WG European Market Design & System Operation

Feb 7th 2020

14:00 – 17:00

Agenda

European Market Design

1. Future-proofing the EU energy system towards 2030
2. Update on CEP 70%

System Operation

3. Update regarding emergency & restoration

AOB

1. Future-proofing the EU energy system towards 2030

Future proofing the EU energy system towards 2030

Levers to realise the next phase of the energy transition in a timely and efficient way with maximum welfare for society

Agenda

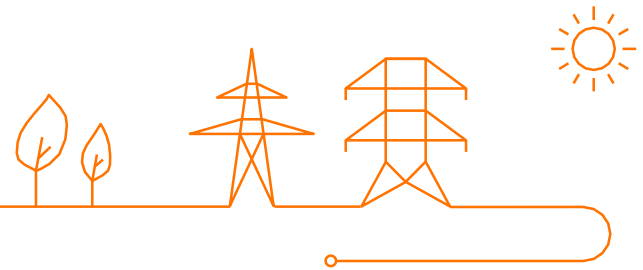
1. **Welcome and introduction**

2. Main levers for an efficient horizontal system towards 2030

3. Presentation of second lever on improved market design

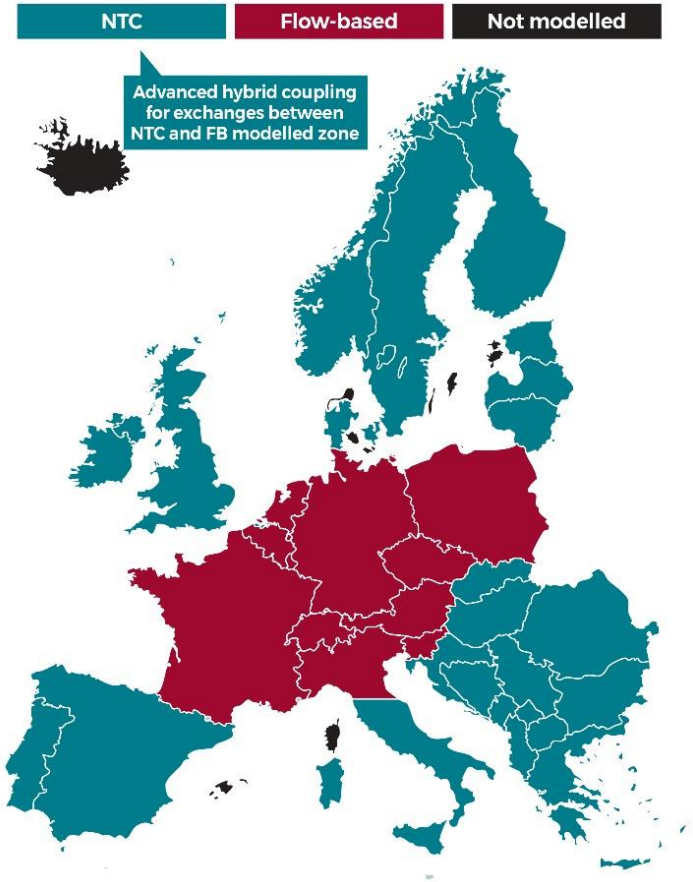
4. Next steps

5. Discussion

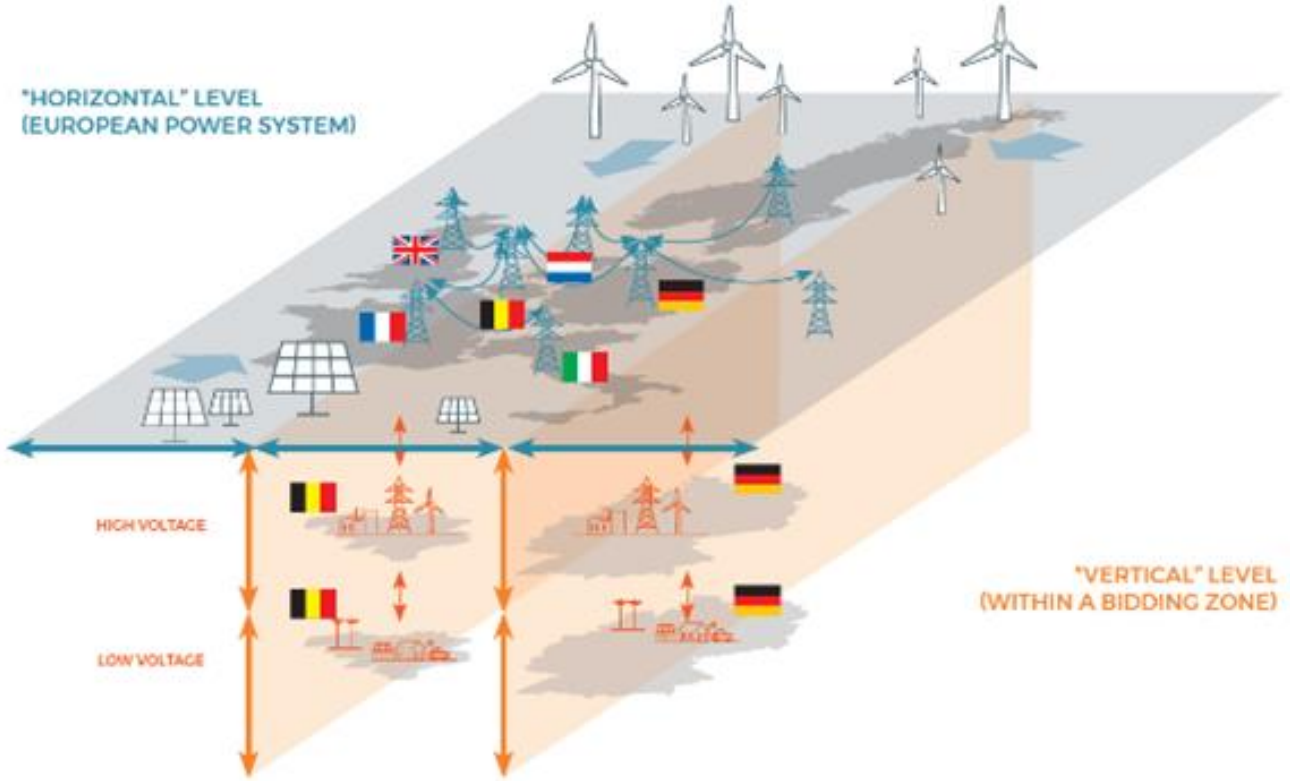


Introduction

Why a joint study on the European energy system?



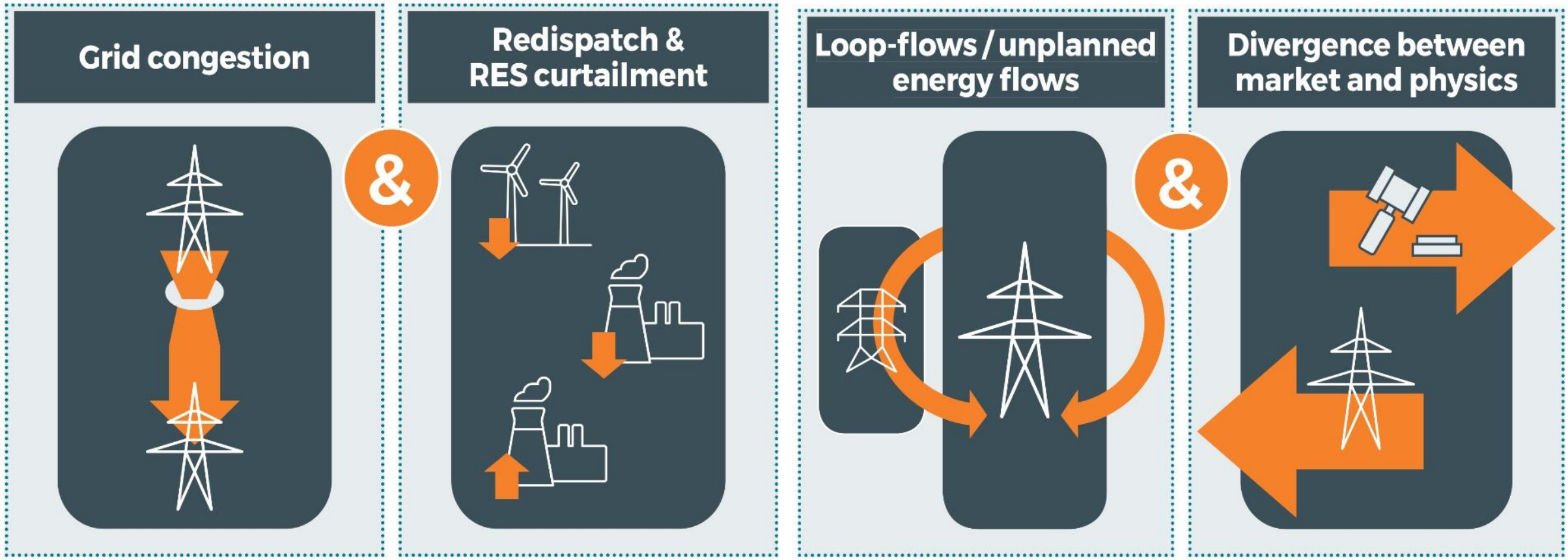
Future-proofing the EU Energy System towards 2030: Elia Group analysis on the next phase of the energy transition



