Article 3(a) of Regulation 2015/1222 aims at promoting effective competition in the generation, trading and supply of electricity.
    - The DA Scheduled Exchange Calculation Methodology does not interfere with, and in some cases, may facilitate trading between multiple NEMOs within a Bidding Zone. Additionally, as it is derived from the results of single day-ahead coupling, it does not affect competition in the generation, trading and supply of electricity.
  - Article 3(b) of Regulation 2015/1222 aims at ensuring optimal use of the transmission infrastructure.
    - The Scheduled Exchanges resulting from the DA Scheduled Exchange Calculation Methodology are derived from the results of the single day-ahead market coupling i.e they are based upon the net positions and the allocated capacities in the form of allocated flows, into and out of individual relevant DC Network Elements and between adjacent bidding zone and/or Scheduling Area borders.
  - Article 3(c) of Regulation 2015/1222 aims at ensuring operational security.
    - The DA Scheduled Exchange Calculation Methodology is carried out by the Scheduled Exchange Calculator(s) following receipt of the outputs itemised within the list of information required from relevant NEMOs as outlined in Article 3 of this DA Scheduled Exchange Calculation Methodology Proposal. This list of information provided by the relevant NEMOs to the Scheduled Exchange Calculator(s) shall result from completion of the single day-ahead market coupling session. The DA Scheduled Exchange Calculation Methodology shall be initiated post single day-ahead coupling and shall have no influence on operational security under Regulation 2015/1222.
  - Article 3(d) of Regulation 2015/1222 aims at optimising the calculation and allocation of cross zonal capacity.
    - Scheduled Exchanges resulting from single day ahead coupling shall not modify, but only reflect the results of the single day-ahead market coupling session.
  - Article 3(e) of Regulation 2015/1222 aims at ensuring fair and non-discriminatory treatment of TSOs, NEMOs, the Agency, regulatory authorities and market participants.
    - The DA Scheduled Exchange Calculation Methodology shall be fair and transparent as it is based on the results of single day-ahead coupling. Additionally, where required under certain market settlement regimes, the calculation may be performed at NEMO Trading hub level, in order to allow the reconciliation of Scheduled Exchanges per NEMO and therefore facilitating multi-NEMO scenarios in such contexts.
  - Article 3(f) of Regulation 2015/1222 aims at ensuring and enhancing the transparency and reliability of information.
    - The DA Scheduled Exchange Calculation Methodology comprises a bottom-up approach for the calculation of Scheduled Exchanges which ensures and enhances

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the transparency and reliability of the DA Scheduled Exchange Calculation Methodology.

- Article 3(g) of Regulation 2015/1222 aims at contributing to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union.
  - The DA Scheduled Exchange Calculation Methodology shows clear cross-Network Code thinking in order to contribute to the efficient development of a single day-ahead electricity market in Europe. The DA Scheduled Exchange Calculation Methodology, through its construction comprising of bilateral exchanges, as well as multilateral exchanges, does not interfere with the efficient long-term operation and development of the European transmission system.
- Article 3(h) of Regulation 2015/1222 aims at respecting the need for a fair and orderly market and fair and orderly price formation.
  - The DA Scheduled Exchange Calculation Methodology does not interfere with or compromise the anonymity of the market participants as it has no influence on the results of single day-ahead coupling.
- Article 3(i) of Regulation 2015/1222 aims at creating a level playing field for NEMOs.
  - The DA Scheduled Exchange Calculation Methodology creates a level playing field for NEMOs as it has no influence on the results of single day-ahead coupling. Additionally, the DA Scheduled Exchange Calculation Methodology supports scenarios where there are multiple NEMOs within a Bidding Zone.
- Article 3(j) of Regulation 2015/1222 aims at providing non-discriminatory access to cross-zonal capacity.
  - The DA Scheduled Exchange Calculation Methodology does not interfere with the provision nor allocation of cross-zonal capacity.

### **Article 1 - Subject matter and scope**

The DA Scheduled Exchange Calculation Methodology, as determined in this DA Scheduled Exchange Calculation Methodology Proposal shall be considered as the common proposal of all TSOs, for those TSOs which intend to calculate Scheduled Exchanges resulting from single day-ahead coupling, in accordance with Article 43 of Regulation 2015/1222. The DA Scheduled Exchange Calculation Methodology Proposal shall cover the following:

- a) Calculation of Bilateral and Multilateral Scheduled Exchanges between Scheduling Areas
- b) Calculation of Bilateral and Multilateral Scheduled Exchanges between Bidding Zones
- c) Calculation of Bilateral and Multilateral Scheduled Exchanges between NEMO Trading hubs

The scope of the DA Scheduled Exchange Calculation Methodology does not extend to the assignment of roles and responsibilities to specific parties. Neither does the scope attempt to provide a governance

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framework for specific roles or responsibilities. These aspects will be defined by the TSOs, where required, and in accordance with Article 8(2g) of Regulation 2015/1222.

