Market Coupling Steering Committee

Market Coupling Consultative Group meeting

7th June 2022

Agenda

	Topics	Timing	Speaker, experts
Morning session 9:00 – 11:40			
1	Welcome Recap of the Terms of Reference Presenting the co-convenors	9:00 – 9:10	Helene Robaye Javier Barrantes Pierre Milon
2	High level overview of the new Market Coupling organization	9:10 – 9:30	Miha Pregl Jean Verseille Stefano Aliamo
3	**SDAC**: Impact analysis for 20 minutes extension	9:30 – 9:55	Mario Pession Tjacka Bus
4	**SDAC**: Non Uniform Pricing (NUP) concept	9:55 – 10:45	Francois Lucas
5	**SDAC:** publication of aggregated curves: publication of execution status of blocks	10:45 – 11:15	Miha Pregl Timo Suhonen
6	**SDAC & SIDC** 15 minutes Market Time Unit (MTU) roadmap overview	11:15 – 11:40	Fabian Heus Dávid Barta
Lunch break		11:40 – 14:00	

Agenda

Afternoon session 14:00 – 16:15			
7	**SIDC**: Result of consultation on SIDC Product	14:00 – 14:15	Hilde Rosenblad
8	**SIDC**: Cross Product Matching (CPM): presenting the concept	14:15 – 15:15	David Myska, Auke van der Zijden
9	**SIDC**: Intraday Auctions (IDAs)	15:15 – 15:45	David Myska
10	Announcement of consultation on Harmonised Maximum and Minimum Clearing Prices (HMMCP) Methodology for **SDAC** ad **SIDC**	15:45 – 16:00	Hilde Rosenblad
11	Closing remarks	16:00 – 16:15	Helene Robaye Javier Barrantes Pierre Milon

Market Coupling Steering Committee

Welcome

Introduction of the Market Coupling Consultative Group (MCCG)

Helene Robaye, Javier Barrantes, Pierre Milon

MCCG co-convenors

Welcome - by co-convenors of MCCG

Introduction of the ToR of the MCCG
Main objectives:

- To consult market participants on issues related to the design, development, implementation and operation of SDAC and SIDC
- To facilitate the exchange of views and information among NEMOs, TSOs and market participants
- this group will support the preparation of certain topics to be addressed in the MESC.

Scope:

- Terms, Conditions or Methodologies of EU-wide scope under CACM
- Developments and operation of SDAC and SIDC
- Relevant technical presentation and impact assessments
- High-level follow-up of relevant regional implementation projects

Membership and attendance

- The MCCG is open to everyone, the active members are the MCCG co-convenors, market participants (EFET, Eurelectric, IFIEC, etc.), relevant conveners or experts from NEMOs and TSOs actively contributing, individual market participants, representatives of individual NEMOs and TSOs

Governance

- MCCG is first and foremost a forum aiming at reaching a better common understanding between market participants, and NEMOs and TSOs. It has no decision-making power related to operation or implementation, which is a role belonging to the MCSC. The outcome of MCCG discussions will be duly considered by the MCSC. The MCCG can facilitate reaching aligned positioning that could be presented jointly to e.g. MESC.
- The MCCG is led by three co-convenors: one NEMO co-convenor, one TSO co-convenor, and one market participants co-convenor.
- MCCG meetings will typically take place twice a year

Welcome - by co-convenors of MCCG

The MCCG is led by three co-convenors:

Market participants co-convenor:
Helene Robaye, Head of Regulation & Market Design, ENGIEENGIE

TSO co-convenor:
Javier Barrantes, Markets Advisor, Red Eléctrica de España

NEMO co-convenor:
Pierre Milon, Head of Market Coupling Projects & Algorithm, EPEX SPOT

Market Coupling Steering Committee

High level overview of the Market Coupling organization

Miha Pregl, Jean Verseille, Stefano Aliamo

MCSC Co-chairs

Market Coupling Steering Committee

In January 2022, a new joint governance structure was implemented in order to achieve a better cooperation between NEMOs and TSOs in the SIDC and SDAC projects. All NEMOs and TSOs have been working intensely over recent years to achieve a truly integrated European electricity market. By integrating the decision making for both the day-ahead and intraday timeframe, the new structure will ensure further coordination, foster efficiency and create a faster decision-making mechanism.

MCSC is a new governance structure where **cooperation among NEMOs and TSOs is taken to another level with the creation of a new joint structure**. The first meeting of the newly formed MCSC took place on 2nd - 3rd February 2022.

All NEMOs and TSOs have decided to go beyond advocacy and to start implementing, on a voluntary basis, some of the most relevant building blocks of their proposals for the CACM review:

joint Qualified Majority Vote, which will speed up decision making and avoid escalation to authorities, and **the creation of a Consultative Group with stakeholders.**

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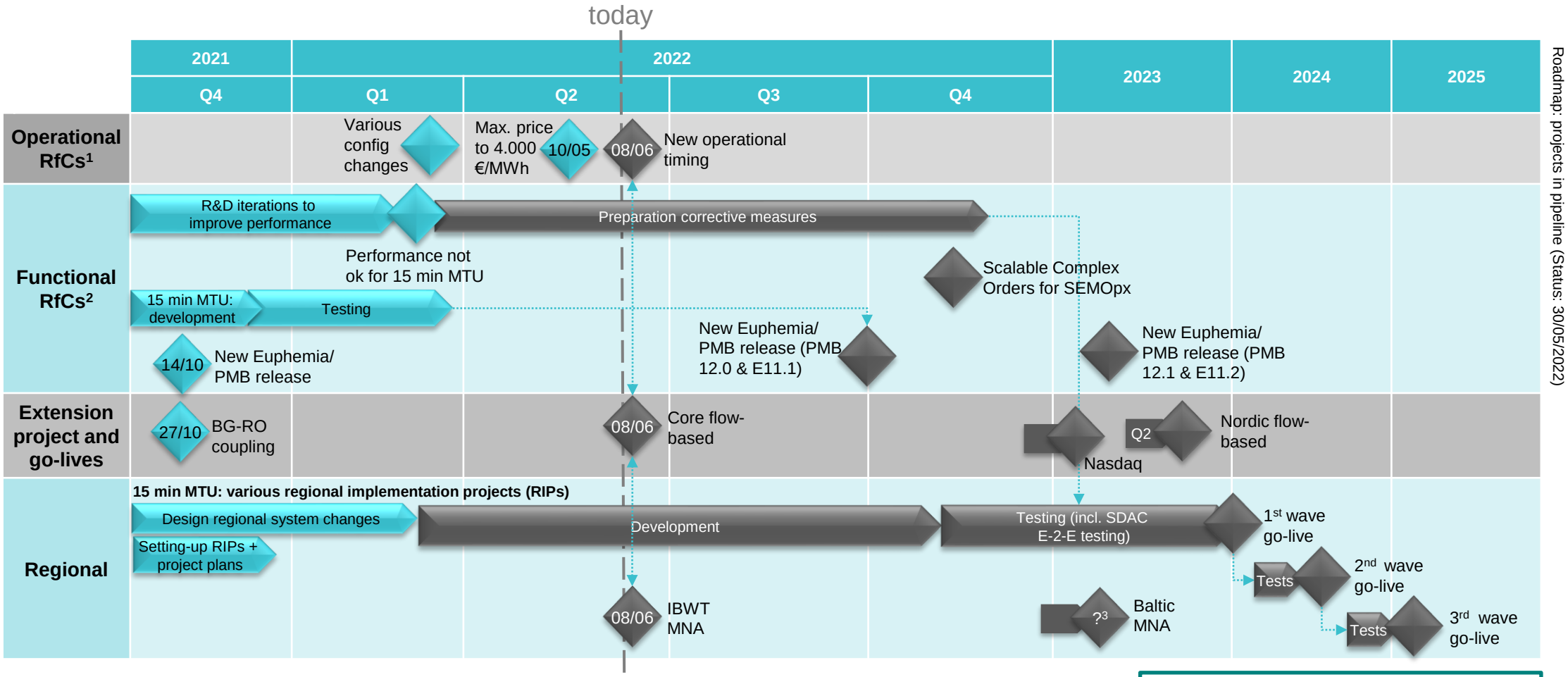
Overview of SDAC

Miha Pregl

MCSC Co-chair

SDAC

SDAC overview – high-level roadmap



[1] Changes of topology, bidding zones, which will have an effect on the operations of the market coupling. Not necessarily related to a change of Euphemia algorithm,
but could possibly have as a prerequisite that a functionality is implemented first.
[2] A change of functionality of Euphemia → requires a change in the algorithm. Hence, linked to algorithm releases.
[3] Baltic MNA go-live is pending the entrance of a second NEMO

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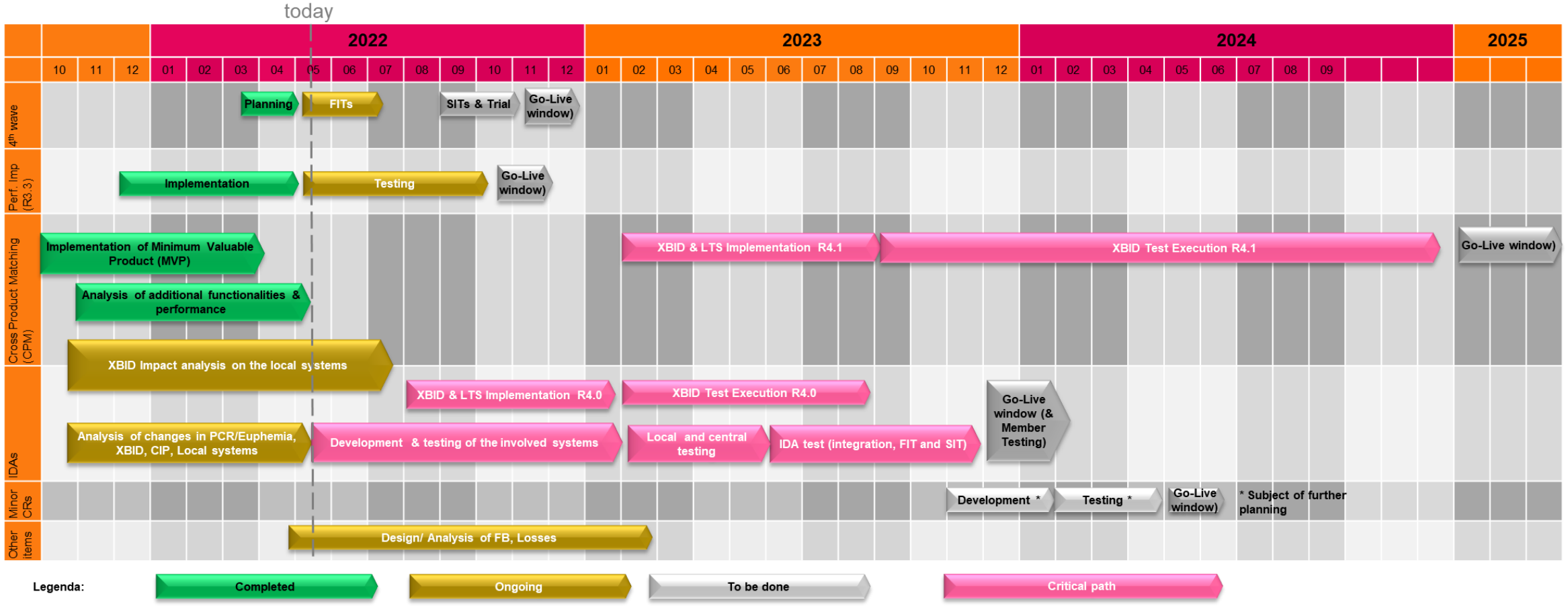
Overview of SIDC

Jean Verseille, Stefano Aliamo

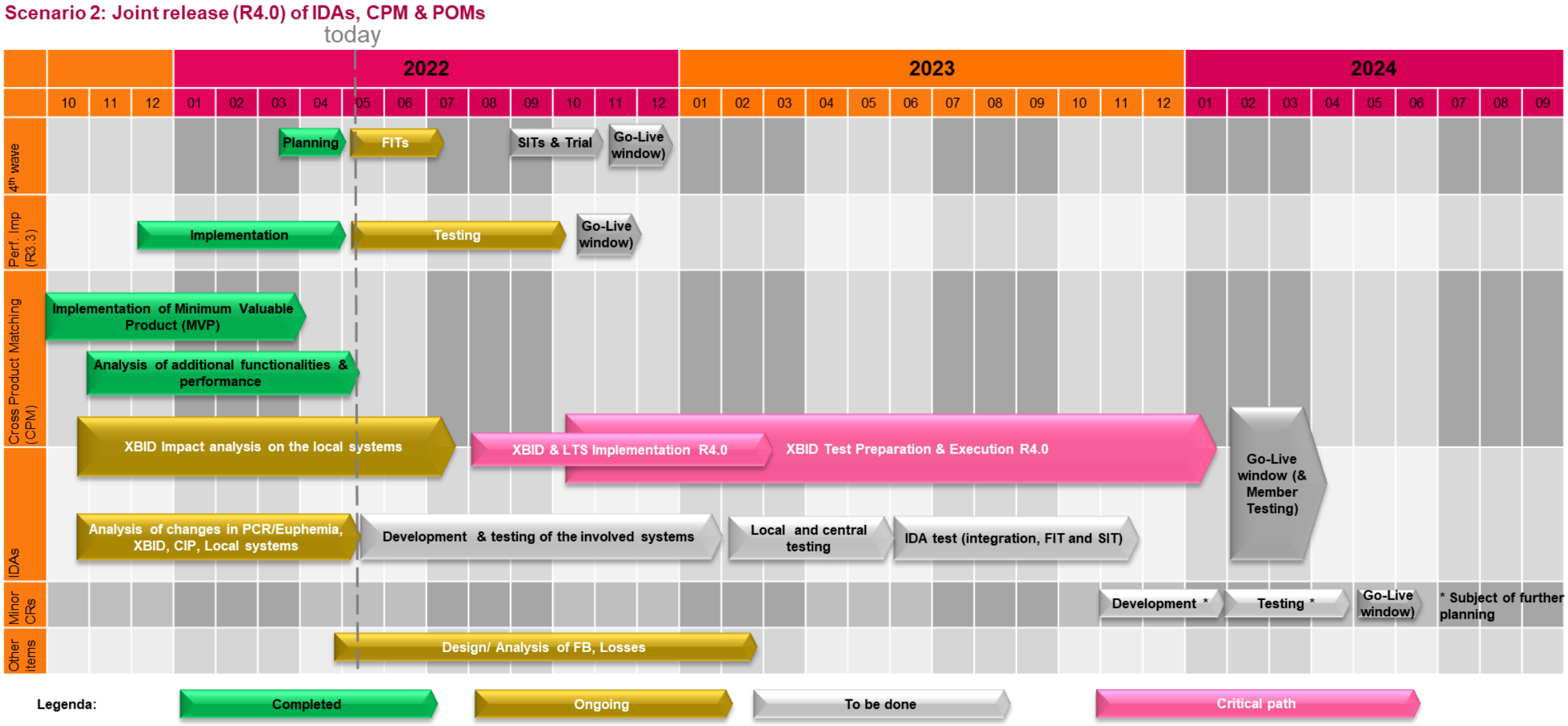
MCSC Co-chairs

SIDC overview – high-level roadmap – Scenario 1

Scenario 1: 1st release for IDAs & IDA POMs (R4.0), 2nd release CPM & POMs (R4.1)