Observations over last ten years:

- Higher and more volatile flows in horizontal system
- Grid lagging behind rapid increase of RES (>5 years lead-time difference)
- Market design needing some changes to cope with changing system

Effects observed in the horizontal system



Main levers for the horizontal system towards 2030

Key messages

1 Hardware — **Grid Infrastructure**

How much ***transmission capacity*** *is available?*

Timely completion
of planned grid infrastructure

→ maximum welfare & benefits

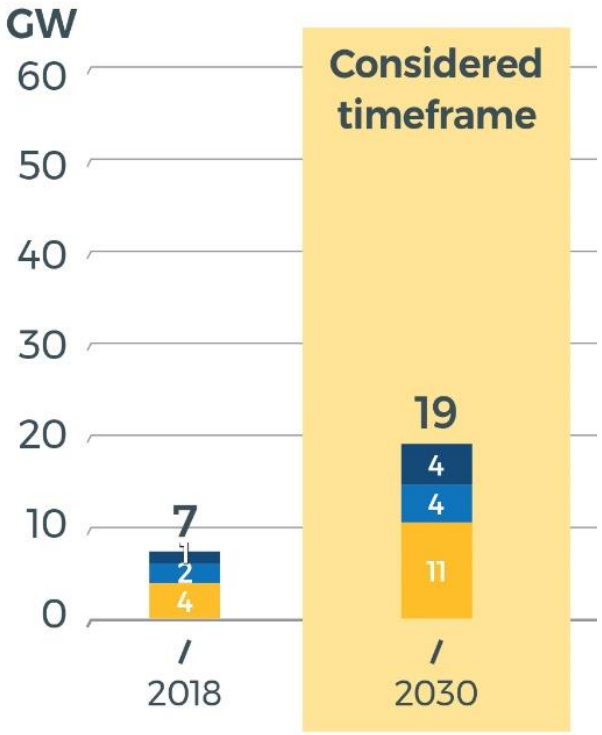
2 Software — **Market Design**

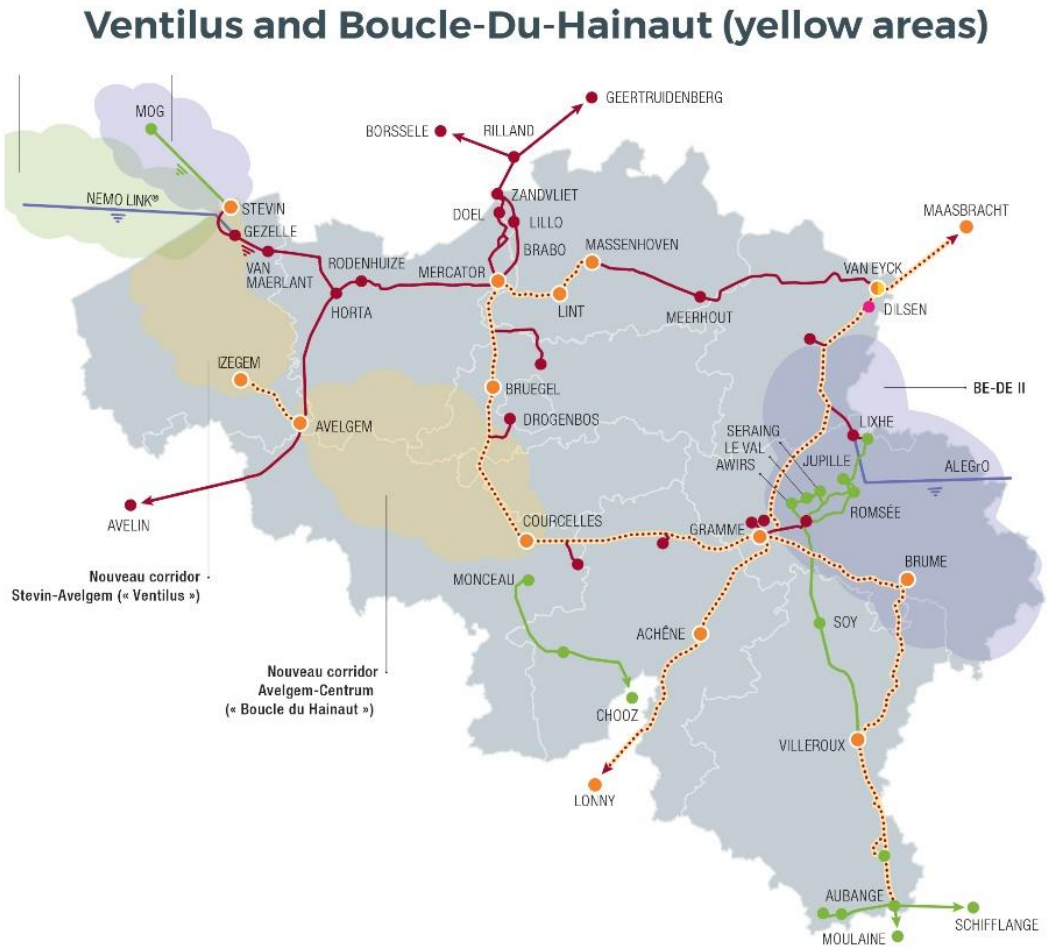
How to ***use*** *available capacity* ***in most efficient way?***