It is acknowledged that the market coupling operator shall calculate Scheduled Exchanges as part of the market coupling operator function. This DA Scheduled Exchange Calculation Methodology shall apply to TSOs which intend to calculate Scheduled Exchanges separately to the market coupling operator calculation of Scheduled Exchanges.

## **Article 2 - Definitions and interpretation**

1. For the purposes of this DA Scheduled Exchange Calculation Methodology Proposal, terms used shall have the meaning of the definitions included in Article 2 of Regulation 2015/1222, Commission Regulations (EU) 543/2013 and (EU) 1227/2011. In addition, the following definitions shall apply:
  - a) 'Scheduling Area' shall be defined as an area within which the TSOs' obligations regarding scheduling apply due to operational or organisational needs.
  - b) 'TSOs which intend to' shall be defined as TSOs intending to calculate Scheduled Exchanges separately from the Scheduled Exchanges calculated by the market coupling operator via Chapter 4 and 5 of Regulation 2015/1222.
  - c) 'Relevant NEMOs' shall be defined as 'NEMOs responsible for the market coupling operator function'.
  - d) 'Bilateral Scheduled Exchanges' shall be defined as 'Scheduled Exchanges between one Scheduling Area/Bidding Zone and another Scheduling Area/Bidding Zone'.
  - e) 'Multilateral Scheduled Exchange' shall be defined as a 'scheduled exchange between one Scheduling Area/Bidding Zone and a group of other Scheduling Areas/Bidding Zones'.
  - f) 'NEMO Trading hub' shall be defined as 'the set of orders submitted by the market participants to a specific NEMO within a geographic area'.
  - g) 'Neighbouring Scheduling Areas / Bidding Zones' shall be defined as 'a Scheduling Area or Bidding Zone directly connected to another Scheduling Area / Bidding Zone via at least one AC or DC interconnector'.
  - h) 'Neighbouring NEMO Trading hub' shall be defined as 'a NEMO Trading hub connected to another NEMO Trading hub, either as part of the same Neighbouring Scheduling Area or Bidding Zone, or via at least one AC or DC interconnector'.
  
2. The term 'Scheduled Exchange' is defined within Article 2 of Regulation 2015/1222. For the purposes of the DA Scheduled Exchange Calculation Methodology Proposal, the term 'geographic areas' is interpreted as meaning both Scheduling Area, as defined by this DA Scheduled Exchange Calculation Methodology Proposal and Bidding Zone, as defined in Commission Regulations (EU) 543/2013. The notion of 'NEMO Trading hub' has specific relevance in order to ensure proper functioning of post coupling processes under certain market settlement regimes where multiple NEMOs are active in a Bidding Zone or Scheduling Area in accordance with the requirements contained within Article 45 of Regulation 2015/1222.

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3. In this DA Scheduled Exchange Calculation Methodology Proposal, unless the context requires otherwise:
- a) the singular indicates the plural and vice versa;
  - b) the table of contents and headings are inserted for convenience only and do not affect the interpretation of this methodology for the calculation of Scheduled Exchanges from single day-ahead coupling proposal; and
  - c) any reference to legislation, regulations, directive, order, instrument, code or any other enactment shall include any modification, extension or re-enactment of it then in force.

### **Article 3 - List of Information Required from Relevant NEMOs**

The Relevant NEMOs shall provide the following information, coming from the single day-ahead coupling to the Scheduled Exchange Calculator(s) and all TSOs, for each market time unit, in order to perform the DA Scheduled Exchange Calculation:

- Net position per Scheduling Area;
- Net position per Bidding Zone;
- Net position per NEMO Trading hub;
- Allocated capacities, in the form of allocated flows into and out of individual relevant DC network elements (difference in flows in/out reflecting losses where applicable)
- Allocated capacities, in the form of allocated flows between relevant adjacent Bidding Zone/Scheduling Area borders (flows in/out reflecting losses where applicable)
- Scheduled Exchanges resulting from single day-ahead market coupling, in the form of:
  - Bilateral and Multilateral Scheduled Exchanges between Scheduling Areas
  - Bilateral and Multilateral Scheduled Exchanges between Bidding Zones
  - Bilateral and Multilateral Scheduled Exchanges between NEMO Trading hubs

### **Article 4 - Scheduled Exchange Calculator**

The Scheduled Exchange Calculator(s) shall be established at the same level as the coordinated capacity allocation is performed. The Scheduled Exchange Calculator role shall evolve in line with day-ahead market coupling moving stepwise towards pan-European level.