SIDC overview – high-level roadmap – Scenario 2



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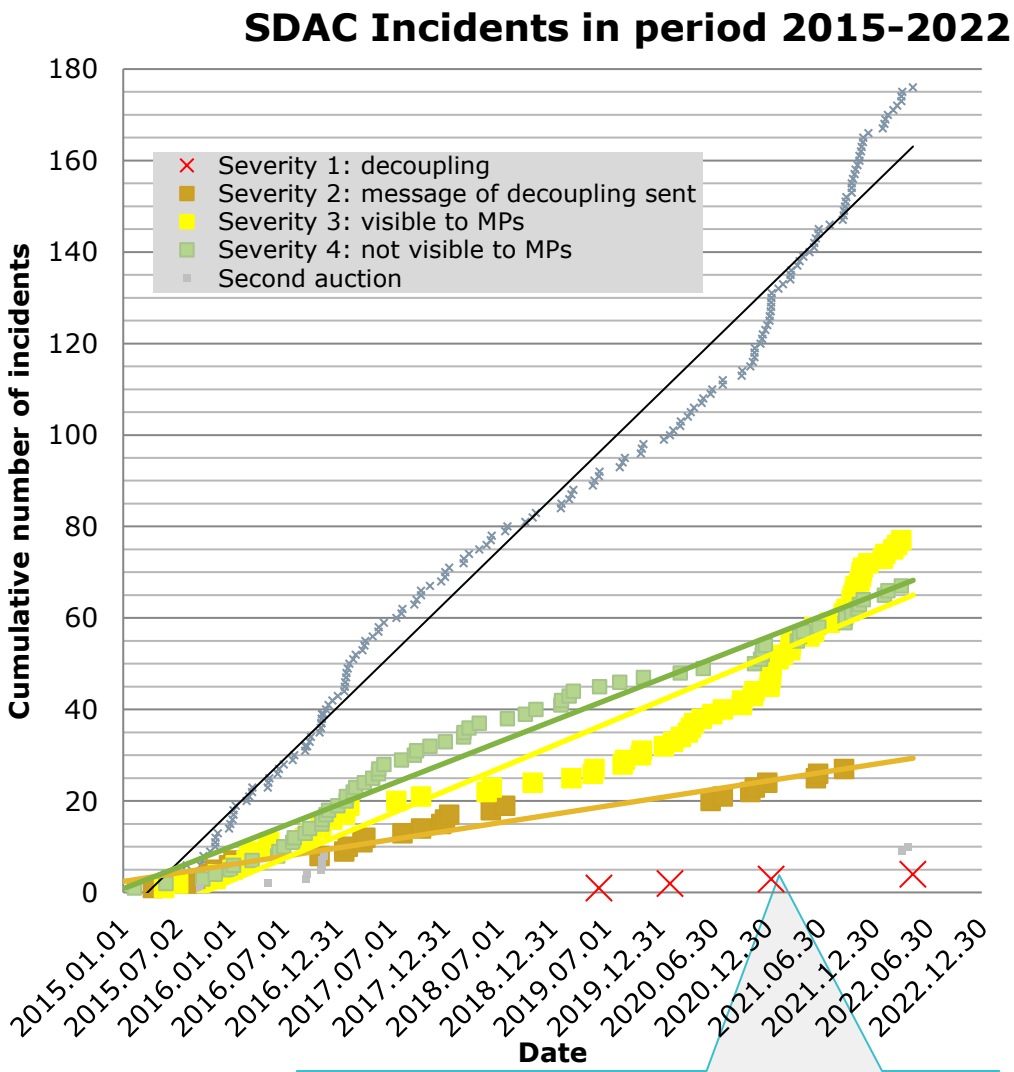
SDAC: Impact analysis for 20 minutes extension

Mario Pession

SDAC and ANDOA OPSCOM Chair

SDAC: Proposed new operational timing

- In the last years, **operations are becoming more and more complex** (due increased complexity of topology, systems, and procedures).
- This is leading to an **increased incident rate and more severe incidents**.
- The most severe incidents that have happened until now are the partial decoupling of a single NEMO, which means decoupling also of some borders related to that NEMO and not optimal allocation of flows in Europe.
- In order to secure robust and reliable operations in the period to come, SDAC has been looking into mitigation measures in order to give more time to the process in case of incidents and to reduce the risk of partial and full decoupling



Partial decoupling incidents: 4 in total

- at least one would have been avoided, if the proposed additional 20 minutes would have been available.
- Costs related to decoupling incidents, easily amount multiple millions of Euros.

SDAC: Proposed new operational timing

- The SDAC processes that have been evaluated concern those between 12:00 (order book closure time) and 15:30 (last deadline for nomination in some areas).

- Several options have been explored in order to gain additional time for the whole process:
  1. **Second auctions abolishment after SDAC full decoupling where this second auction was putting some constraints on the global timeline**
  2. **No reopening of orderbooks after partial decoupling**
  3. **Remove partial decoupling for order book reason**
  4. **Anticipation of Orderbook Gate Closure Time (earlier than 12:00)**

An analysis of pros and cons is presented in the next slides.

Publication of impact assessment: 1/4 Slides elaborating on the different options

1. Second auctions abolishment after SDAC full decoupling

- Description: some fallback regional procedures after full decoupling allocate some time for a possible second local auction after having run the local auction.
- This puts some constraints on timings due to this allocated time, so that the full decoupling deadline should consider also that additional time after it is declared. Removing this option (only in the areas where this puts a constraint on the full decoupling deadline) would give more time to the global common process.

Criteria and scoring									
Impact central TSO systems (e.g. CWE TSO CS, Nordic Selecting Service, etc.)	Impact central NEMO systems (PMB and Euphemia)	Impact local TSO systems (pre-coupling system, back-end, etc.)	Impact local NEMO systems (e.g. Local Trading System)	Impact on procedures	Impact on the market	Need for NRA approval	Implementation time	Cons	Expected gain
None	None	None	Low	Low, because it would concern the removal of a process that is currently in place	Medium, because MPs cannot change offer if after a full decoupling, a high price is detected	Yes	Long, because of NRA approval	It requires regulatory change Risk of extreme prices in decoupled zones (when MPs cannot adapt).	20 min

- Comments:
  - Second auction at SDAC level to be distinguished from CWE second auction after full decoupling
  - Situation has never occurred until now

Publication of impact assessment: 2/4 Slides elaborating on the different options

2. No reopening of orderbooks after partial decoupling

- Description: Use the originally submitted orderbooks, after a partial decoupling has been declared, even if the situation related to network data is changed: shadow auctions are run and interconnector capacities are no more considered in the SDAC process (but original offers considered it); also parties in MNA context can move their offer to another NEMO in the same bidding zone

Criteria and scoring									
Impact central TSO systems (e.g. CWE TSO CS, Nordic Selecting Service, etc.)	Impact central NEMO systems (PMB and Euphemia)	Impact local TSO systems (pre-coupling system, back-end, etc.)	Impact local NEMO systems (e.g. Local Trading System)	Impact on procedures	Impact on the market	Need for NRA approval	Implementation time	Cons	Expected gain
None	None	None	None	Low, because it would concern the removal of the local reopening process.	High	Yes	Long, because of NRA approval	MPs cannot adapt to the new situation (i.e. loss of capacities after shadow auctions). Low acceptance from some MPs expected in MNA context, because very valuable to have the possibility to move the orders from one NEMO to another.	30 min Small simplification of the daily operational process.

- Comment: For transparency reasons, this is not considered as a valid possibility.

Publication of impact assessment: 3/4 Slides elaborating on the different options

3. Remove partial decoupling for order book reason

- Description: the partial decoupling deadline (currently at 12.40) will be removed leaving only the full decoupling deadline (currently at 13.50).
- This would mean that if an order book cannot be generated in time, the whole Europe would go directly to the full decoupling. Given the high number of order books in comparison with the start of SDAC (former MRC), this would mean a significantly higher risk of full decoupling.

Criteria and scoring									
Impact central TSO systems (e.g. CWE TSO CS, Nordic Selecting Service, etc.)	Impact central NEMO systems (PMB and Euphemia)	Impact local TSO systems (pre-coupling system, back-end, etc.)	Impact local NEMO systems (e.g. Local Trading System)	Impact on procedures	Impact on the market	Need for NRA approval	Implementation time	Cons	Expected gain
None	None	None	None	Low, because it would concern the removal of processes.	High	Yes	Long, because of NRA approval	This makes the whole SDAC more sensitive for a full decoupling. Rather than decoupling a part of Europe, this would result in a full decoupling.	75 min Significant simplification of the daily operational process.

Publication of impact assessment: 4/4 Slides elaborating on the different options

4. Anticipation of Orderbook Gate Closure Time

- Description: Gaining time in the morning where TSOs are less pressed by time by moving order book gate closure earlier, i.e. 11:00 or 11:30 CET (if going for this, this needs to be included in the revision process of the CACM)

Criteria and scoring									
Impact central TSO systems (e.g. CWE TSO CS, Nordic Selecting Service, etc.)	Impact central NEMO systems (PMB and Euphemia)	Impact local TSO systems (pre-coupling system, back-end, etc.)	Impact local NEMO systems (e.g. Local Trading System)	Impact on procedures	Impact on the market	Need for NRA approval	Implementation time	Cons	Expected gain
Low	None	Low	Low	Medium	High, since processes will be heavily impacted	Yes, ACER (and EC?)	Long	Unless the whole process starts earlier, 1) less time to fix CZC calculation issues, 2) impacting the capacity firmness process and deadline. 3) less time for the MPs	Same as the number of minutes that the gate closure time is shifted

Comments: As a follow up, it could be investigated whether there are big issues to be expected (previous consultations show challenges with acceptance from the market).

Conclusions 1/2

- In SDAC it was evaluated (through evaluation and scoring of the different options) that the less impacting action and most promising way to obtain some additional time was the **removal of second auctions, after full decoupling** in the regions where this puts time constraints to the whole process (second auction after full decoupling can be still be executed if there is time but taking in consideration that the new full decoupling deadline is 14.20).
  - Currently, time is reserved in the operational processes for the option to run in CWE and Hungary a second auction, after a SDAC full decoupling.
  - Both incidents leading to full decoupling, as well as market situations leading to second auctions, are considered rare events.
  - SDAC parties consider the avoidance of decoupling (even) more important than the options for organizing second auctions in some regions only.
  - Therefore, SDAC decided to not facilitate a second auction process in case of a full decoupling in order to gain that time for the global process.

Conclusions 2/2

- **20 minutes time were gained**
  - Time will be used to strengthen the robustness of the daily operational processes in case particular situation will appear.
  - By using the gained 20 minutes for solving issues in the market coupling process, the TSOs and NEMOs can secure a more robust operations and decrease the risk of partial and full decoupling, dedicating more time to the solution of issues in the global SDAC process.
  - These additional 20 minutes are required to manage SDAC's current & future challenges.
- With the removal of the second auction (in case of a decoupling situation) the deadline to declare full decoupling will be moved by 20 min to 14:20 CET & the partial decoupling will be moved to 13:05 CET.
  - The regional fallback procedures and shadow auction rule were adjusted, and NRA approvals collected.
  - The change will be implemented together with the go-live of Core FB 08/06/2022.