Proposal
for an improved
market mechanism

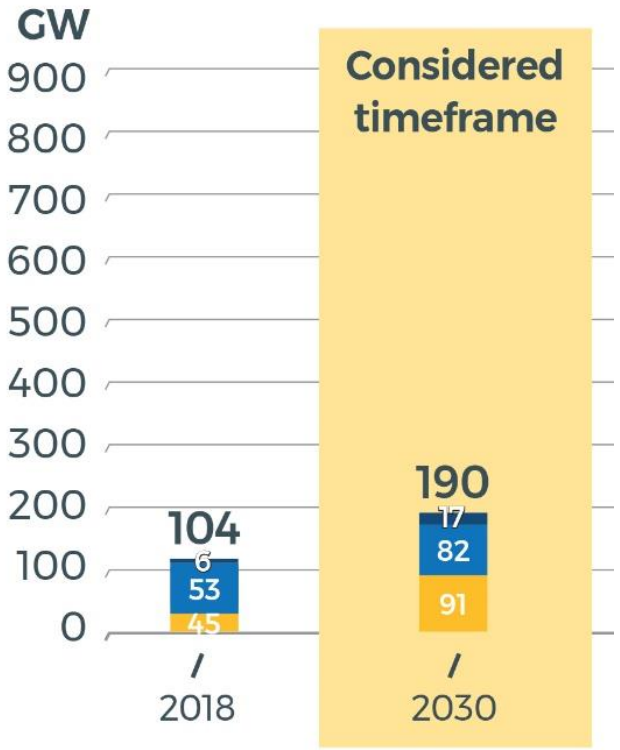
→ Flex-In-Market design

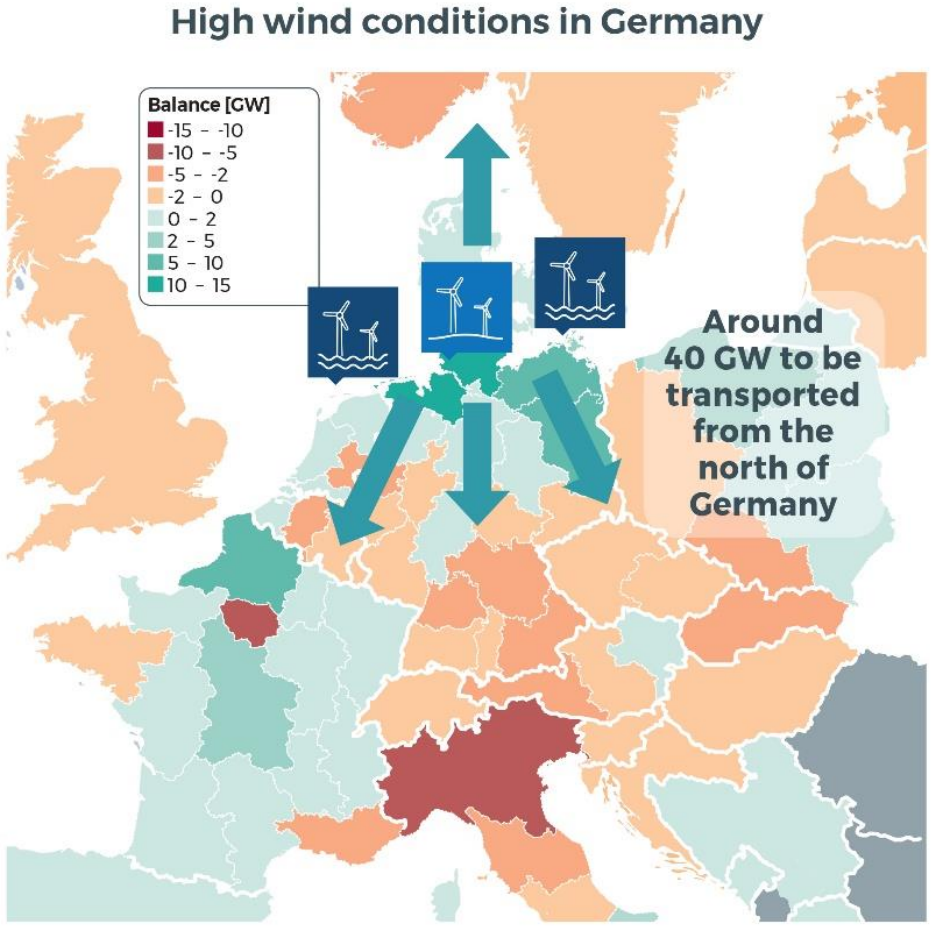
Forecast of RES production in Belgium by 2030



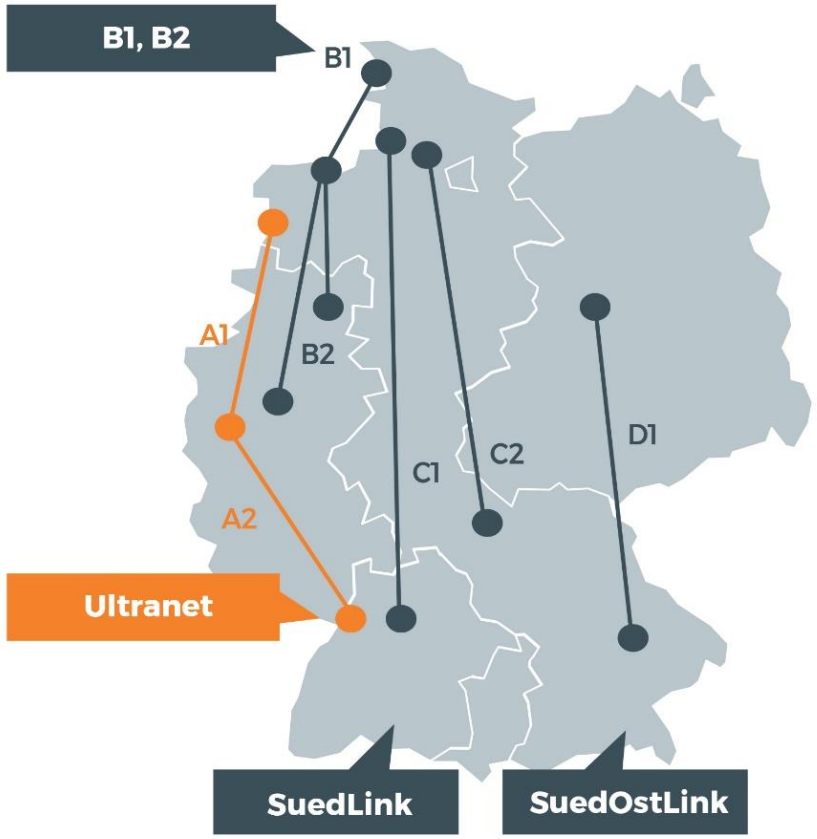


65% of RES infeed in Germany by 2030



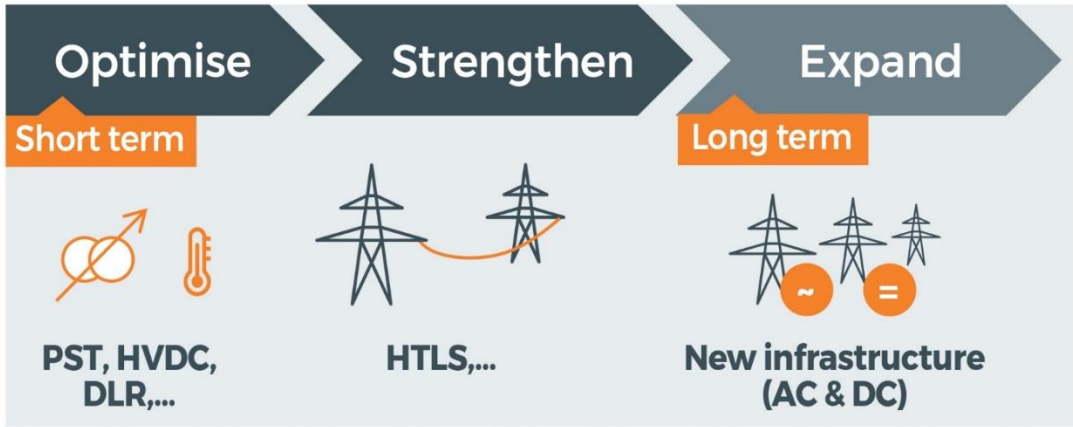


Effect of missing infrastructure



German N-S HVDC lines
(2 GW each) by 2030

- ✓ Yearly EU welfare loss of around € 1 billion to € 1.5 billion by 2030
- ✓ Increased redispatch & loop flows (though Belgium)
- ✓ Higher volumes of EU RES curtailment: approximately +40%



Key messages

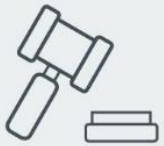
1 Hardware — **Grid Infrastructure**

How much ***transmission capacity*** *is available?*

Timely completion
of planned grid infrastructure

→ maximum welfare & benefits

2 Software — **Market Design**



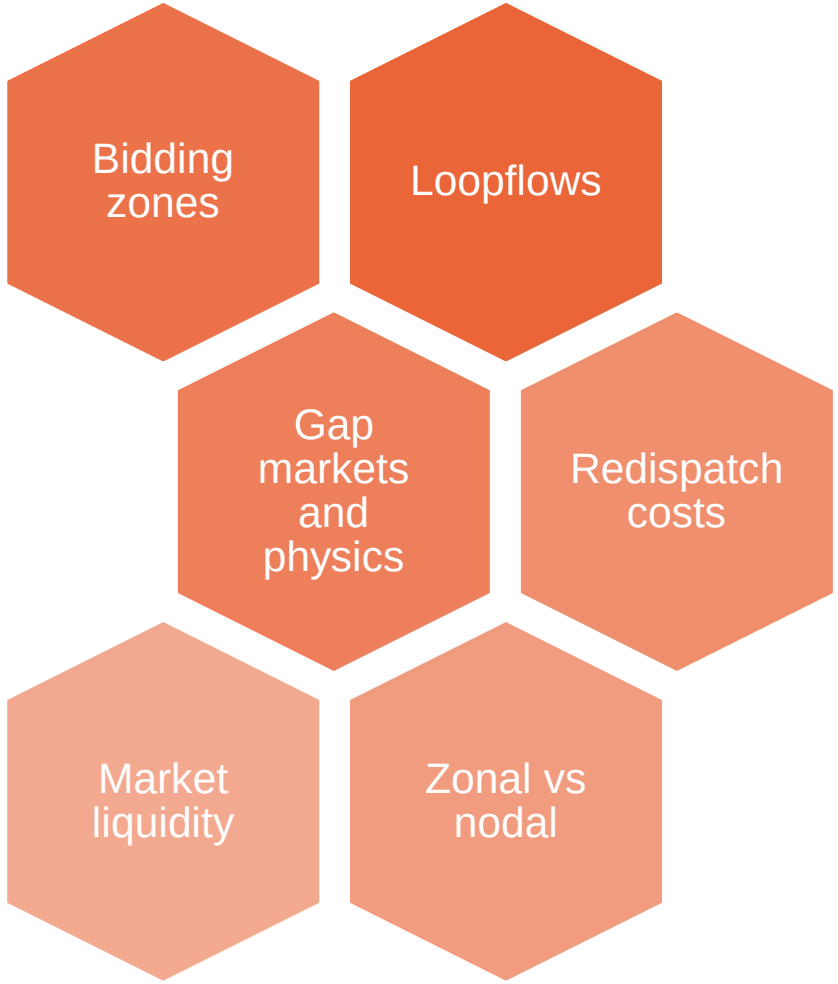
How to ***use*** *available capacity* ***in most efficient way?***