The DA Scheduled Exchange Calculation shall be initiated upon receipt of the outputs itemised within the list of requirements from relevant NEMOs.

The Relevant NEMOs, as part of the market coupling operator function, shall provide the information listed in Article 3 of this DA Scheduled Exchange Calculation Methodology to the Scheduled Exchange Calculator(s) and all TSOs within 5 minutes after delivery of day-ahead market coupling results, in order for the Scheduled Exchange Calculator(s) to comply with Article 49 of Regulation 2015/1222.



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The Scheduled Exchange Calculator(s) shall notify the results of the DA Scheduled Exchange Calculation to relevant NEMOs, central counter parties, shipping agents and TSOs. The results of the Scheduled Exchange Calculator(s) shall be:

- Bilateral Scheduled Exchanges per DC Interconnector, per Scheduling Area border, per Bidding Zone border and per NEMO Trading hub
- Multilateral Scheduled Exchanges<sup>1</sup> per Scheduling Area, per Bidding Zone and per NEMO Trading hub

### **Article 5 – General Principles for Calculation of Scheduled Exchanges**

The SEC shall, on request of TSOs which intend to calculate Scheduled Exchanges, calculate the Scheduled Exchanges on the relevant bidding zone/Scheduling Areas borders and between NEMO Trading hubs according to the following principles:

- Scheduled Exchanges calculated by the market coupling operator on non-relevant<sup>2</sup> bidding zone/Scheduling Areas borders and between NEMO Trading hubs shall not be impacted by the DA Scheduled Exchange Calculation.
- The calculation of Scheduled Exchanges shall be carried out by the Scheduled Exchange Calculator(s) such that the constraints described in Article 6 and Article 7 of this DA Scheduled Exchange Calculation proposal are respected.
- The DA Scheduled Exchange Calculation as described in Article 6 and Article 7 shall respect the net position of the Scheduling Area, bidding zone and NEMO Trading hub and allocated capacities, in the form of allocated flows on DC Interconnectors resulting from the single day-ahead coupling.
- When applicable, the relevant TSOs which intend to calculate Scheduled Exchanges resulting from single day-ahead coupling shall identify to the Scheduled Exchange Calculator(s) all relevant constraints considered for allocation and possible additional constraints.

### **Article 6 - Methodology for calculating Scheduled Exchanges per Scheduling Area/Bidding Zone resulting from single day-ahead coupling**

The DA Scheduled Exchange Calculation Methodology, in accordance with Article 43 of Regulation 2015/1222, shall be based on a step-wise DA Scheduled Exchange Calculation approach as described below.

All equations and associated elements within Article 6 are on a per market time unit basis.

#### **Article 6.1 Scheduling Areas**

##### **Article 6.1.1 Scheduled Exchanges**

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<sup>1</sup> Multilateral Exchanges do not include DC Interconnector exchanges as DC Interconnector exchanges are not relevant for calculation of the set-point of Load Frequency Controllers.

<sup>2</sup> Non-relevant refers to those borders which do not require a separate calculation for Scheduled Exchanges



The Scheduled Exchanges per Scheduling Area border shall be calculated based on single day-ahead coupling algorithm outputs including, but not limited to, net positions per Scheduling Areas, and subject to specific constraints, where relevant. When applicable, the TSOs which intend to calculate Scheduled Exchanges resulting from single day-ahead coupling shall identify to the Scheduled Exchange Calculator(s) any additional constraints required for the calculation of Scheduled Exchanges at this level.