Market Coupling Steering Committee

SDAC MCCG

The Non-Uniform Pricing Approach
Context and basics of this R&D topic

02/05/2022

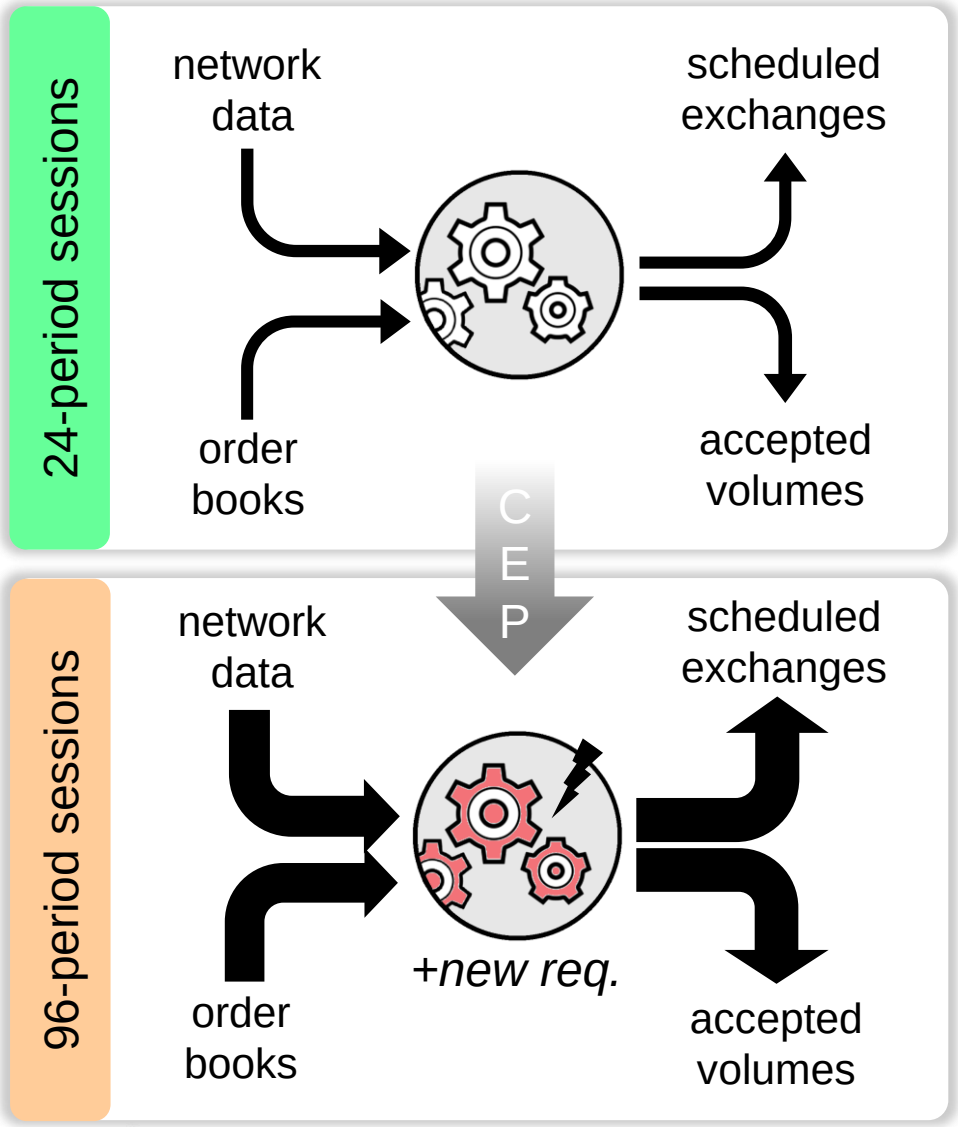
François LUCAS

SDAC MSD NEMO Co-leader

NUP in SDAC: Why is it investigated and where do we stand

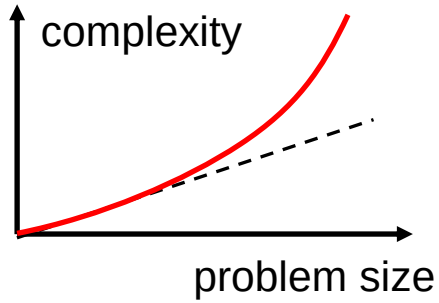
- In line with EU Clean Energy Package (CEP), SDAC is preparing the move of DA market coupling auctions from a time resolution of 60 min to 15 min. **This represents a significant additional challenge for the algorithm performance.**
  - Already the current challenges require continuous R&D to comply with the limited operational timings allowed to determine the best solution
  - For the implementation of 15 min, performance may not suffice to maintain everything in place – an arbitrage of requirements might be needed
- **« Non-Uniform Pricing » (NUP) is being investigated in SDAC Euphemia Lab as part of the disruptive topics that may bring a significant increase in performance**
- **Aim of this presentation:** provide the consultative group and market participants with insights on the last achievements of the research (still ongoing) on the NUP, as a starting point for future dialogue on the NUP

Context: Changes brought by the CEP as for the 15´MTU



15-min MTU

- An **unprecedented change**
- A **must-have**
- A **challenge** for the **algorithm performance**



R&D

- Dedicated research since 2019
- Significant improvements made
- Performance goals not yet met
- Implementation scenarios in progress

Reaching expectations for 15 min MTU implementation

Mitigations measures

Improvements

Actions
- Review of requirements
- R&D
- HW

Goals
- Potential simplifications
- Improved efficiency

Outcomes
- Evolutive changes
- **Disruptive changes: NUP**

Timing

Actions
- Review of market coupling processes & timings

Goals
- Allocation of additional time for calculation

Outcomes
- Evolution of operational procedures

Main objectives of SDAC

- Maintain consistent market design & price formation
- Ensure algorithm's scalability for future evolutions

NUP investigated within 15' MTU implementation: Performance gains would be enablers for new features in the algorithm.

Back-up solution in case Improvements & Timing not sufficient

Corrective measures

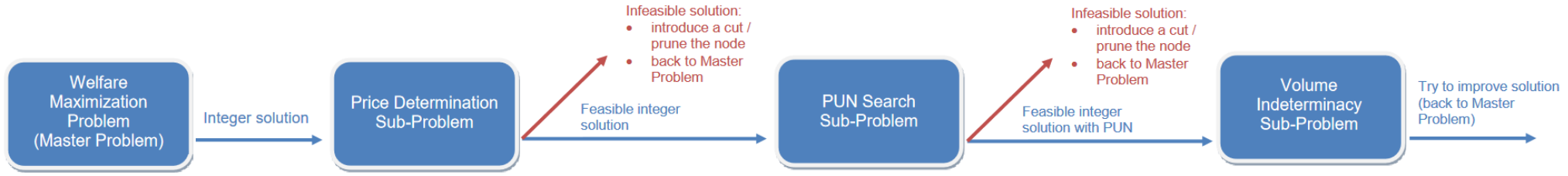
Actions
- Limit non-essential but performance impacting requirements

Goals
- Temporary alleviation of the problem complexity

Outcomes
- List of applicable corrective measures

Non-Uniform Pricing (NUP) motivation: Increase of performance

Current setup = Strict Linear Pricing **(SLP)**



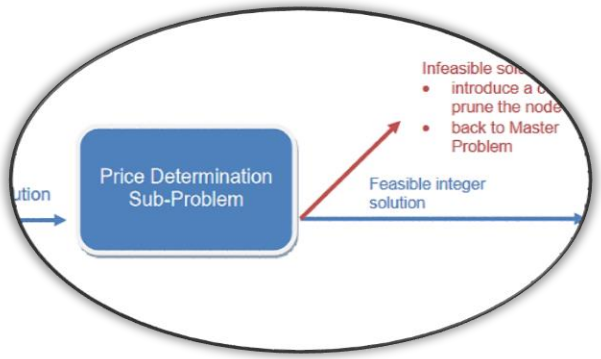
- **Part of time** is spent in assessing infeasible solutions
  - Rejection of a **candidate solution** may occur

from: Euphemia public description (12/10/2020)

Non-Uniform Pricing **(NUP)**

- **Scalability and performance gain as the volumes and the prices are set separately**
  - Guarantee to infer a solution from each candidate one
  - NUP could also make more efficient use of parallel computation with Distributed Computing
- **Requires**
  - Defining side-payments to compensate paradoxically accepted bids
  - Finalizing the replacement of Complex Orders (COs) with *Scalable COs* (SCOs)
  - Decommissioning of PUN (currently assessed in Italy, independently from the NUP)

NUP in SDAC: concept & properties investigated so far (R&D ongoing)



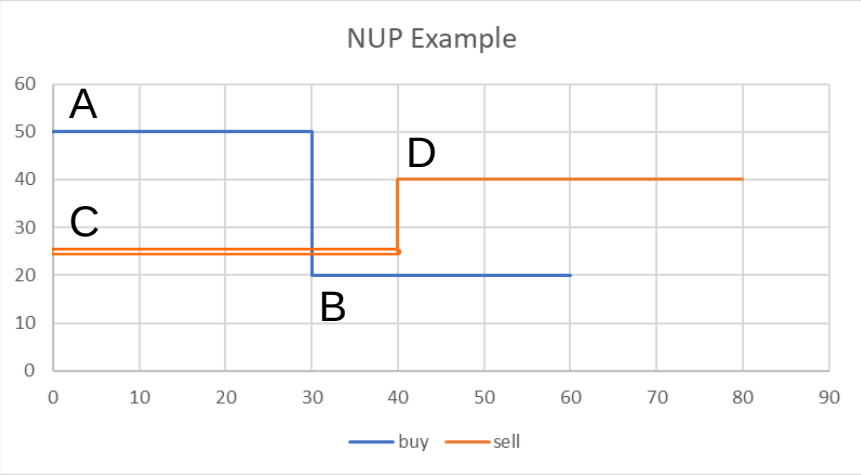
Paradoxically-Accepted Bids (PABs)
(only inflexible bids can be PAB)

Current model (SLP)	NUP
✗ Reject the solution	☑ Accommodate PABs

- **Welfare maximization respected:** Optimal solutions to the NUP problem are at least as good as in the current set-up (SLP)
- **PABs can occur within NUP**
  - They only occur if they benefit to the overall welfare, i.e. allow matching more volumes which generate surplus
  - **They must be compensated by a side-payment and be settled paid-as-bid** (= they are not executed at a loss)
- **SDAC parties are currently assessing different side-payments options**
  - Attention given to the definition of contributions, so that the mechanism is considered "fair"
  - The solution shall not lead to financial concerns from MP point-of-view
  - The solution shall not lead to significant changes in bidding behaviours

The research is still ongoing. The following section presents several examples, based on outcomes achieved so far - but no decision of the preferred design has been taken.

NUP in SDAC: example (1 NEMO hub only)

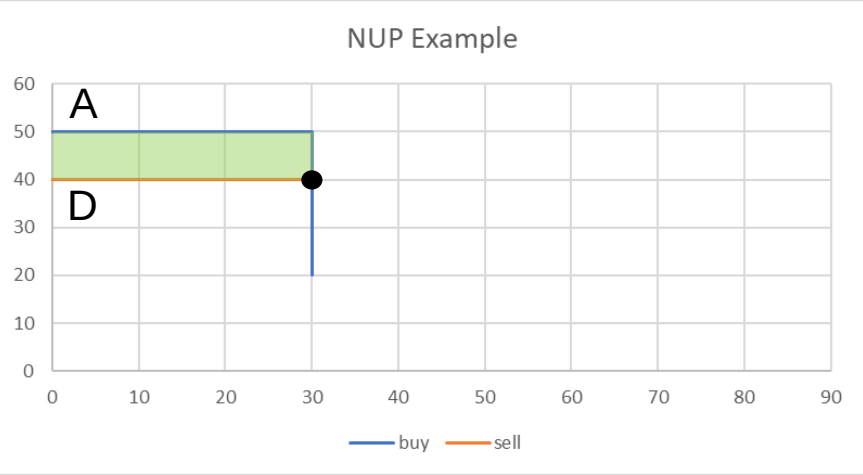


buy orders				
order	NTH	type	quantity	price
A	1	curve	30 MWh	50 €
B	1	curve	30 MWh	20 €

sell orders				
order	NTH	type	quantity	price
C	1	block	40 MWh	25 €
D	1	curve	40 MWh	40 €

NUP in SDAC: example (1 NEMO hub only)

Current setup = Strict Linear Pricing (SLP)



buy orders				
order	NTH	type	quantity	price
A	1	curve	30 MWh	50 €
B	1	curve	30 MWh	20 €

sell orders				
order	NTH	type	quantity	price
C	1	block	40 MWh	25 €
D	1	curve	40 MWh	40 €

Allocation:
- C cannot be accepted (being a block)
- D is accepted (30 MWh) and matches A
- B is out-of-the-money

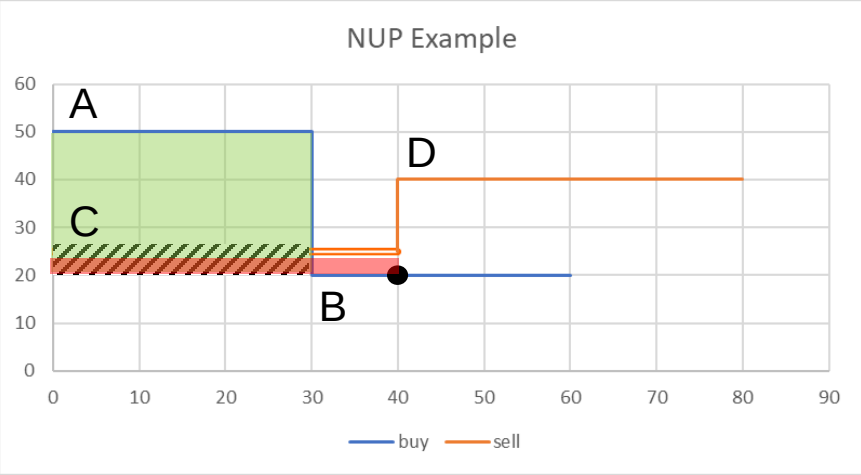
Settlement (balanced):
- A pays 1200 €
- D receives 1200€

MCP	welfare
40€/MWh	300€

(order D)

NUP in SDAC: example (1 NEMO hub only)

Non-Uniform Pricing (NUP)



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sell orders				
order	NTH	type	quantity	price
C	1	block	40 MWh	25 €
D	1	curve	40 MWh	40 €

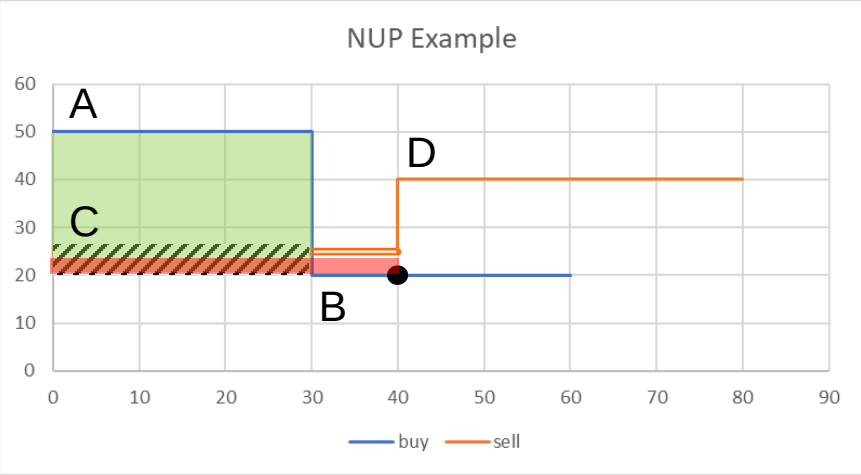
Allocation:
- A fully accepted
- C accepted (beneficial to the welfare)
- B accepted at-the-money (10 MWh)
- D is out-of-the-money

Settlement (balanced):
- Principle applied in this example: orders generating surplus equally contribute to compensation of PABs

MCP	welfare		surpluses		losses
20€/MWh	700€	=	900€	+	200€
			(order A)		*(order C)*

NUP in SDAC: example (1 NEMO hub only)

Non-Uniform Pricing (NUP)



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B	1	curve	30 MWh	20 €

sell orders				
order	NTH	type	quantity	price
C	1	block	40 MWh	25 €
D	1	curve	40 MWh	40 €