Proposal
for an improved
market mechanism

→ Flex-In-Market design

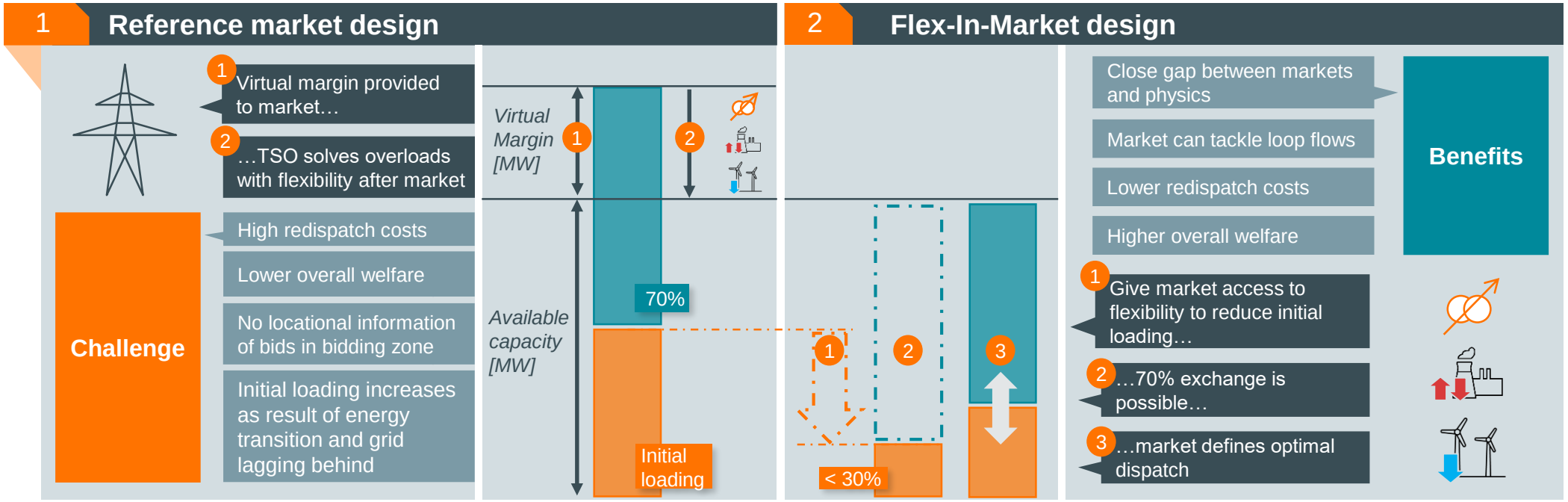
Flex-In-Market design

Market design discussions: a highly complex context

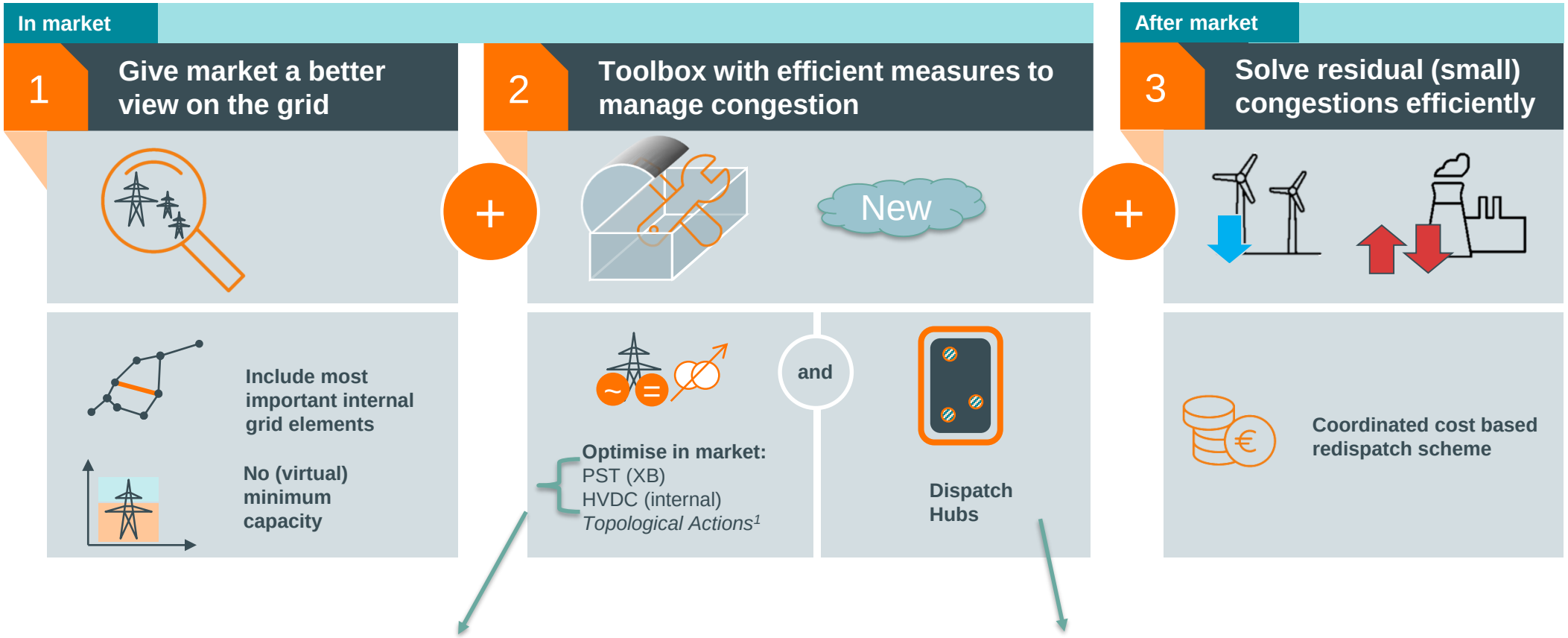


- "Flex-In-Market" design brings currently opposing views closer together
- It closes the gap between markets and physics and enables maximum welfare and benefits for society
  - (Costly) remedial actions are optimized within the market (economic optimisation)
  - No change in bidding zone configuration
  - Better and more efficient utilisation of grid capacity