The Scheduled Exchanges per Scheduling Area border shall be calculated such that the following equation is fulfilled:

Equation 1

$$NP_{SA_j} = \sum_{m=1}^n SCHEX_{SA_j \rightarrow m}$$

$NP_{SA_j}$  = Net Position of Scheduling Area  $j$  ( $SA_j$ )

$m$  = Variable representing individual Scheduling Areas (and/or group of other Scheduling Areas)  $m \rightarrow n$  which have borders with Scheduling Area  $j$

$n$  = Number of Scheduling Areas (and/or group of other Scheduling Areas) which have borders with Scheduling Area  $j$

$SCHEX_{SA_j \rightarrow m}$  = Scheduled Exchanges between Scheduling Area  $j$  and each other Scheduling Area (and/or group of other Scheduling Areas)  $m \rightarrow n$  which has a border with Scheduling Area  $j$ , from the perspective of Scheduling Area  $j$

The aggregated Scheduled Exchanges per Scheduling Area are comprised of AC / DC bilateral exchanges and AC multilateral exchanges as shown in Equation 2.

Equation 2

$$\sum_{m=1}^n SCHEX_{SA_j \rightarrow m} = \sum_{b=1}^c BX_{SA_j \rightarrow b} \pm MX_{SA_j \rightarrow g}$$

Where,

$SCHEX_{SA_j \rightarrow m}$  = Scheduled Exchanges between Scheduling Area  $j$  and each other Scheduling Area (and/or group of other Scheduling Areas)  $m \rightarrow n$  which has a border with Scheduling Area  $j$ , from the perspective of Scheduling Area  $j$

$m$  = Variable representing individual Scheduling Areas (and/or group of other Scheduling Areas)  $m \rightarrow n$  which have borders with Scheduling Area  $j$

$n$  = Number of Scheduling Areas (and/or group of other Scheduling Areas) which have borders with Scheduling Area  $j$

$BX_{SA_j \rightarrow b}$  = AC/DC Bilateral Scheduled Exchanges between Scheduling Area  $j$  and any Neighbouring Scheduling Area with Scheduling Area  $j$ , from the perspective of Scheduling Area  $j$

$b$  = Variable representing any Neighbouring Scheduling Areas  $b \rightarrow c$  with Scheduling Area  $j$

$c$  = Number of Neighbouring Scheduling Areas with Scheduling Area  $j$

$MX_{SA_j \rightarrow g}$  = AC Multilateral Exchange between Scheduling Area  $j$  border and a group of other Scheduling Areas  $g$

Where applicable, the AC Multilateral Scheduled Exchange shall be the scheduled exchange between the border of Scheduling Area  $j$  and a group of Scheduling Areas within the same synchronous area which has a border with Scheduling Area  $j$ . The allocated capacities, in the form of allocated flows, into and out of individual relevant DC network elements and between Scheduling Area borders shall be considered as inputs into this Bilateral Scheduled Exchanges calculation. Where applicable, the difference in flows in/out of relevant DC network elements and between Scheduling Area borders shall reflect losses.

In the specific case of Scheduling Areas connected via DC network elements, notwithstanding the direction of the Scheduled Exchanges, the quantity of Bilateral Scheduled Exchanges between Scheduling Areas  $j$  and  $k$  from the perspective of Scheduling Area  $j$  may not equal the quantity of Bilateral Scheduled Exchanges between Scheduling Areas  $j$  and  $k$  from the perspective of Scheduling Area  $k$ , due to losses.

For DC Interconnectors, the Bilateral Scheduled Exchange per DC Interconnector is equivalent to the allocated capacities, in the form of allocated flows, on individual relevant DC network elements resulting from single day-ahead coupling.

## Article 6.2 Bidding Zones

### Article 6.2.1 Scheduled Exchanges

The Scheduled Exchanges per Bidding Zone shall be calculated based on single day-ahead coupling algorithm outputs including, but not limited to, net positions per Bidding Zones, and subject to specific constraints, where relevant. When applicable, the TSOs which intend to calculate Scheduled Exchanges resulting from single day-ahead coupling shall identify to the Scheduled Exchange Calculator(s) any additional constraints required for the calculation of Scheduled Exchanges at this level.

Where the Scheduling Area  $j$  is equal to the Bidding Zone  $f$ , the Scheduled Exchanges for Scheduling Area  $j$  borders are equal to the Scheduled Exchanges for Bidding Zone  $f$  borders.