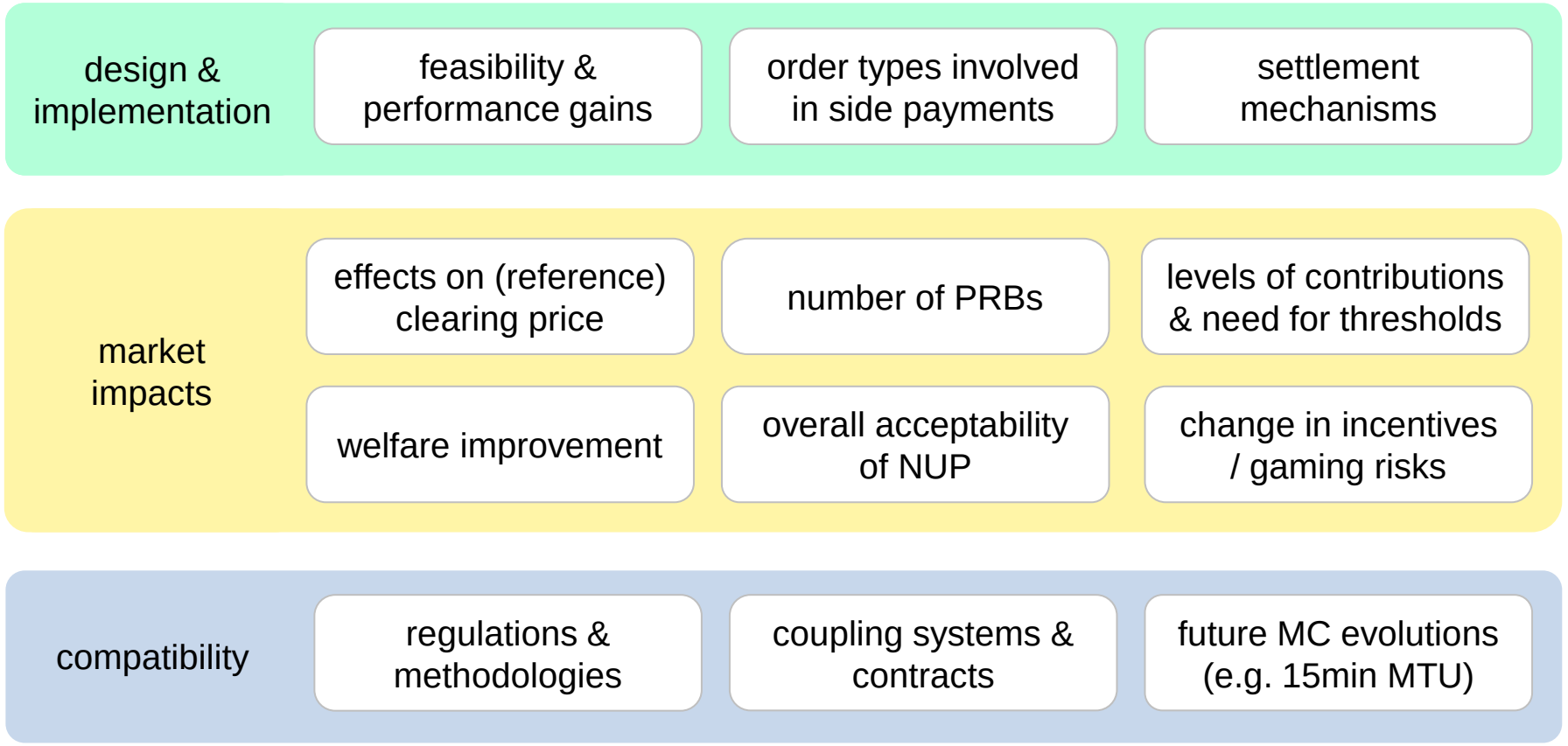
Allocation:
- A fully accepted
- C accepted (beneficial to the welfare)
- B accepted at-the-money (10 MWh)
- D is out-of-the-money

Settlement (balanced):
- A pays 600 € **+ 200 €**
- B pays 200 €
- C receives 800€ **+ 200 €**

« side payment »

MCP	welfare		surpluses		losses
20€/MWh	700€	=	900€	+	200€
			(order A)		*(order C)*

NUP within SDAC: points of attention being studied / to be further studied



The research will continue, updates will be shared with market participants and their feedback and inputs will be collected.

Market Coupling Steering Committee

SDAC: publication of aggregated curves

Timo Suhonen

ANDOA PMB Leader

SDAC: publication of aggregated curves

- Aggregation of the Bid Curves has been in production since fall/2021
  - Supported by list of anymized block orders / Bidding Zone (cluster)

- During 2H/2022 NEMO will introduce the requested improvement to include the execution status of the Block orders
  - Accepted, Rejected or Paradoxically Rejected
  - The target go live of the new release is October/2022. The schedule shall be updated during early July.

Market Coupling Steering Committee

SDAC: 15 minutes Market Time Unit (MTU) roadmap overview

Fabian Heus

15 min MTU Implementation Coordination Group Leader

15 min MTU implementation in SDAC

- **In line with EU Clean Energy Package (CEP), SDAC is preparing the move of DA market coupling auctions from a time resolution of 60 min to 15 min.**
  - This represents among others a significant additional challenge for the algorithm performance
  - The implementation is foreseen in 3 waves, starting in beginning 2024 (see further slides); it is coordinated by a dedicated body (eg testing activities etc)

Progress of the project:

- **The adaptation of the central assets is being finalized**, e.g. functional adaptations of Euphemia so that it can handle 15' data and provide 15' results

- A risk register has been created at the start of the project. One risk materialised: performance issues preventing go live of 15' MTU in the whole SDAC.
  - **Several internal improvements coming from R&D have already been concluded to increase the performance**
  - **Allocating additional time to the algorithm in the DA MC process is under investigation**
  - Further (R&D) are being explored and discussed, based on Performance Optimization Plan that is established in SDAC
  - However despite the improvements concluded and under exploration the challenges remain significant due to which additional measures might be needed which impact existing requirements and products

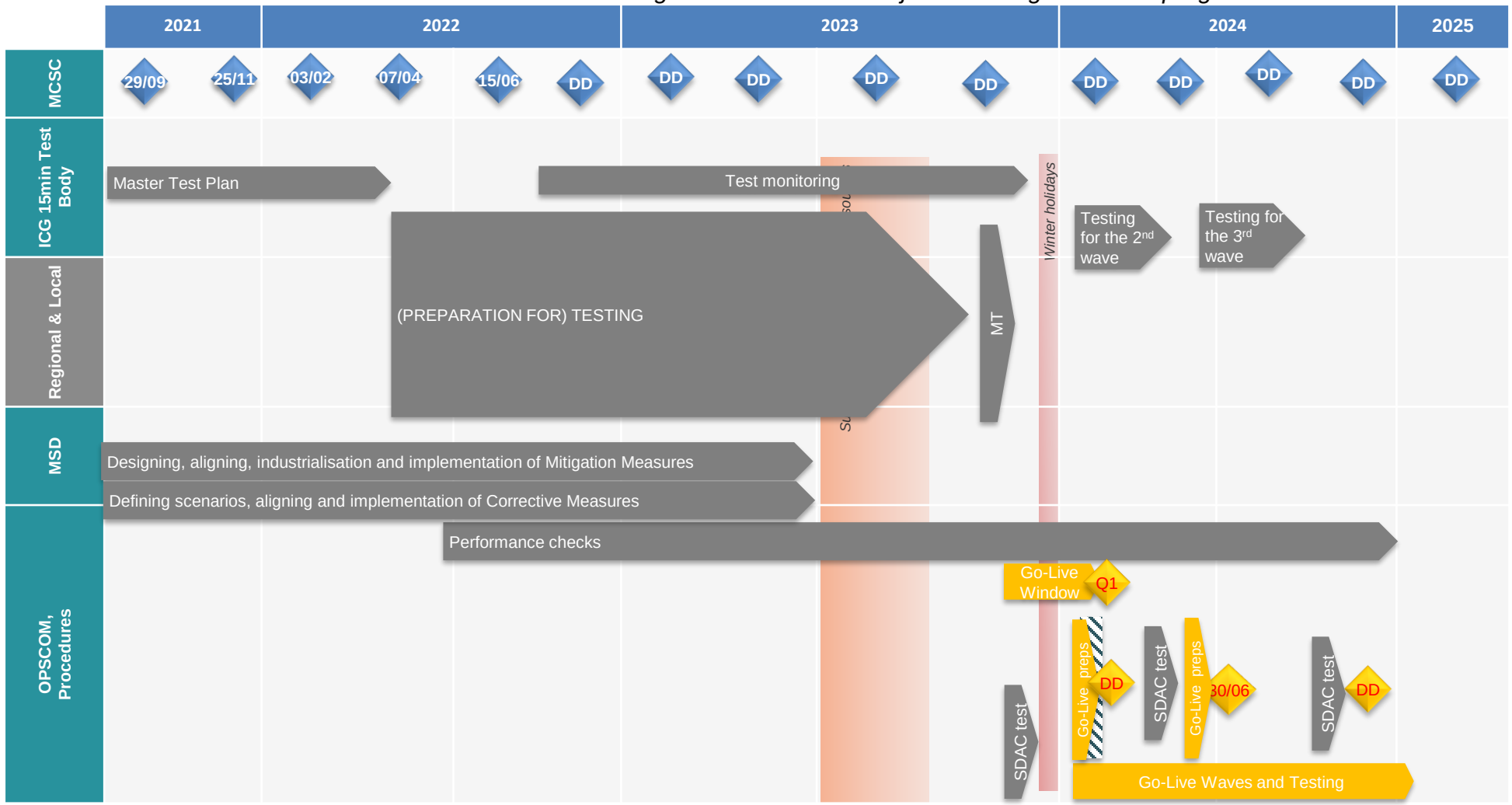
- **Based on SDAC assessment of the performance challenges following insights can already been shared:**
  - No solution can be found which allows PUN to be accommodated in a 15 min MTU context
  - Remove Complex Orders and replace with Scalable Complex Orders brings performance gain
  - Facilitating only 15' MTU products instead of combination of 15'/'30/'60 within bidding zones might ease the performance issue (under investigation)
  - Non Uniform Pricing shall increase algorithm performance (dedicated presentation for NUP concept in previous slides)

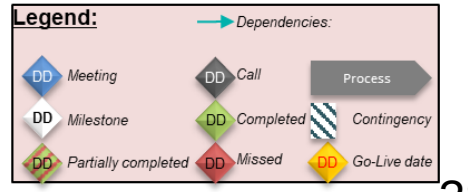
- To be noted that no decisions taken so far as investigations are ongoing

- This performance risk jeopardizes the current project timeline and planning for the 1st go live wave in 2024 as it cannot be confirmed at this moment that the algorithm will be performant enough to support 15' MTU in SDAC

SDAC 15 min MTU overall plan

Please note that the nature of this Overall Planning is flexible as it is subject to changes as time progresses.

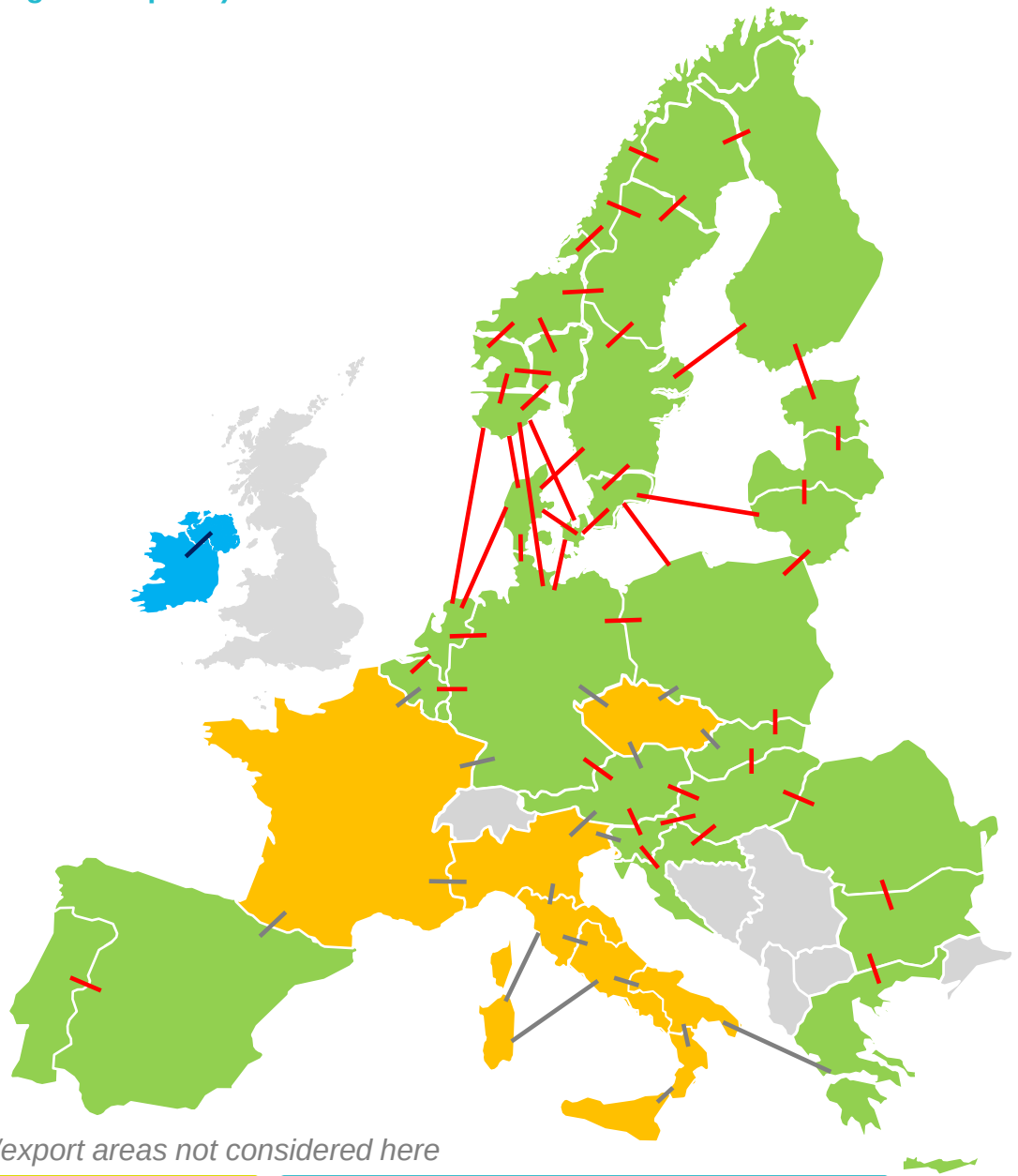




Go-Live wave 1

Q1-Q2 2024 (working assumption)