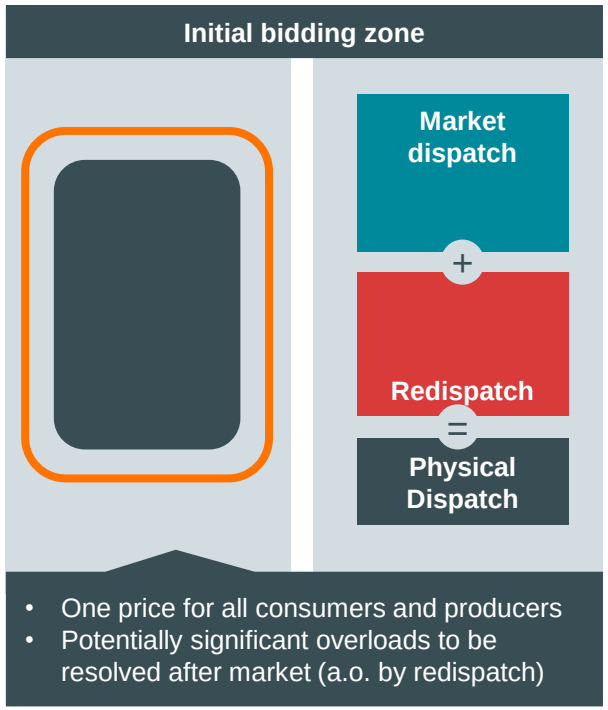
Flex-In-Market design: concept

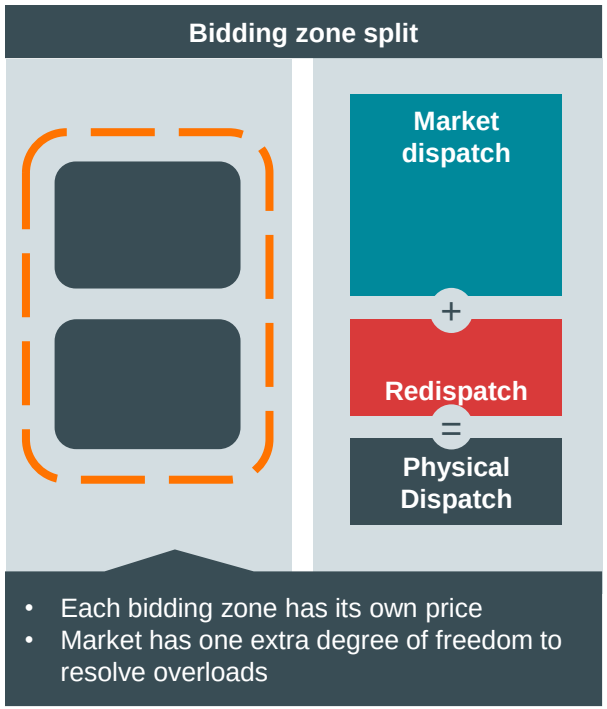


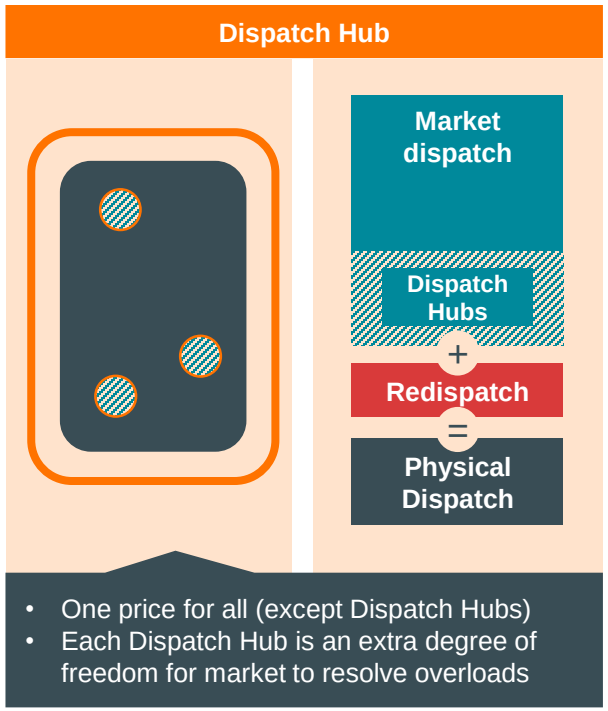
Flex-In-Market design: components



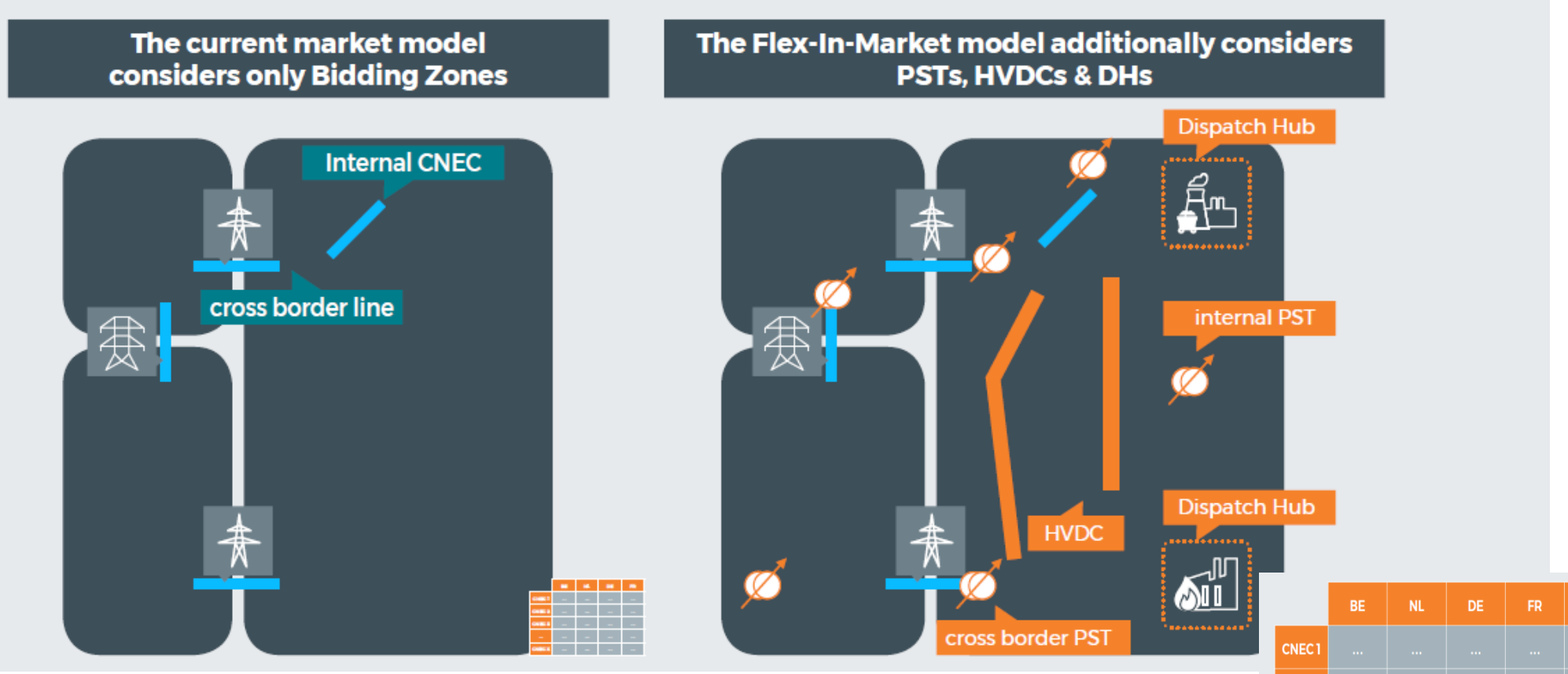
Dispatch Hubs: concepts and functioning





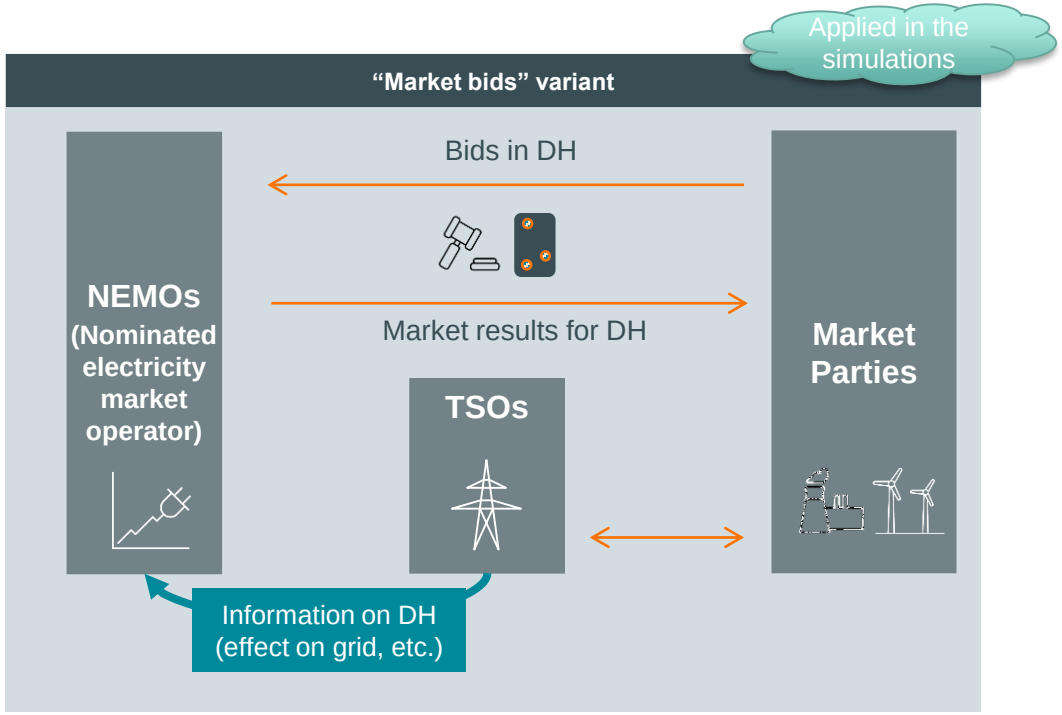


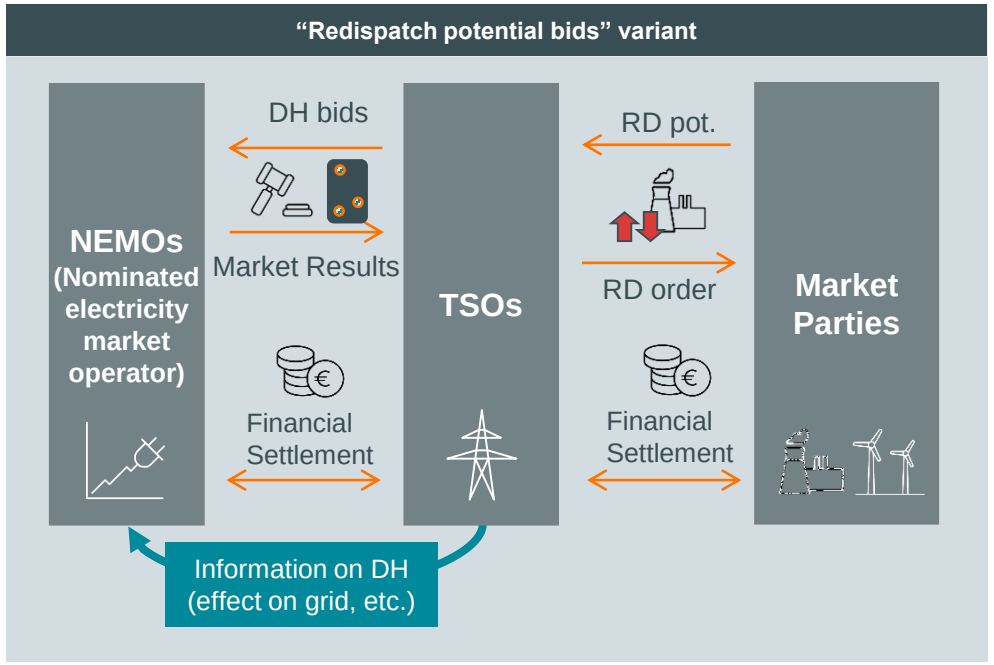
Optimisation of HVDCs, PSTs and dispatch hubs within the market



	BE	NL	DE	FR	...	PST_1	...	$HVDC_1$	...	$DH\ BE_1$	...
CNEC 1	...	...	...	...	...	...	...	...	...	...	...
CNEC 2	...	...	...	...	...	...	...	...	...	...	...
CNEC 3	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