Where there are multiple Scheduling Areas in a bidding zone, the Scheduled Exchanges per Bidding Zone border shall be calculated such that the following equation is fulfilled:

Equation 3

$$NP_{BZ_j} = \sum_{m=1}^n SCHEX_{BZ_j \rightarrow m}$$

Where,

$NP_{BZ_j}$  = Net Position of Bidding Zone  $j$  ( $BZ_j$ )

$m$  = Variable representing individual Bidding Zones (or group of other Bidding Zones)  $m \rightarrow n$  which have borders with Bidding Zone  $j$

$n$  = Number of Bidding Zones (and/or group of other Bidding Zones) which have borders with Bidding Zone  $j$

$SCHEX_{BZ_{j \rightarrow m}}$  = Scheduled Exchanges between Bidding Zone  $j$  and each other Bidding Zone (and/or group of other Bidding Zones)  $m \rightarrow n$  which has a border with Bidding Zone  $j$ , from the perspective of Bidding Zone  $j$

The aggregated Scheduled Exchanges per Bidding Zone are comprised of AC / DC bilateral exchanges and AC multilateral exchanges as shown in Equation 4.

Equation 4

$$\sum_{m=1}^n SCHEX_{BZ_{j \rightarrow m}} = \sum_{b=1}^c BX_{BZ_{j \rightarrow b}} \pm MX_{BZ_{j \rightarrow g}}$$

Where,

$SCHEX_{BZ_{j \rightarrow m}}$  = Scheduled Exchanges between Bidding Zone  $j$  and each other Bidding Zone (and/or group of other Bidding Zones)  $m \rightarrow n$  which has a border with Bidding Zone  $j$ , from the perspective of Bidding Zone  $j$

$m$  = Variable representing individual Bidding Zones (or group of other Bidding Zones)  $m \rightarrow n$  which have borders with Bidding Zone  $j$

$n$  = Number of Bidding Zones (and/or group of other Bidding Zones) which have borders with Bidding Zone  $j$

$BX_{BZ_{j \rightarrow b}}$  = AC/DC Bilateral Scheduled Exchanges between Bidding Zone  $j$  and any Neighbouring Bidding Zone with Bidding Zone  $j$ , from the perspective of Bidding Zone  $j$

$b$  = Variable representing any Neighbouring Bidding Zone  $b \rightarrow c$  with Bidding Zone  $j$

$c$  = Number of Neighbouring Bidding Zones with Bidding Zone  $j$

$MX_{BZ_{j \rightarrow g}}$  = AC Multilateral Exchange between Bidding Zone  $j$  border and a group of other Bidding Zones  $g$

Where applicable, the AC Multilateral Scheduled Exchange shall be the scheduled exchange between the border of Bidding Zone  $j$  and a group of Bidding Zones within the same synchronous area which has a border with Bidding Zone  $j$ . The allocated capacities, in the form of allocated flows, into and out of individual relevant DC network elements and between Bidding Zone borders shall be considered as inputs into this Scheduled Exchanges calculation. Where applicable, the difference in flows in/out of relevant DC network elements and between Bidding Zone borders shall reflect losses.

In the specific case of Bidding Zones connected via DC network elements, notwithstanding the direction of the Scheduled Exchanges, the quantity of Bilateral Scheduled Exchanges between Bidding Zones  $j$  and  $k$  from the perspective of Bidding Zone  $j$  may not equal the quantity of Bilateral Scheduled Exchanges between Bidding Zones  $j$  and  $k$  from the perspective of Bidding Zone  $k$ , due to losses.

For DC Interconnectors, the Bilateral Scheduled Exchange per DC Interconnector is equivalent to the allocated capacities, in the form of allocated flows, on individual relevant DC network elements resulting from single day-ahead coupling.

## **Article 7 - Methodology for calculating Scheduled Exchanges per NEMO Trading hub resulting from single day-ahead coupling**

The DA Scheduled Exchange Calculation Methodology, in accordance with Article 43 of Regulation 2015/1222, shall be based on a step-wise DA Scheduled Exchange Calculation approach as described below.

All equations and associated elements within Article 7 are on a per market time unit basis.

### **Article 7.1 NEMO Trading hub**

#### **Article 7.1.1 Scheduled Exchanges**

The Scheduled Exchanges between NEMO Trading hubs shall be calculated based on single day-ahead coupling algorithm outputs including, but not limited to, net positions per NEMO Trading hubs, and subject to specific constraints, where relevant.