Market Coupling Steering Committee



- BZB on 15 min MTU
- BZB on 30 min MTU
- BZB on 60 min MTU

- BZ on 15 min MTU
- BZ on 30 min MTU
- BZ on 60 min MTU
- Not part of SDAC coupling

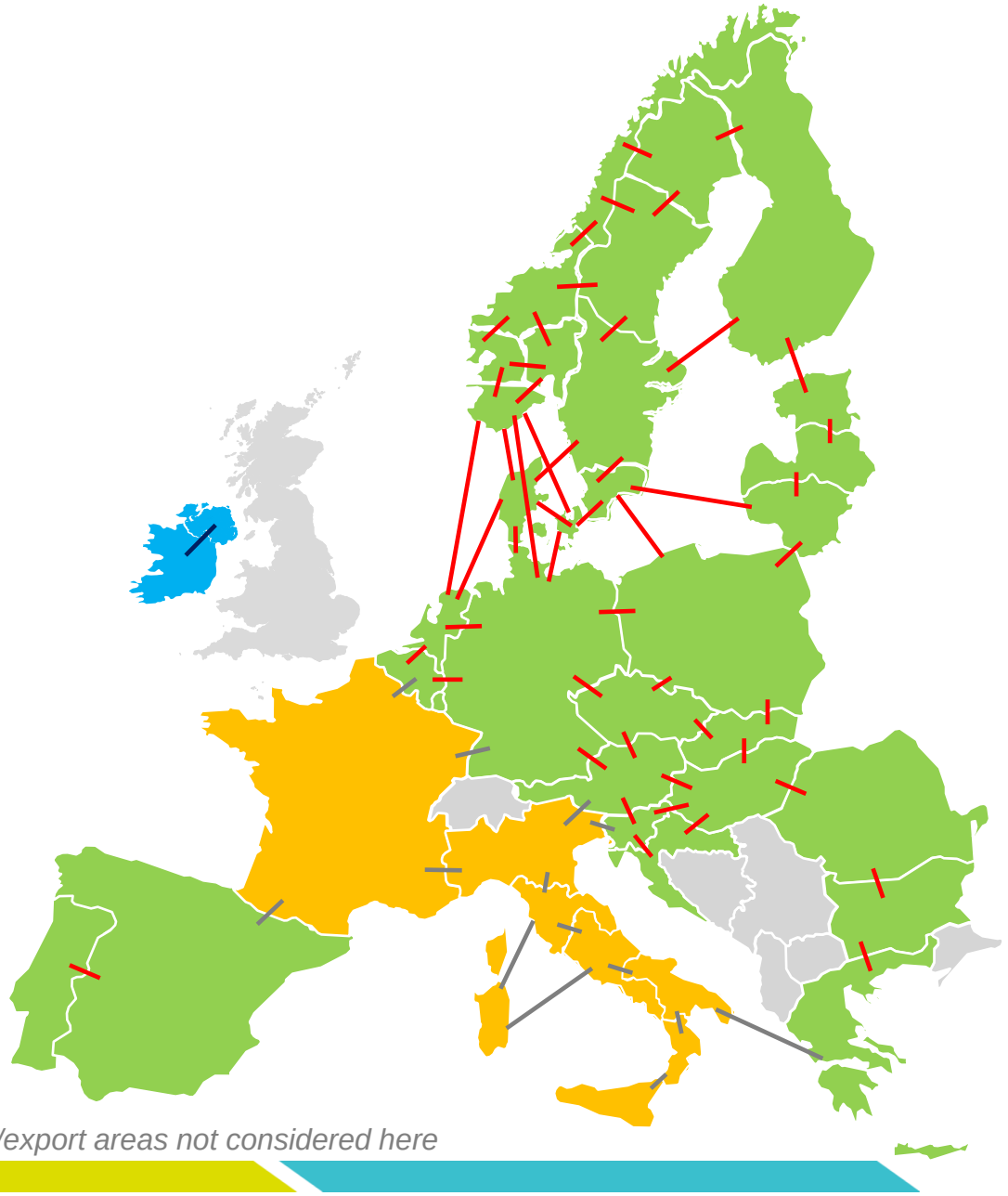
AT, BE, DE, ES, GR, PL, SI, SK areas will have to manage several BZB resolutions

note: import/export areas not considered here

Go-Live wave 2

Czech Republic moves to 15 min MTU on June 30, 2024

Market Coupling Steering Committee



BZB on 15 min MTU
BZB on 30 min MTU
BZB on 60 min MTU

BZ on 15 min MTU
BZ on 30 min MTU
BZ on 60 min MTU
Not part of SDAC coupling

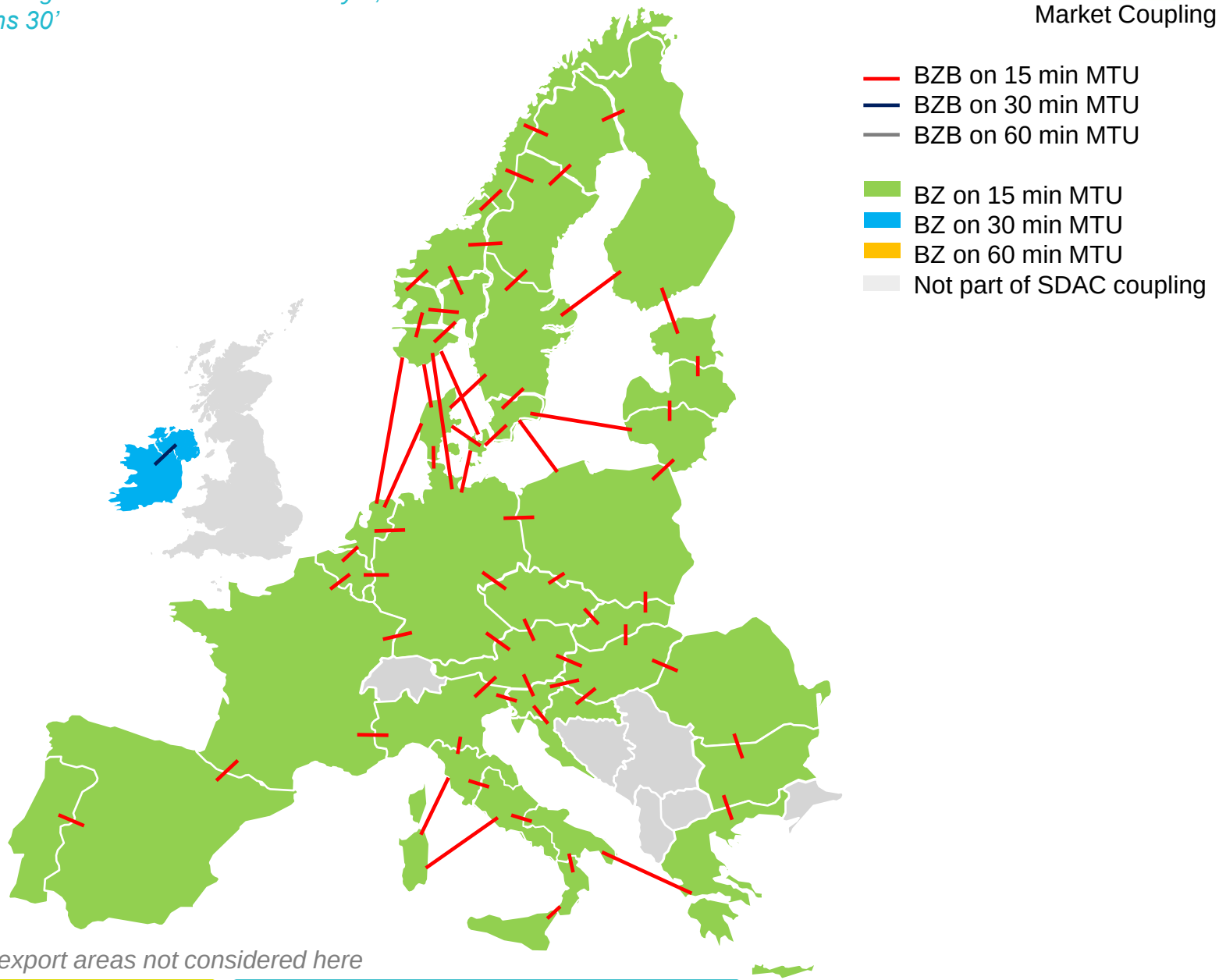
AT, BE, DE, ES, GR, SI areas will have to manage several BZB resolutions

note: import/export areas not considered here

Go-Live wave 3

France and Italy moving to 15 min MTU on January 1, 2025
Only Ireland remains 30'

Market Coupling Steering Committee



note: import/export areas not considered here

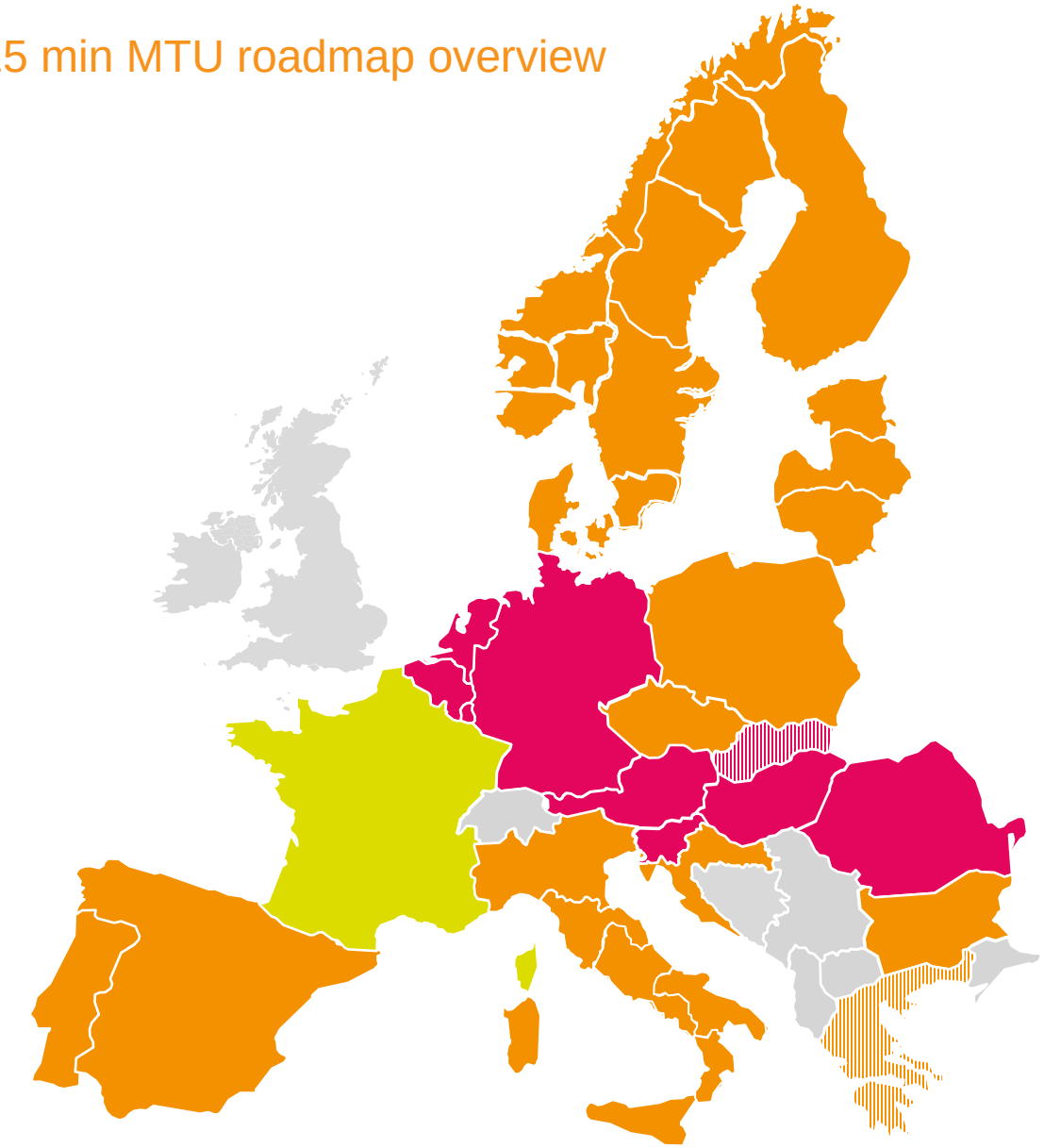
Market Coupling Steering Committee

15 minutes Market Time Unit (MTU) roadmap overview

Dávid Barta

SIDC OPSCOM Chair

SIDC: 15 min MTU roadmap overview



Lowest product granularity in particular BZs

- BZ on 15 min MTU
- BZ on 30 min MTU
- BZ on 60 min MTU
- BZ will join to SIDC with 15m MTU in Q4 2022
- BZ will join to SIDC with 60m MTU in Q4 2022
- Not part of SIDC coupling

Note 1: Hourly products are avaliable in every SIDC country

Note 2: 30-min products are currently tradable across the borders FR-DE, FR-BE and BE-NL.

Note 3: 15-min products are currently tradable across the borders BE-NL, BE-DE, NL-DE, AT-DE, AT-HU, AT-SI and HU-RO.

Upcoming 15m MTU go-lives in countries that are already in SIDC.

- Bulgaria – 2022 Q4
- Nordic Area – 2024 H1

Lunch break

until 14:00

Market Coupling Steering Committee

SIDC: Result of consultation on SIDC Product

Hilde Rosenblad

NEMO Technical Task Force Co-leader

SIDC: Result of consultation on SIDC Product

Between 5 January and 12 February 2022 the NEMO Committee had an open public consultation on the SIDC products. 7 responses was received from stakeholders.

There were several important issues highlighted in the responses and NEMOs have found the input very useful.

Regarding the SIDC products methodology itself, none of the issues brought forward supported a need to amend the existing SIDC Products methodology.

