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Regional coordination of short-term operations

Integrating balancing markets

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Summary

1. The context of electricity balancing markets

- Hugh diversity in system operations and balancing markets designs
- Issues in European balancing markets
- The need to integrate national balancing projects

2. NC Electricity Balancing : a necessary binding regulatory framework

- The process to develop a Network Code
- Where do we stand now?
- ACER's opinion regarding well-functioning balancing markets

3. Early implementation through Balancing Pilot Projects

- The need for voluntary initiatives across the EU
- Overview of the balancing pilot projects
- Case study: exchanges using the Processes for Replacement Reserves

Summary

Managing generation units in Europe: coexistence of very different models

Two main market models for scheduling processes

Central Dispatch Systems (CDS)

- **TSOs** responsible for unit commitment and dispatching of majority of prequalified generating units
- **Integrated Scheduling Process :** TSOs solve the **global optimisation** problem of the generation costs given technical constraints (generation units & transmission system).

Self Dispatch System (SDS)

- **Generation unit's owners** perform unit commitment process.
- **Individual decisions,** with possible **local optimisation** for units groups under a portfolio (e.g. BRP).
- Depending on network constraints, TSOs may have to apply redispatching to ensure system security.

Coexistence of very different models to operate systems in Europe, Hugh diversity in balancing markets designs

- Balancing historically entrusted to **individual TSOs**
- Designs based on **historical national specificities**
- Access to resources is mostly **limited to national markets**

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Issues in European balancing markets

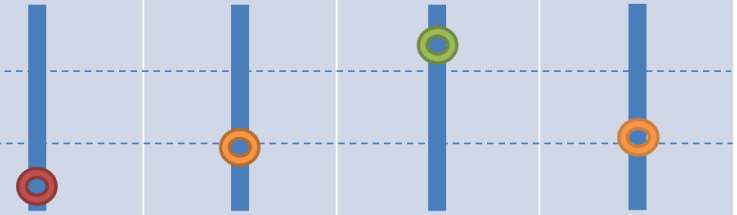
Challenges in ensuring security of supply

- Need for **enhanced system flexibility** with massive penetration of non programmable RES (increase in system requirements and products, decrease in short-term availability of traditional balancing units)

Developing EU-wide competition

- **High levels of concentration** in many Member States
- In spite of on-going efforts, still **a very limited participation of demand response**.

Area		France	Netherlands	Great Britain	Spain
Type of balancing market		Upward manually-activated energy from FRR and RR (2011)	Upward energy from FRR (2011)	Upward and downward balancing energy (2010)	Automatically-activated FRR capacity (2011)
HHI value		3894	2639	1300	2494
Level of market concentration	Unconcentrated HHI <1500				
	Moderately concentrated 1500<HHI<2500				
	Highly concentrated HHI > 2500				

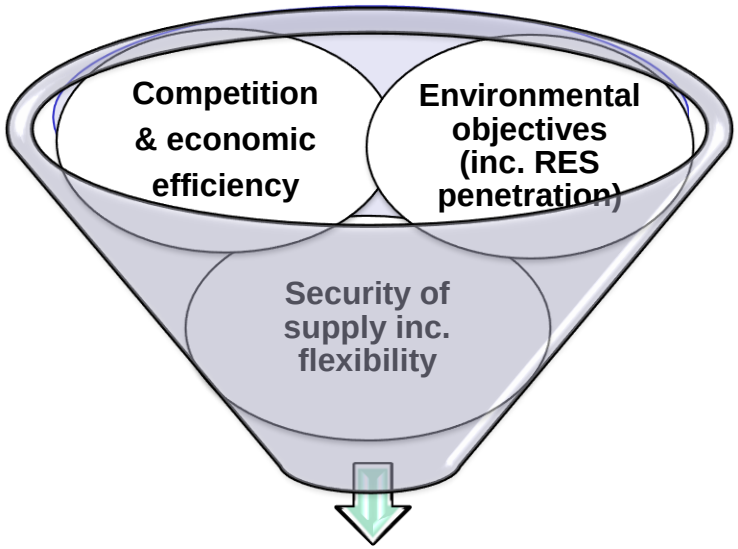


The need to **integrate balancing markets**

- Balancing market concentration could be decreased through higher cross-border integration, **reduction in entry barriers and improvement in market efficiency**. More competition between BSPs and increased liquidity in balancing energy trading.