CNEC X	...	...	...	...	...	...	...	...	...	...	...

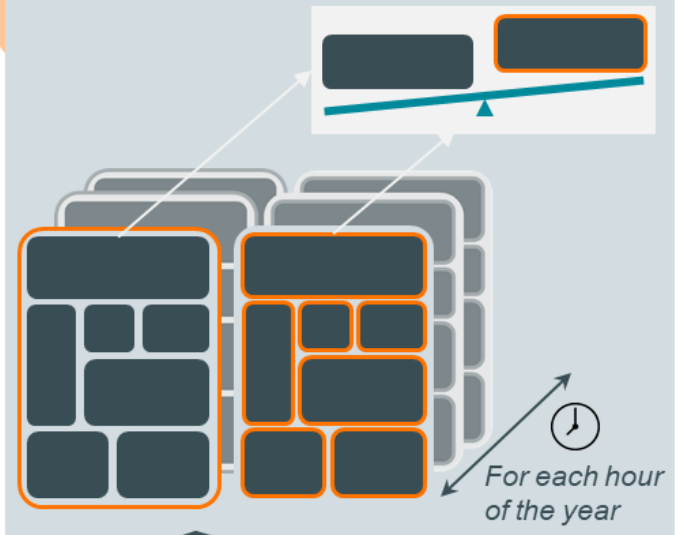
Two variants of Dispatch Hubs: need for further discussion





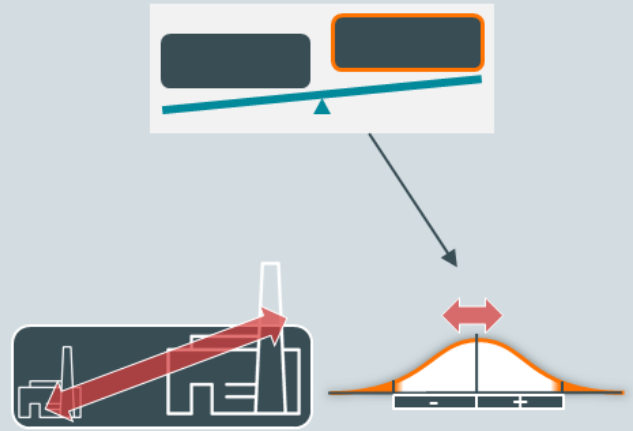
Dispatch hubs: location and dimension (1)

1a Simulate market dispatches



- Run a model with existing bidding zones and technical small zones
- Calculate the difference in the net position for each hour

1b Location and size of Dispatch Hubs



- Location: select the technical zones with largest absolute deviation
- Size: define X%-percentile of hourly deviations the Dispatch Hub must cover