Input received from Stakeholders are not discarded and NEMOs look forward to discuss further some of the topics in todays agenda.

The details of the public consultation can be found on the NEMO Committee website here.

Market Coupling Steering Committee

SIDC: Cross Product Matching concept

Auke Van Der Zijden, MSD Expert

David Myska, SIDC MSD Leader

SIDC: Cross Product Matching concept

1) Introduction

Background

- Algorithm Methodology, Common set of requirements for the continuous trading matching algorithm and the intraday auction algorithm includes following requirement

  "The continuous trading matching algorithm must allow, as part of SIDC, to cross-match the different order types of the ID products within one and between multiple bidding zones, respecting the capacity and order restrictions."

- General expectation regarding CPM is that it increases trading opportunities in particular when
  - there is a mixture of 60min (30min) and 15min orders in Shared Order Book (SOB) and
  - there are in place restrictions which disable a party active in one market (on one product) see trading opportunities represented by orders from other market or other product*

    Moreover even in case when the mentioned restrictions are not in place CPM brings fully automated central feature which would allow different products match together without additional effort on side of market participant (partial alternative solutions exist and are listed in detail in following slides)

*restriction can be represented by an interconnector with 60min granularity or 60min ISP in delivery area disabling to market participant active in specific area to see price information and trading opportunities created by orders with 15min granularity from other areas

Background

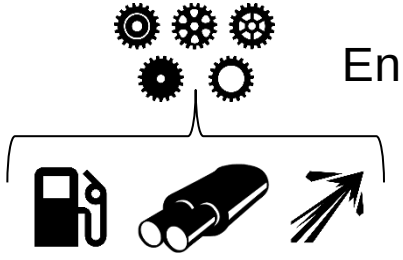
- Market participants requested in past to have ability to match orders of different products in XBID to create equal opportunity of CPM for every Market Participant
  - Today some Market Participants have tools to calculate CPM opportunities and to easily submit them to LTS. Which are mainly Market Participants who use API and it is rather a small group (which has knowledge and resources to create these opportunities and tools)

- TSOs requested CPM to increase liquidity on all products, especially when more products will be introduced in every area in XBID

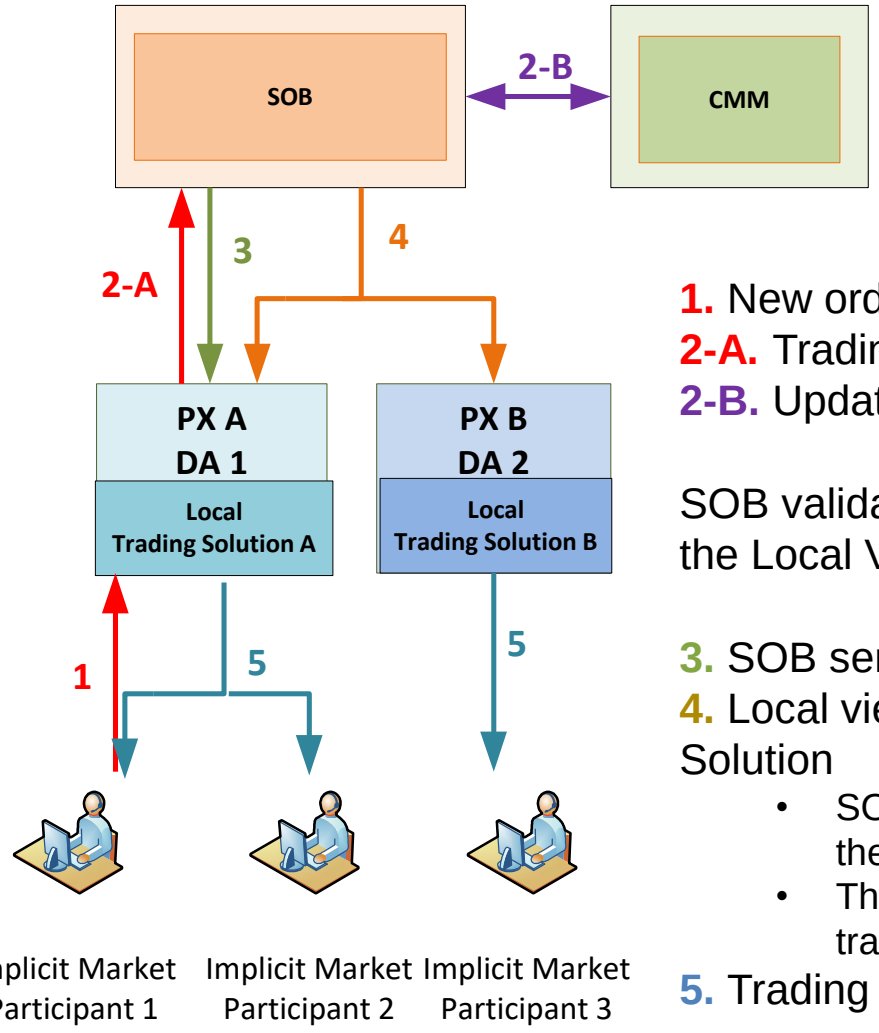
SIDC: Cross Product Matching concept

2) Current SOB (XBID) behavior

The SIDC matching solution from MP's view

Component	Provided by	Comment
 Cockpit	LTS	Local Trading Solution (LTS) offers ultimate interface to Market Participants, either via pre-built screens or via automated communication which allows MP's development of the „cockpit". **LTS is sole interface to MPs to provide market data** (order, trades, status of the market, status of the products, etc.). **Each LTS has an individual functionalities and individual look & feel.**
 Engine	XBID Solution (SIDC matching solution)	Core of the system ensuring matching of the orders in line with predefined and transparent principles including processing of the trades. It is done via utilization of The trading Module (SOB), The Capacity Management Module (CMM) and The Shipping Module (SM)

Order processing



Calculation of the local view of an order book is based on the following factors:

- The available transmission capacity.
- Orders entered for the contract.

1. New order entered
2-A. Trading Solution anonymized the order and forward to SOB
2-B. Update available capacity.

SOB validates if any orders in the local view of the order book can match and calculate the Local View for each DA

3. SOB send the result of order entry to trading solution
4. Local view of the updated order book* is published via the PMI to the Trading Solution

- SOB will contain all orderbooks and the NEMOs LTS will have the orderbooks relevant for the areas where the NEMO is active
- The same order can be displayed in multiple local views (depending on available transmission capacity)

5. Trading Solution publish new local view

*There are 4 separate Order Books today (15min, 30min, 60min, User Defined Blocks)

SOB Order matching

- The best sell and buy orders are defined based on **Price-Time priority**
  - In case equal the lower orderID number will have higher priority
- Price determination of the matched orders is based on the **initiator order**
  - Initiator order is the order already in the orderbook and the aggressor order is the order that comes into the orderbook and trigger the matching
- The matched orders will be send as trade (with one buy and sell side) to the LTS.

Contract: 14:00 - 15:00				***Area: RTE***			
Buy				**Sell**			
ID	**Time**	**Price**	**Quantity**	**ID**	**Time**	**Price**	**Quantity**
4	11:32:44	13,8	9	3	10:45:56	14	9
1	08:10:23	11,2	4	2	08:12:34	15,5	25
5	12:03:01	10	5	6	12:25:55	16,1	12

SIDC: Cross Product Matching concept

3) Cross-product matching principles

Introduction

- Cross-product matching (CPM) is between orders on different products. A match involves more than two orders
- CPM will match orders within one delivery area and/or cross market/delivery areas (as it is already today).
- CPM allows 1 x 60min order match against 2 x 30min orders, 4 x 15min orders or 1 x 30min order and 2 x 15min orders; 1 x 30min order match against 2 x 15min orders. But it also allows match between 2 x 30min orders and 4 x 15min orders or 1 x 30min order and 2 x 15min orders on one side and 2 x 15min orders and 1 x 30min order on the other side – so called M:N match is allowed
- Cross-product matching implementation in SIDC would not include Block orders treatment i.e. block order can match only with another Block order of the same kind as today (due to too much performance impact the block orders are excluded)
- Current order execution restrictions (FOK,IOC) can also be used with CPM
- CPM will also be applied in the mini-auction in XBID
- One order is the active (aggressor) order; all the other orders are passive (initiator) orders. Entry of the active order triggers the cross-product matching
- Orders could still match without CPM, CPM just increases match opportunities by allowing orders on different products to match with each other
- CPM will take place in XBID, just like the current cross-border matching. The public order book & matching results will be provided to LTS by XBID
- The quantity principle will not change, total buy and total sell quantity must always be equal

Concept of Shadow and Virtual Order

- With aim of addressing aspects of transparency, equal treatment among products and efficient use of the new market opportunities introduced with Cross product matching NEMOs & TSOs consider important to ensure a party active within single product see within the relevant Order Book trading opportunities created by orders of other products
  - It must be ensured to the extent feasible that if in a delivery area is traded only 60 min product the market participant see opportunities created by 15min orders in other areas and that in the area where 15min products are traded the market participant is aware of trading opportunities towards 60 min products from other area

- The requirement above is resolved by introduction of so called Shadow and Virtual order
  - A Virtual order is an order consisting of two or more regular orders of a shorter delivery period(s) which together after being merged match the delivery period of the Virtual order
  - A Shadow order is created as a complement to in system already present orders in adjacent contracts.

Common characteristics of Shadow and Virtual Order

- Shadow and Virtual orders are orders created automatically by the system to create trade opportunities between products. These orders are not owned by a NEMO neither has private order information
- When a market party submits an order trying to match with a Shadow and Virtual order, a cross product trade will be generated with the precursor original orders.
- The Virtual Order (VO) and Shadow Order (SO) will be showed as ‘normal’ order in the orderbook, but without an orderID (respectively static orderID is used for identification of the VO and SO)
- The smallest quantity of the orders involved to the Virtual Order and Shadow Order (so called precursor orders) is used
- Only the best orders are used to create VO or SO up to the order depth (combination of orders and VO, SO). When creating a VO or SO an underlying order's capacity is used only once for each local OBK (in other words the capacity is reserved only once, VOs/SOs don't reserve additional capacity).

Orders/Orderbooks – Virtual Order

- To show the market opportunity for CPM, an order will be created for the 30 or 60 min orderbook, which group orders with a shorter duration period. This order will be called Virtual Order.
- A virtual order is an order consisting of two or more regular orders of shorter delivery period(s) which meet the delivery period of the virtual order (i.e. 4 x 15 min orders, 2 x 30 min orders or 2 x 15 min & 1 x 30 min orders create a 60min virtual order, 2 x 15 min orders create a 30min virtual order)
- Weighted Average Price will be used to define one price for the virtual orders

Orders/Orderbooks – Virtual Order

Example

1. We have the following orderbooks:

Contract: 14:00 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
1	12,8	15			

Contract: 14:30 - 14:45 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			2	9,12	11

Contract: 14:00 - 14:30 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			3	14,02	9

Contract: 14:45 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			4	12,8	15

2. A virtual order of 60 min will be created by a system in the APG 14:00 – 15:00 & and of 30 min in APG 14:30 – 15:00 orderbook:

Contract: 14:00 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
1	12,8	15	-1	12,49	9

Contract: 14:30 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			-1	10,96	11

3. Two VOs will be created for the 30 min and 60 min orderbooks in APG. The VO will not have an ID (but could has information of precursor orders). The quantity will be 9 for 60min ordebook and 11 for 30min orderbook, because of both VOs shall respect the smallest quantities of the precursor orders. The price will be a weighted average price of the precursor orders. For 60 min ordebook P = 14,02/2 + 9,12/4 + 12,8/4

Orders/Orderbooks – Shadow Order

- To have more market opportunities with CPM, there will be a second type of order introduced which will create matching opportunities by completing a set of orders. This type of order is called Shadow Order.
- This was mainly introduced to ensure a party active with a single product within the relevant Order Book, is equal in trading opportunities compared to party's who are active on all products
- A shadow order is created whenever one order is required to complete the possible match opportunities between orders of different products. This will be needed to complete a set of, buy and sell orders with large and smaller delivery duration, to be able to match these
- This order is on the opposite side of the market (buy or sell) of the set orders to complete a virtual order.

Orders/Orderbooks – Shadow Order

Example

1. We have the following orderbooks:

Contract: 14:00 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
3	13,81	15			

Contract: 14:30 - 14:45 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			2	9,1	11

Contract: 14:00 - 14:30 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			1	14,02	9

2. The orders in the 30 min and 15 min orderbook will not be able to match with the 60 min order, a 15 min order is missing for contract 14:45-15:00. Shadow order will be created by the system to allow the market to match the 60min order if they hit this shadow order:

Contract: 14:45 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
-1	18,1	9			

3. This shadow order doesn't have an orderID. The price P is based on a set of the three orders already in the market (1x 60 min sell, 1x 15 min buy and 1x 30 min buy) P= 4 x 13,81 - 2 x 14,02 – 9,1 . The quantity is based on the smallest quantity of the set. This shadow order is linked to all three orders. In case there is a change to one of these three orders, the shadow order will be deleted/replaced.

Orders/Orderbooks – Shadow Order

Example

4. When a trader enter an order to hit this shadow order, this 15 min buy order will be **in principle** used to complete the virtual order for the 60 min order book (virtual order is however not created and match occur directly among 3 orders being in system and new coming order ID4):

Contract: 14:45 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
-1	18,1	9	4	16	9

Contract: 14:00 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
3	13,8	15	-1	13,28	9

Matching/Trades

- Just like in the existing continuous matching: The entry of a new order triggers the matching. This order is the active (aggressor) order. All other orders involved in the match are called passive (initiator) orders.
- The link of regular order with trades will keep existing, but Virtual and Shadow order information will not be given for the trades
- The trade resulting from a cross product match will in XBID not consist of 1 buy leg & 1 sell leg, as currently. Instead, both sides of the trade will have multiple trade legs (multiple means 2-4).