- **Relevant price signals** will allow to enhance the efficiency of balancing markets as they have a direct impact on the volume of residual imbalances to be balanced by TSOs.

- Developing cross-border balancing can be considered essential in **accommodating an increasing amount of intermittent generation** without jeopardising the European system and inducing high additional balancing costs.



Necessity to integrate balancing markets

What are the main **integration tools?**

Formal process: establishing a legal framework

- Develop Framework Guidelines and Network codes
- Establish methodologies and/or term and conditions for balancing

Informal process: early implementation

- Use ACER Electricity Regional Initiatives
- Develop balancing pilot project(s)
- Ensure strong pan-European dimension: cross-regional roadmaps
- Ensure strong stakeholders' involvement: Florence Forum, AESAG, BPPSAG …
- Provide close and transparent follow-up (regular reports, status reviews)

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General process to elaborate a Network Code

- The network codes**,** which were introduced by the Third Energy Package, involve several stakeholders (ACER, ENTSOs, European Commission, Member States).
- They specify the principles established in the ACER framework guidelines.

Annual priority list

Every year, the European Commission draws up a list of priority topics to be addressed within a network code.

Framework Guidelines

ACER establishes clear objectives and principles related to these topics.

Network Code

ENTSO-E clarifies the principles from the framework guidelines.

Annex to the Regulation

On the basis of recommendation from ACER, the European Commission may submit the network code to a comitology process to make it binding.