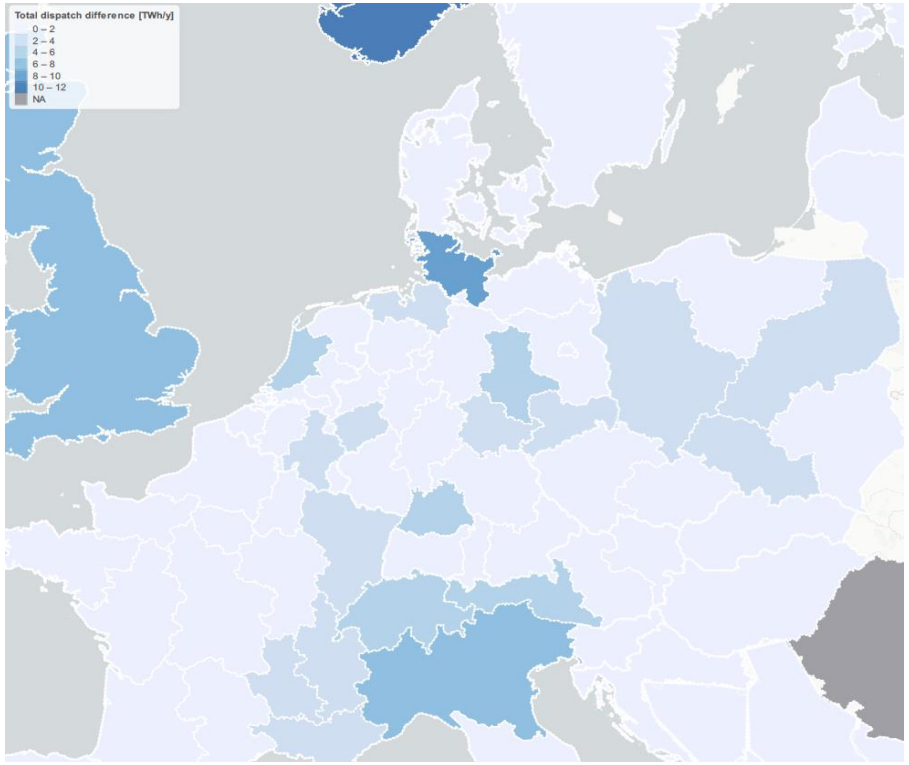
OR

2 Dispatch Hubs at opposite sides of congestion

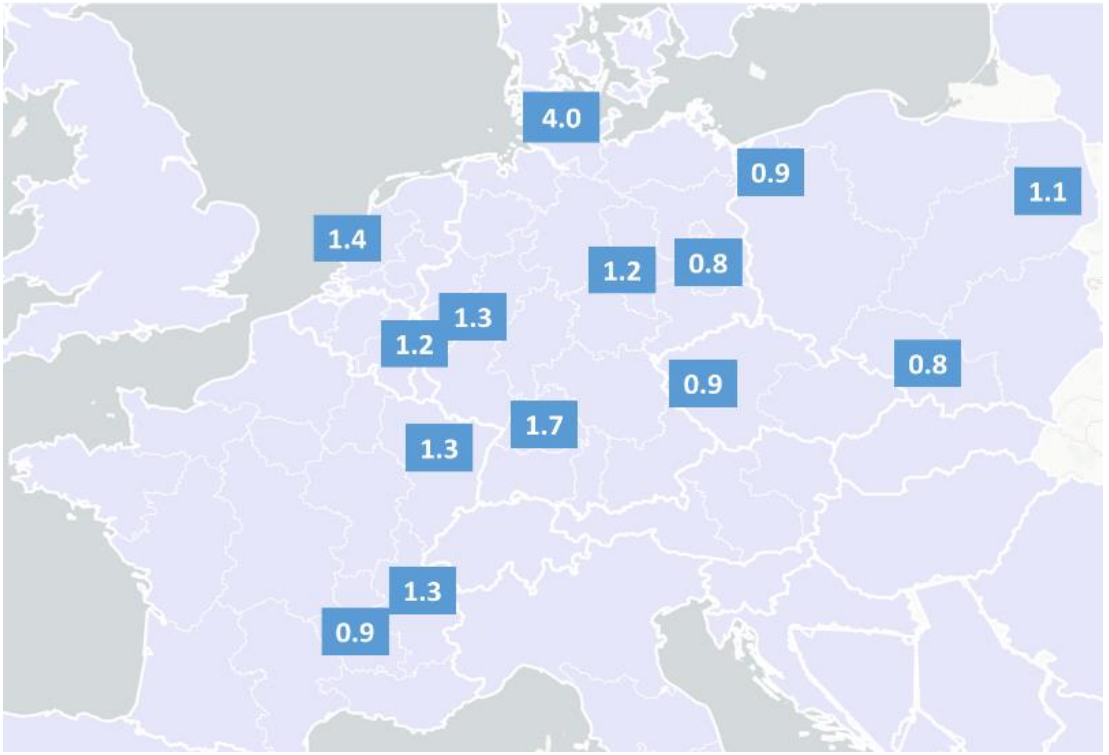
- Dispatch Hubs are located at opposite sides of a structural congestion
- Size of Dispatch Hub is defined by the size of the congestion to be solved

Dispatch hubs: location and dimension (2)

Difference in net position between existing zone run and technical small zone run

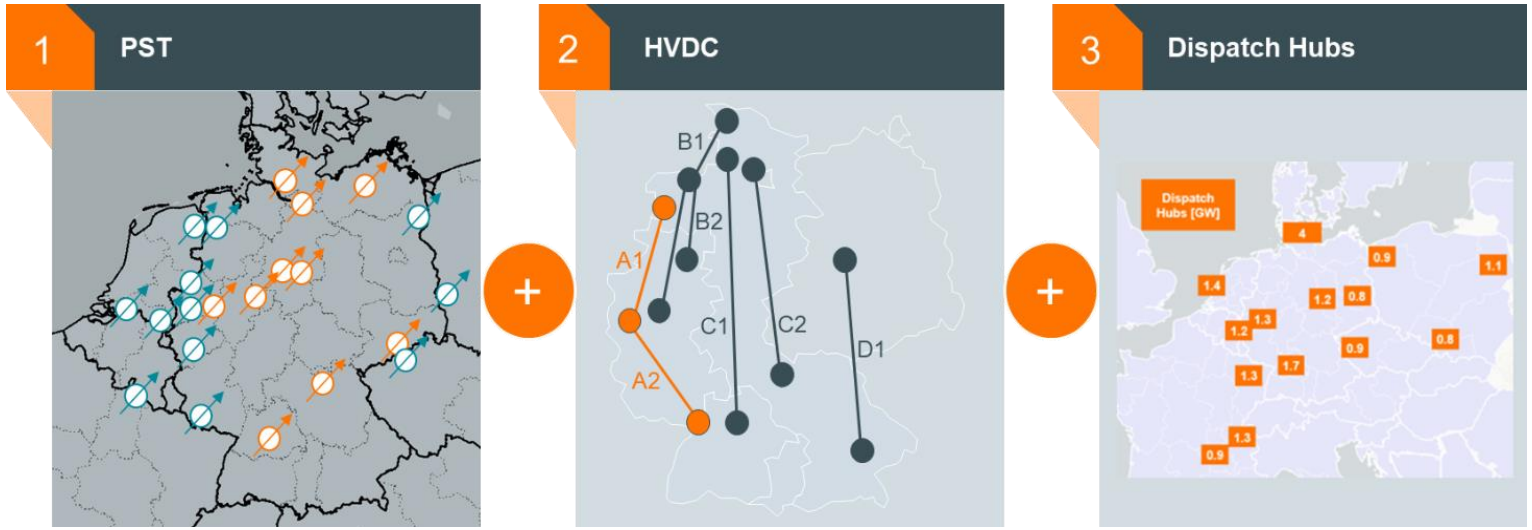


Dispatch hub capacity [GW]



Overview of the different simulated designs

- **Flex-In-Market design**
  - 0% minRAM
  - >10% PTDF internal elements
  - Existing BZ configuration
  - Additional flex in the market



Flex-in-Market design compared to the reference market design

- ✓ **Welfare gains of € 300 to € 400 million per year in 2030 and decrease of RES curtailment by 10% to 15%**
- ✓ **Potential reduction of German redispatch costs of > 50% in anticipation of the HVDC lines**
- ✓ **Closing the gap between markets and physics & more efficient utilisation of the grid**

Next steps

Elia Group paper is an **invitation for dialogue** with other TSOs, market parties, regulators, policy makers, etc.

- It wants to **raise awareness** on the upcoming **challenges on both the hardware** (grid infrastructure) and **software** (market design) side of the EU electricity system in the **next stage of the energy transition**.
- It **might bring currently opposing views closer together** to come to solutions to cope with those challenges in an efficient way.

Elia Group will **continue its discussions with different relevant stakeholders** to gather feedback on its proposed ideas. In a next stage, Elia will inject its ideas in the **relevant European platforms** for further consideration and elaboration.

The Flex-In-Market design is to be considered **as potential improvement after the ongoing implementation of the Clean Energy Package and the Core Capacity Calculation Methodology (Core CCM).**

2. Update on CEP 70%

The implementation is progressing as planned

Recap

- Elia submitted a request for derogation which was approved by CREG and accepted by the Core NRAs
- The derogation entails an external parallel run in Q12020 being part of Elia's implementation plan to introduce new tools & processes for managing the CEP70 requirement in the CWE day-ahead process

Where we are today

- External parallel started with business day Jan 7th
- Elia publishes the results of the Belgian CNECs on a weekly basis on JAO
- The process is running stable

The implementation is progressing as planned

First insights

- Derogation on loopflows is working and was activate in ~10-15% of cases (all CNECs all hours) in Jan
- A reduction of the minRAM target due to unsolvable overloads occurred in <1% cases in Jan
  - The validation step of the CEP process can conclude that the overloads are unsolvable, despite the application of a remedial action optimizer (RAO). *Elia introduced the RAO its local tooling to find solutions to address congestions*
  - Consequently the minRAM target is reduced to a level that ensures operational security
  - Still respecting the 20% minRAM
- Disclaimer: these figures are not a projection for the future, they reflect the situation during the first month of // run which is characterized by quite some price convergence and thus not so stressed grid situations.