Example

1. If we continue on previous example of the shadow orders, the orderbooks looked like (virtual order is not created – used for better illustration):

Contract: 14:00 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
3	13,81	15	-1	13,28	9

Contract: 14:30 - 14:45 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			2	9,1	11

Contract: 14:00 - 14:30 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			1	14,02	9

Contract: 14:45 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
-1	18,1	9	4	16	9

Matching/Trades

2. The buy and the sell orders will match due to a lower sell price. This will set multiple actions in motion:
   - Shadow order will be removed from the orderbook
   - The precursor orders will be fully matched and removed from orderbook or the quantity will be reduced
   - The orderbooks will be now:

Contract: 14:00 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
3	13,81	6			

Contract: 14:30 - 14:45 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q
			2	9,1	2

Contract: 14:00 - 14:30 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q

Contract: 14:45 - 15:00 *Area: APG*

Buy			Sell		
ID	P	Q	ID	P	Q

3. In SOB four trade legs will be created. The price of orders 1,2,3 will be the order price, because they are the initiator order. Order ID 4 will get the price of the shadow order, because this order was the aggressor of the shadow order:

TradeID	OrderID	Side	Contract	Price	Quantity
5	3	Buy	14:00 - 15:00	13,81	9
5	1	Sell	14:00 - 14:30	14,02	9
5	2	Sell	14:30 - 14:45	9,1	9
5	4	Sell	14:45- 15:00	18,1	9

Orders priority/timestamp

- Just like in the existing continuous matching: Price-time priority is applicable meaning orders are matched based on price. If the price is the same timestamp sets which order is matched first. If the timestamps are also the same order ID would be today decisive
- VO, SO timestamp is set by the precursor orders. Instead of Order ID a new attribute „priority“ is used for all orders (VO, SO, regular) where the order with lower priority attribute takes precedence

Example

1. We have the following orderbooks:

Contract: 14:00 - 14:15 *Area: APG*

Buy				Sell			
ID	Priority	P	Q	ID	Priority	P	Q
				1	1	9,00	10

Contract: 14:00 - 14:30 *Area: APG*

Buy				Sell			
ID	Priority	P	Q	ID	Priority	P	Q
				3	2	10,00	10

Contract: 14:15 - 14:30 *Area: APG*

Buy				Sell			
ID	Priority	P	Q	ID	Priority	P	Q
				2	1	11,00	12

2. A virtual order of 30 min will be created by a system in the APG 14:00 – 14:30 orderbook. VO1 takes precedence because its newest underlying order's ID is lower than the O3's order ID

Contract: 14:00 - 14:30 *Area: APG*

Buy				Sell			
ID	Priority	P	Q	ID	Priority	P	Q
				3	2	10,00	10
				-1	1	10,00	10

Routing

- Important aspect of CPM is a routing. Orders creating a VO might not be visible when passing through the interconnector with longer period resolution. VO cannot be split again to precursor orders behind such interconnector

Example: Orders routing from DE

Area : DE

Contract: 14:00 - 15:00

Buy		
ID	P	Q
-1	12,75	8

Area : APG

Contract: 14:00 - 15:00

Buy		
ID	P	Q
-1	12,75	8

Area : CEPS

Contract: 14:00 - 15:00

Buy		
ID	P	Q
-1	12,75	8

Area : SEPS

Contract: 14:00 - 15:00

Buy		
ID	P	Q
-1	12,75	8

Contract: 14:00 - 14:15

Buy		
ID	P	Q
1	13,0	15

Contract: 14:30 - 14:45

Buy		
ID	P	Q
3	15,0	12

Contract: 14:00 - 14:15

Buy		
ID	P	Q
1	13,0	15

Contract: 14:30 - 14:45

Buy		
ID	P	Q
3	15,0	12

Contract: 14:00 - 14:15

Buy		
ID	P	Q

Contract: 14:30 - 14:45

Buy		
ID	P	Q

Contract: 14:00 - 14:15

Buy		
ID	P	Q

Contract: 14:30 - 14:45

Buy		
ID	P	Q

Contract: 14:15 - 14:30

Buy		
ID	P	Q
2	12,0	10

Contract: 14:45 - 15:00

Buy		
ID	P	Q
4	11,0	8

Contract: 14:15 - 14:30

Buy		
ID	P	Q
2	12,0	10

Contract: 14:45 - 15:00

Buy		
ID	P	Q
4	11,0	8

Contract: 14:15 - 14:30

Buy		
ID	P	Q

Contract: 14:45 - 15:00

Buy		
ID	P	Q

Contract: 14:15 - 14:30

Buy		
ID	P	Q

Contract: 14:45 - 15:00

Buy		
ID	P	Q

Summary of principles for applied Cross-product matching

- Basic matching
  - For set of orders creating a trade the weighted average of buy orders limit prices shall be equal or higher than the weighted average of sell orders limit prices
- Missed leg principle
  - A shadow order is created whenever one order is required to complete the match possibility between products (including the case when match possibility is identified between VO and regular orders)
- Propagation
  - Loops are not allowed in the propagation, shadow orders cannot create new shadow orders in the source product
  - Virtual orders should not be combined to create a new virtual order
- Timestamp
  - The timestamp assigned to a shadow/virtual order will be the most recent timestamp of its precursor orders
  - Timestamp is decisive in case of orders with the same price

CPM impact to SOB (mini) Auction Matching

Trigger for SOB (mini) Auction

- Trigger for SOB (mini) Auction is the same as today - an increase of cross border capacity leading to that one or more order(s) be displayed in other delivery areas based on the new capacity situation.

Auction

- When an auction is triggered, temporarily the orderbooks are frozen from trading (normally less then one second)
- All orders in the affected orderbooks will be part of the auction
- There are orders of multiple products in the orderbooks, to deal with this the orders with the longest duration period will first be matched → **here is the only difference to current behavior as the VOs will be included to the matching**

15 min OBK

Order	Type	Contract	Quantity	Price
A	Sell	00:00-00:15	10	50
B	Sell	00:15-00:30	10	50
C	Sell	00:30-00:45	10	50
D	Sell	00:45-01:00	10	50
E	Buy	00:00-00:15	10	100
F	Buy	00:15-00:30	10	100
G	Buy	00:30-00:45	10	100
H	Buy	00:45-01:00	10	100

60 min OBK

Order	Type	Contract	Quantity	Price
X	Buy	00:00-01:00	10	70
VO(A,B,C,D)	Sell	00:00-01:00	10	50
VO(E,F,G,H)	Buy	00:00-01:00	10	100

VO (A,B,C,D) and VO (E,F,G,H) will match as their price spread is the biggest one

Remaining part of the process is again the same as today

Alternatives if CPM is not implemented*

- Linked basket orders
  - Four 15min orders can be placed as “linked basket order” instead of 60min order
  - Aggressor only, match within the underlying (=15min) orderbook
  - Order does not stay in the market if not matched (Fill or Kill)
- User defined blocks
  - Initiator or Aggressor (All or Nothing), match occur only within the user defined block orderbook
  - Order stay in the market if not matched
- The market participant see trades in 15min OrderBook even in case he is trading User defined blocks i.e. he is technically able to compare trading opportunities within 15min OrderBook and other OrderBooks including user defined block OrderBook as long as relevant NEMO makes available all related products. This means there are also technical means on local side (market participants) to handle this situation and provide support

- None of above indicated existing alternatives bring the same trading opportunities as approach when cross-product matching would be implemented as initially foreseen by NEMOs and TSOs. As long as some market areas/borders work only with 60 minutes the alternatives can be further restricted for use in a relevant area as 15min orders are not visible in 60min area. At the same time both alternatives may contribute to limited added value of CPM once all areas/borders have implemented 15min resolution (deadline 2025), especially knowing that the go-live of CPM is at the earliest in 2024.

*Assuming a situation when 15min products are traded in all delivery areas

Price tick change

- The calculation of the (weighted average) price of the virtual order (VO) could result in a price with more than two decimals.
  - The VO consist out of the multiple underlying orders (precursor orders) and the price of the VO will be calculated based on the prices of the precursor orders.
    - For example, there are four 15min orders, which will be used to create a VO of 60min. The prices of the 15min orders are: 0,01, 0,01, 0,01 & 0,02, then the price of the VO will be 0,0125.
  - XBID supports only maximum of two decimal for prices
- Rounding of the prices could give the undesirable situation that a VO order seems in the money for matching another order but will violate the cash value principle (buyer pay more than minimal required or seller get less then minimal required) of the underlying orders. Not accepting matching of these orders will lead to crossed order book case.
- Instead of rounding the prices, the breach of the two decimals will be avoided. This will be solved with changing the price tick of the 30min and 15min orders. With the new price ticks the prices of VO can't be more than two decimals.
  - 30min will change to 0,02 (from 0,01)
  - 15min will change to 0,04 (from 0,01)

Impact CPM for market participants

Orders

- No change to the orders entered by the market participants
- New order types (virtual and shadow orders) in the public order book for XBID products, these can be identified by a default order ID*
  - Regular orders will keep having the order ID numbering as it is today.
- The virtual and shadow orders will contain information about the precursor orders*
- The priority of the orders in the orderbook will be extended with a new attribute*
  - Price-Time priority still will be applied, but in case these are equal a new attribute will be used to define the position of the order in the orderbook

* Depends on local implementation of NEMO

Impact CPM for market participants

Trades

- Today a trade consist (in SOB) always with one sell and buy leg. With CPM, a trade resulting from CPM, could have multiple sell and multiple buy legs of one trade.
  - How the (CPM) trades will exactly be reported to each market participants is up to every NEMO
- Today the buy and sell leg of the trade has one price and has the same contract. With CPM, a trade resulting from CPM, the buy and sell leg(s) will have different prices and contracts.
  - Quantity will stay equal with CPM trades
- Trades not resulting from CPM, will still have one buy and sell leg (the same price and contract).
- SOB will deliver new trade information to the LTS:
  - indication if a trade is based on CPM
  - Who aggressed the trade
  - Cash Value of the trade leg
- Recall and cancellation will be applied to all trade legs of a trade

Price tick

- Price tick 30min will change to 0,02 (from 0,01) and 15min will change to 0,04 (from 0,01)

Market Coupling Steering Committee

SIDC - IDAs

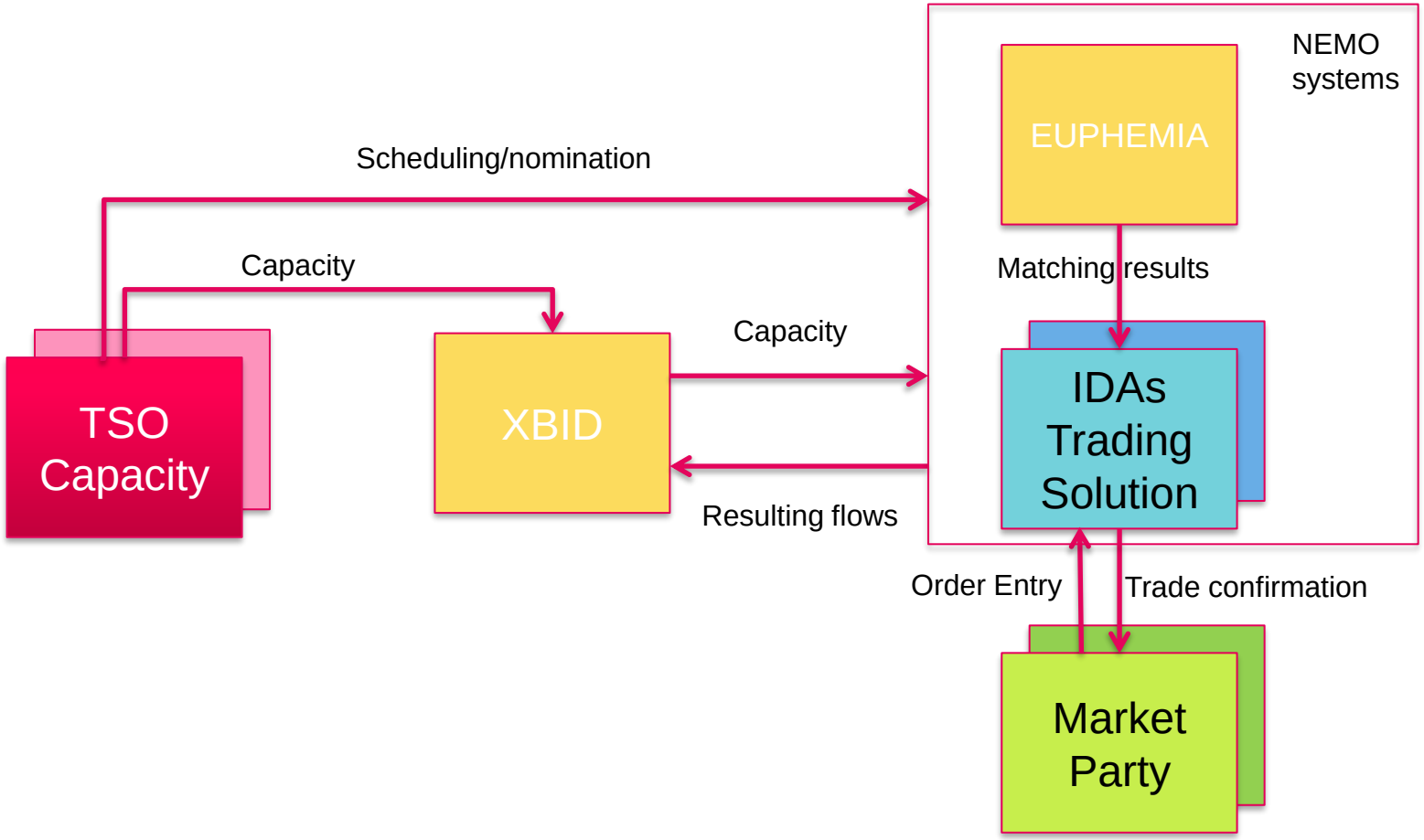
David Myska

SIDC MSD Chair

Regulatory background - general

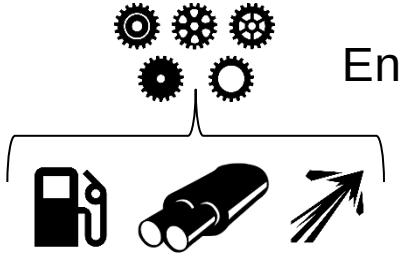
- Methodology for the price coupling algorithm, the continuous trading matching algorithm and the intraday auction algorithm (“Algorithm methodology”) establishes relevant processes in accordance with Article 37(5) and Article 55 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (“CACM Regulation”) and in accordance with ACER decision 01/2019 of 24 January 2019 establishing a single methodology for pricing intraday cross-zonal capacity
- The Algorithm methodology incorporates **the intraday auctions** (IDAs) to comply with the requirement for pricing cross-zonal capacity in single intraday coupling (SIDC) set forth in Article 55 of the CACM Regulation and to comply with the provisions of the Methodology for pricing intraday cross-zonal capacity.
- In order to be able to support the same set of products and functionalities while assuring at the same time an efficient use of resources in terms of implementation costs and time to delivery of new functionalities, as well as benefit from the SDAC algorithm’s development evolution, **the same algorithm used for SDAC should be used also for IDAs**.
- IDAs shall be implemented across Europe to allow for the pricing of cross-border capacity in the intraday timeframe as well as to accommodate a new market coupling that enables Variable Renewable Energy, VRE producers in Europe to offer their energy based on more reliable generation forecasts and thereby reducing the overall imbalances caused by the VRE intermittency.