The NEMO Trading hub Scheduled Exchanges shall be calculated such that the following equation is fulfilled:

*Equation 5*

$$NP_{TH_j} = \sum_{m=1}^n SCHEX_{TH_j \rightarrow m}$$

Where,

$NP_{TH_j}$  = Net Position of NEMO Trading hub  $j$  ( $TH_j$ )

$m$  = Variable representing individual NEMO Trading hubs (and/or group of other NEMO Trading hubs)  $m \rightarrow n$  which have borders with NEMO Trading hub  $j$

$n$  = Number of NEMO Trading hubs (and/or group of other NEMO Trading hubs) which have borders with NEMO Trading hub  $j$

$SCHEX_{TH_j \rightarrow m}$  = Scheduled Exchanges between NEMO Trading hub  $j$  and each other NEMO Trading hub (and/or group of other NEMO Trading hubs)  $m \rightarrow n$ , which has a border with NEMO Trading hub  $j$ , from the perspective of NEMO Trading hub  $j$

The aggregated Scheduled Exchanges per NEMO Trading hub are comprised of AC / DC bilateral exchanges and AC multilateral exchanges as shown in Equation 6.

Equation 6

$$\sum_{m=1}^n SCHEX_{THj \rightarrow m} = \sum_{b=1}^c BX_{THj \rightarrow b} + MX_{THj \rightarrow g}$$

Where,

$SCHEX_{THj \rightarrow m}$  = Scheduled Exchanges between NEMO Trading hub  $j$  and each other NEMO Trading hub (and/or group of other NEMO Trading hubs)  $m \rightarrow n$ , which has a border with NEMO Trading hub  $j$ , from the perspective of NEMO Trading hub  $j$

$m$  = Variable representing individual NEMO Trading hubs  $m \rightarrow n$  which have borders with NEMO Trading hub  $j$

$n$  = Number of NEMO Trading hubs which have borders with NEMO Trading hub  $j$

$BX_{THj \rightarrow b}$  = AC/DC Bilateral Scheduled Exchanges between NEMO Trading hub  $j$  and any Neighbouring NEMO Trading hub with NEMO Trading hub  $j$ , from the perspective of NEMO Trading hub  $j$

$b$  = Variable representing any Neighbouring NEMO Trading hub  $b \rightarrow c$  with NEMO Trading hub  $j$

$c$  = Number of Neighbouring NEMO Trading hubs with NEMO Trading hub  $j$

$MX_{THj \rightarrow g}$  = AC Multilateral Exchange between NEMO Trading hub  $j$  border and a group of other NEMO Trading hubs  $g$

Where applicable, the AC Multilateral Scheduled Exchange shall be the Scheduled Exchange between the border of NEMO Trading hub  $j$  and a group of NEMO Trading hubs within the same synchronous area which has a border with NEMO Trading hub  $j$ .

Where applicable, in the specific case of bilateral NEMO Trading hub Scheduled Exchanges between NEMO Trading hubs in different Scheduling Areas or Bidding Zones connected by DC Interconnectors, notwithstanding the direction of the Scheduled Exchanges, the quantity of Bilateral Scheduled Exchanges between NEMO Trading hubs  $j$  and  $k$  from the perspective of NEMO Trading hub  $j$  may not equal the quantity of Bilateral Scheduled Exchanges between NEMO Trading hubs  $j$  and  $k$  from the perspective of NEMO Trading hub  $k$ , due to losses.

For DC Interconnectors, the Bilateral Scheduled Exchanges per DC Interconnector are equivalent to the allocated capacities, in the form of allocated flows, on individual relevant DC network elements resulting from single day-ahead coupling.

## Article 8 - Implementation date

The implementation of Scheduled Exchanges resulting from single day-ahead coupling will coincide with the implementation of single day-ahead coupling per Bidding Zone border in accordance with Regulation 2015/1222. In the interim, stepwise alignment of existing solutions and application of single day-ahead and intraday coupling at a regional level followed by EU level should be progressed.

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The Relevant NEMOs shall take the DA Scheduled Exchange Calculation Methodology and the requirements of the Scheduled Exchange Calculator(s) into account in implementing and performing, in cooperation with TSOs, the market coupling operator function.

TSOs which intend to calculate Scheduled Exchanges resulting from single day-ahead coupling shall apply the DA Scheduled Exchange Calculation Methodology from initiation of single day-ahead coupling per Bidding Zone border.

### **Article 9 - Language**

The reference language for this DA Scheduled Exchange Calculation Methodology Proposal shall be English. For the avoidance of doubt, where TSOs need to translate this DA Scheduled Exchange Calculation Methodology Proposal into their national language(s), in the event of inconsistencies between the English version published by TSOs in accordance with Article 9(14) of the Regulation 2015/1222 and any version in another language, the relevant TSOs shall be obliged to dispel any inconsistencies by providing a revised translation of this DA Scheduled Exchange Calculation Methodology Proposal to their relevant national regulatory authorities.