The implementation is progressing as planned

Next steps

- Enrich the publication with key data from the CEP process to explain how the minRAM target for CWE is being calculated, taking into account the derogation for loopflows

	AC
MinRAMJustification	
RAM used by external exchanges (MNCC) = -6,22% ; Total loopflow = 5,93% ; Loopflow threshold = 10,18% ; MinRAM target for CWE (MCCC) = 76%	
RAM used by external exchanges (MNCC) = -7,67% ; Total loopflow = 7,64% ; Loopflow threshold = 10,18% ; MinRAM target for CWE (MCCC) = 78%	
RAM used by external exchanges (MNCC) = -4,55% ; Total loopflow = 8,76% ; Loopflow threshold = 10,18% ; MinRAM target for CWE (MCCC) = 75%	
RAM used by external exchanges (MNCC) = -27,14% ; Total loopflow = 14,74% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 97%	
RAM used by external exchanges (MNCC) = -26,19% ; Total loopflow = 20,36% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 92%	
RAM used by external exchanges (MNCC) = -26,88% ; Total loopflow = 23,2% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 90%	
RAM used by external exchanges (MNCC) = -22,07% ; Total loopflow = 24,15% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 85%	
RAM used by external exchanges (MNCC) = -13,18% ; Total loopflow = 27,31% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 72%	
RAM used by external exchanges (MNCC) = -9,42% ; Total loopflow = 27,58% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 68%	
RAM used by external exchanges (MNCC) = -14,09% ; Total loopflow = 35,69% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 65%	
RAM used by external exchanges (MNCC) = -12,97% ; Total loopflow = 32,23% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 67% ; MinRAM applied for CWE = 40% ; MinRAM target reduced due to insolvable overloads	
RAM used by external exchanges (MNCC) = -12,82% ; Total loopflow = 29,28% ; Loopflow threshold = 16,6% ; MinRAM target for CWE (MCCC) = 70% ; MinRAM applied for CWE = 56% ; MinRAM target reduced due to insolvable overloads	

- Implement fallback procedures to ensure robustness of local tooling when putting them into the operational process in CWE
- Analyze the functioning of the remedial action optimizer

3. Update regarding emergency & restoration

Current status on NCER documents

NCER document	To be appoved by	Status	Next steps
Terms & Conditions for Restoration Service Providers (black start)	Creg	V 1.0 Not approved V 1.01 Submitted by ELIA	V 1.01 is waiting for approval
Rules for suspension and restoration of market activities and rules imbalance settlement during market suspension	Creg	V 1.0 Not approved	V 1.01 to be submitted by ELIA
Test Plan	Minister	V 1.0 Submitted by ELIA	V 1.0 is waiting for approval
System Defense Plan (= reviewed reddingscode)	Minister	V 1.0 No decision, amendments required V1.01 was approved on 19/12/19 with certain conditions	
Restoration Plan (= reviewed reconstruction code)			
List of SGUs identified for defense and restoration plan			
List of High priority SGUs for defense and restoration plan			

Ministerial decree 19/12/19

Defense and restoration plans are approved under the following conditions:

- Duration : 2 years → update of plans to be submitted by 19/12/2021
  - Decide which measures should be implemented in risk preparedness plans, cfr regulation (EU) 2019/941 and which can be removed from the actual defense and restoration plans
- Lists of high priority significant grid users to be submitted for approval by 19/06/2020 → in coordination with DSOs
- Clarify the approach in case there are no black start services that can be contracted by ELIA
- Indicate some situations for which the 4 in-design assumptions of the restoration plan are not fulfilled and specify the approach.

→ Link to Elia website with non-confidential versions of defense and restoration plans
→ Letters to SGUs will be sent in the course of February 2020

Implementation of communication signals

5 notification could be sent to SGUs, DSO, public authorities & NEMOS

Emergency Elia	Similar to existing “Alarm Elia”
Blackout Elia	Inform stakeholders in case of blackout
Grid Restoration Elia	Inform stakeholders Elia applies the Restoration Plan
Market Suspension Elia	Inform stakeholders markets are suspended due to a blackout or a tool unavailability
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Notifications will be sent by multiple channels to ensure transparency

Website	Only required channel by NCER Stakeholders have to proactively consult the website
Mail	Registered stakeholders will receive the notification Unreliable channel in case of blackout
SMS	Registered stakeholders will receive the notification Unreliable channel in case of blackout
SCADA	Only reliable communication channel in case of BO Only large producers/demand facilities have a Scada

Key milestones for stakeholders

March 2020	June 2020	December 2020	To be determined
Stakeholders will be asked to register to the different communication channels	Elia will provide a technical note describing the requirements for the SCADA communication channels	GO LIVE of Emergency Elia, Blackout Elia and Grid Restoration Elia,	GO LIVE of Market Suspension Elia and Market Restoration Elia after approval of the “Rules for market suspension and imbalance settlement” by CREG

Deployment of black-out proof phones for communication during black-out

Context

- Communication between Elia and Significant Grid Users (SGUs) is key during a reconstruction process. **ELIA must be able to contact SGU**.
- In order to accelerate the reconstruction, the Network Code Emergency and Restoration in 2017 sets up new standards for communication systems.
- The NC ER imposes a deadline for implementation on 18/12/2022. ELIA will contact each SGUs to define a gap analysis and implementation plan.

The NC ER sets the following requirements

- Blackout proof communication system for SGUs identified in the Restoration Plan
- 24 hours autonomy
- Redundancy

Approach for stakeholders

Elia KAM contacts the SGU to provide details and request additional technical information → The technical solution is discussed between the SGU and Elia → Works are planned together with the client → Act commitment in the connection contract → Deliver the Elia blackout proof phone

Expected contribution

Elia expects the following contribution from the SGUs:

- Provide the required information to Elia such that the best technical solution can be chosen.
- Finance the work and equipment necessary for a blackout proof connection within their own battery limits.
- Realize the adaptations on their site within the agreed deadlines.

Black-Start Tender 2021-2023

Delivery Period: 01/01/2021 to 31/12/2023

Need for Black-Start technical units:

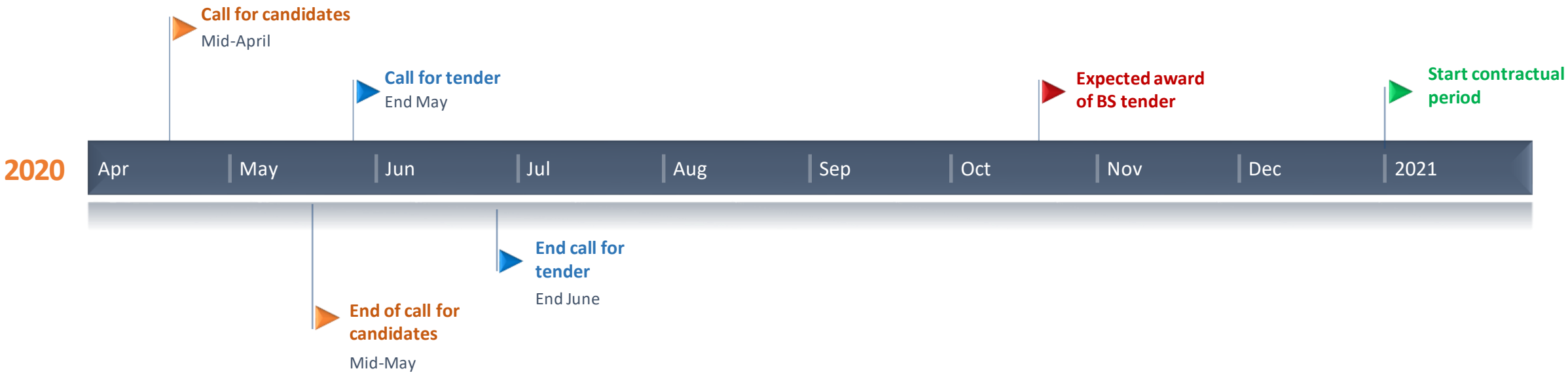
Delivery Period	Electrical Zone	# BS technical Units to be contracted
01/01/2021 – 31/12/2023	380	1
	North-West	1
	North-East	1
	South-West	1
	South-East	1

Contractual Framework: T&C for Restoration Service Providers (to be approved by the CREG)

- Consult proposal for T&C RSP here
- More information on “How to become a RSP?” here

Black-Start Tender 2021-2023 (2)

Expected timeline



- ✓ **Call for Candidates**: mid-April to mid-May
- ✓ **Call for Tender**: End May to End June
- ✓ **Expected award**: Mid October

AOB

Tentative date 27/05 for joint training NEMOs, TSOs, MPs, JAO on decoupling event

Next meeting: before summer, doodle to be launched