High-level Architecture



- XBID is used as source of network constraints data for IDA (pre-coupling) and to validate the IDA results in terms of capacity meet the network constraints (coupling)
- Network data are provided via NEMOs to EUPHEMIA (auction algorithm)
- IDA results are submitted to XBID to update the information about Already Allocated Capacity in XBID and to reflect in relevant CMM files the existence of capacity reserved for IDA results
- IDAs Trading Solution could be the same solution as used for day-ahead or adapted for IDAs, depending on each NEMO.

IDA process from MP's view

Component	Provided by	Comment
 Cockpit	IDAs Trading Solution	IDAs Trading Solution offers ultimate interface to Market Participants, either via pre-built screens or via automated communication which allows MP's development of the „cockpit". IDAs Trading Solution is sole interface to MPs to provide market data (order, trades, status of the market, status of the products, etc.). Each IDAs Trading Solution has an individual functionalities and individual look & feel. To get familiar with your IDAs Trading Solution you need to contact your respective NEMO(s).
 Engine	EUPHEMIA and XBID Solution	Supply demand curves from IDAs Trading Solutions are collected and submitted to Euphemia, which matches the orders Capacity management and TSOs validations are secured by XBID

Basic characteristics 1

- Capacity data
  - In the period where Flow Based allocation is not supported by Intraday continuous trading (IDC - XBID platform), IDA will run in ATC-mode. As soon as IDC could support Flow-based allocation in production, IDA should also support FB allocation.

- Losses
  - It will be allowed to apply loss factor in IDA as of go-live i.e. prior to losses being implemented in continuous trading

- The IDA overall solution should be able to support the 3 mandatory IDAs required by Algorithm Methodology (will be configurable)
  - IDA1: Gate Closure Time for market parties at D-1 15h. Allocated period D [0h-24h]
  - IDA2: Gate Closure Time for market parties at D-1 22h. Allocated period D [0h-24h]
  - IDA3: Gate Closure Time for market parties at D 10h. Allocated period D [12h-24h]

Basic characteristics 2

- Impact of IDA to continuous trading
  - XBID **cross-border trading** shall be interrupted during IDA but should not be interrupted within regular operation* more than 20 minutes before GCT of the IDA (30 minutes at interim during one year) and 20 minutes after GCT of the IDA (30 minutes at interim during one year).
    - Cross-border trading halt is applicable to contracts and borders being included to IDA
    - For interconnectors where ramping is applicable the contract prior IDA is also halted (e.g. for IDA3 and 60min border resolution contract 11:00-12:00 is halted) and last contract within IDA include zero offered capacity
  - **Continuous trading within a bidding zone** may be allowed within XBID during IDA respectively other services may be offered locally – see paragraph (45) of ACER decision 01/2019 of 24 January 2019 establishing a single methodology for pricing intraday cross-zonal capacity below

    "For this purpose, the cross-zonal trade and cross-zonal capacity allocation within the continuous SIDC has to be temporarily suspended and during this suspension all the available cross-zonal capacity has to be allocated through the IDA. Nevertheless, the Agency considers important, in order to limit the impact of the IDAs on the continuous SIDC and to facilitate NEMOs' competition, that, during the running of the IDAs, intrazonal trade within the continuous SIDC is maintained at least in those bidding zones where more than one NEMO operates."

Basic characteristics 3

- Products
  - Mandatory products
    - quarter-hourly
    - half-hourly
    - hourly
    - simple block order
  - Optional products/order types (can be introduced only if IDA algorithm is able to accommodate them together with all current and future requirements)
    - Complex block order
    - Minimum Income Condition (MIC) orders
    - Load gradient orders
    - Merit orders

Decision regarding allowed products will be made based on performance test (considering the results calculation time)

- Simulation Phase 1 include simple orders (quarter-hourly, half-hourly, hourly), simple block order - C01 Block (MAR=1), C01 Curtailable Block - and Merit Order (excluded PUN)
- Simulation Phase 2 will be prepared based on results of Simulation Phase 1, assessing if the rest or some of Optional Products fit from performance perspective.

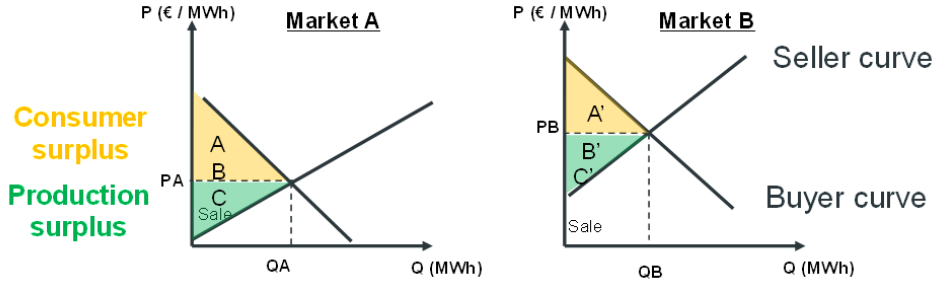
Basic characteristics 4

- Auction algorithm and coupling phase
  - EUPHEMIA i.e. algorithm developed for SDAC used in IDA
  - General description applicable to IDA is the same as for SDAC
    - *First, Market participants start by submitting their orders to their respective power Exchange. All these orders are collected and submitted to Euphemia that determines which orders are to be executed and which orders are to be rejected in concordance with the prices to be published such that:*
      - *The social welfare (consumer surplus + producer surplus + congestion rent across the regions) generated by the executed orders is maximal.*
      - *The power flows induced by the executed orders, resulting in the net positions do not exceed the capacity of the relevant network elements.*
  - Additional feature for IDA
    - Already Allocated Capacity (AAC) need to be provided to EUPHEMIA for interconnectors where losses and/or ramping are applicable
    - Additional boundary condition is included for EUPHEMIA which checks that when AAC and IDA flows are summed up the change of flows between Market Time Units should not exceed the ramping constraint
    - AAC is also used in calculation of losses impact as if the flow in IDA goes in opposite direction than AAC the losses from previous allocation phases are up to certain level mitigated

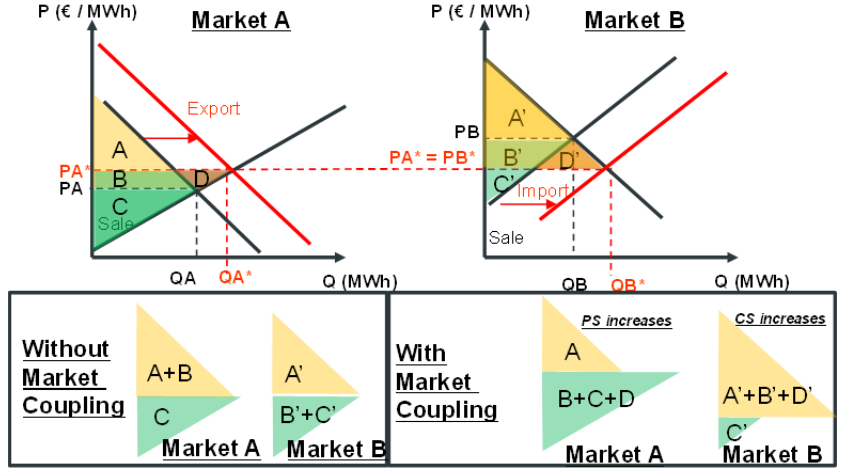
EUPHEMIA – DA Optimisation Algorithm

Objective: Max (Social Welfare)
With **Social Welfare = Producer surplus (producers' revenues) + Consumer surplus (consumers revenues).**

If there is 2 uncoupled market, each zone have its own curve, independent



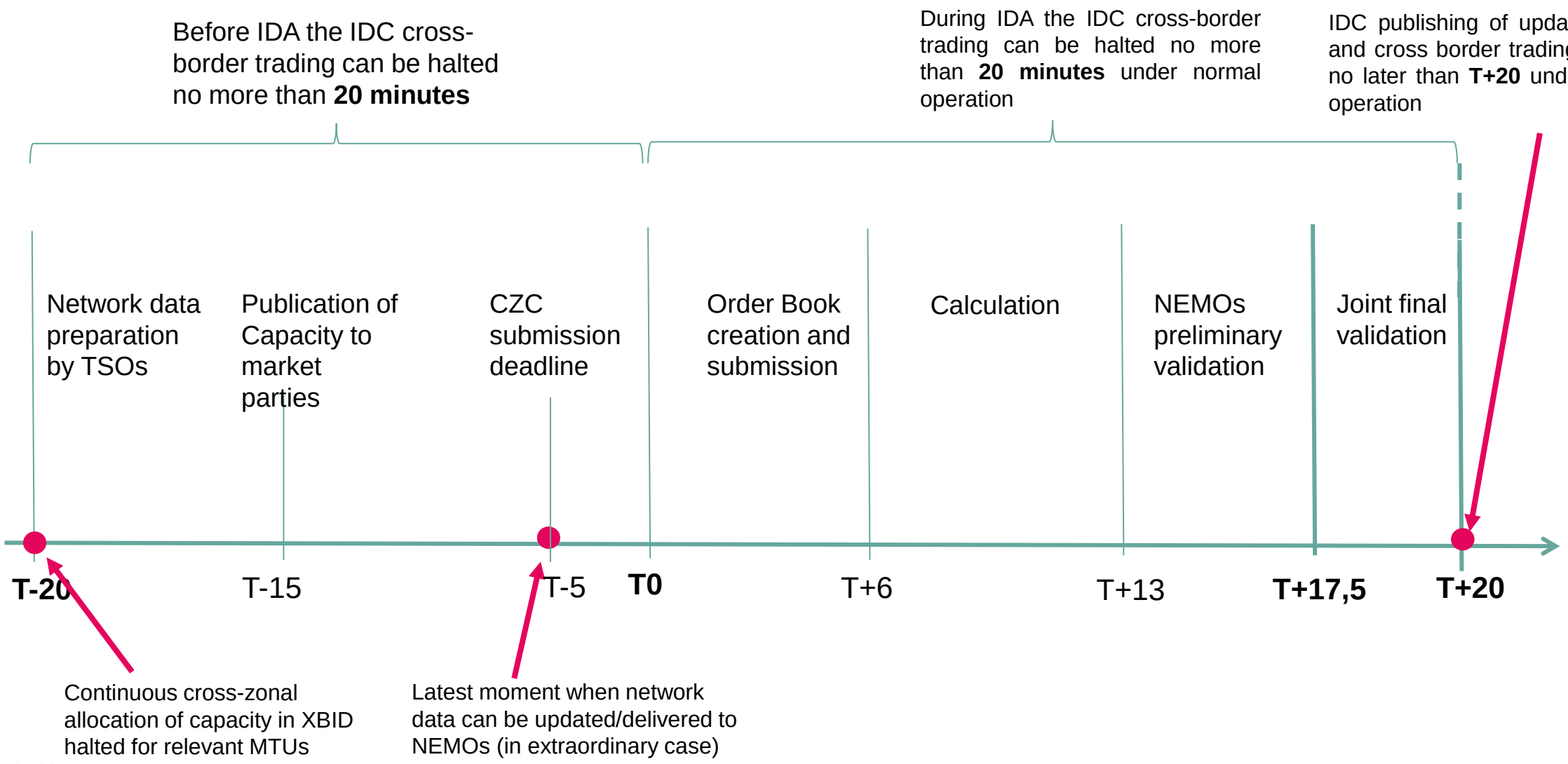
If 2 markets are coupled, producer and consumer surplus increase
→overall bigger market welfare than when the 2 markets are uncoupled.



However, the capacity between the 2 markets could limit the amount of export/import. In such a case, the maximization of the social welfare will still be performed, but due to the congestion, won't allow the price convergence.

- IDA/SIDC is more than 2 zones.
- Optimization and Prices/Net Positions determination is for the whole topology/all zones in same time

Auction process timing



Challenges resolved within the design phase

- Systems integration options
  - Capacity management within XBID or outsourced
  - IDA results validation by TSOs locally or centrally
  - Post-coupling processes integration with continuous trading or other alternatives
- Different features in IDA and XBID to be accommodated on level of topology and data mapping
  - E.g. lineset feature in EUPHEMIA does not exist in XBID
  - For DC interconnectors with losses EUPHEMIA expect capacity information on sending end, XBID is not differentiating such information
- Decisions driven by following aspects
  - process robustness
  - auction process timing
  - Local & central system changes (new tools)
  - Implementation timeline and implementation impact to other R&D activities

Market Coupling Steering Committee

SDAC & SIDC:
Announcement of consultation on HMMCP

Hilde Rosenblad

NEMO Technical Task Force Co-leader

SDAC & SIDC:
Announcement of consultation on HMMCP

According to Article 4 (3) for both the HMMCP methodologies respectively, '*the NEMOs shall, at least every two years, reassess the HMMCP, share this assessment with all market participants and consult it in the relevant stakeholder forums organized in accordance with Article 11 of the CACM Regulation.*'

The harmonized maximum clearing price for SDAC was raised by 1000 EUR/MWh up to 4000 EUR/MWh as the relevant threshold was recently reached in one bidding zone.

Some market participants already expressed some ideas on maximum and minimum prices for SDAC and SIDC. The implementation of Intraday Auctions (IDAs) also requires to introduce a definition of HMMCP for IDAs into the HMMCP methodology for SIDC.

NEMOs have launched a
public consultation to review the HMMCP methodology for SDAC and SIDC.
The consultation was launched on 24 May and will close on 15 July.

The current SDAC HMMCP methodology is available on the NEMO Committee webpage **here**.

Closing remarks

Closing remarks, further information

The minutes of the meeting will be available on the NEMO Committee and ENTSO-E website. The links will be sent out via email.

The next meeting will be in the fall, details will be shared in the summer.