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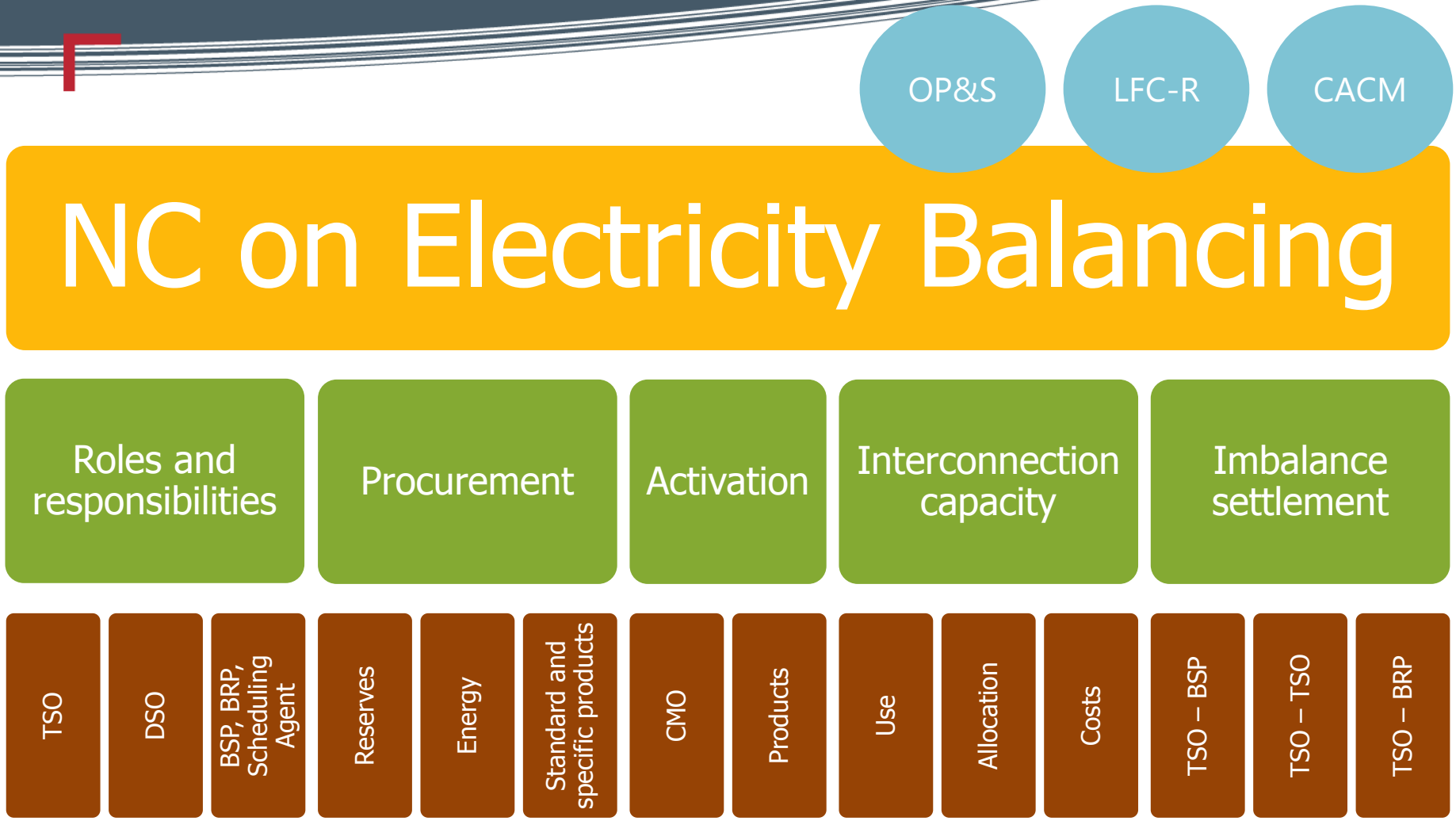
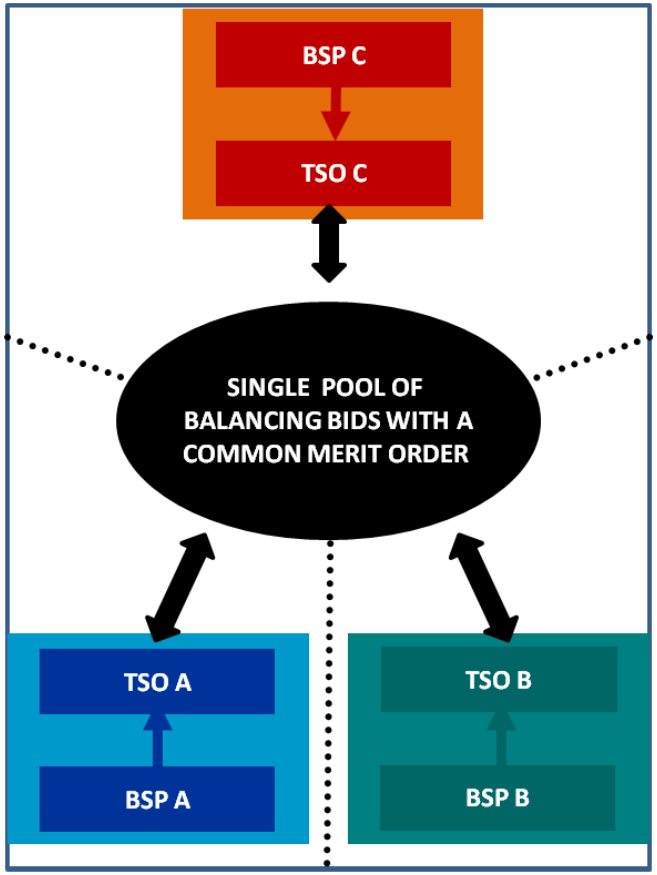
Structure of the Network Code



Balancing Target Model
the pillars at a glance

- **Strong coordination between TSOs** to optimise the activation of energy from balancing resources;
  - On the basis of a **Common Merit Order** for the manually-activated reserves *(mFRR and RR);*
  - On the basis of an **equivalent concept** for the automatically-activated reserves *(aFRR);*
- **Well-designed market incentives** for market participants:
  - **On BSPs**, with the harmonisation of the pricing method to procure balancing energy and requirements on terms and conditions to facilitate the participation of RES and demand response;
  - **On BRPs**, with the definition of common features for an efficient settlement of energy imbalances.



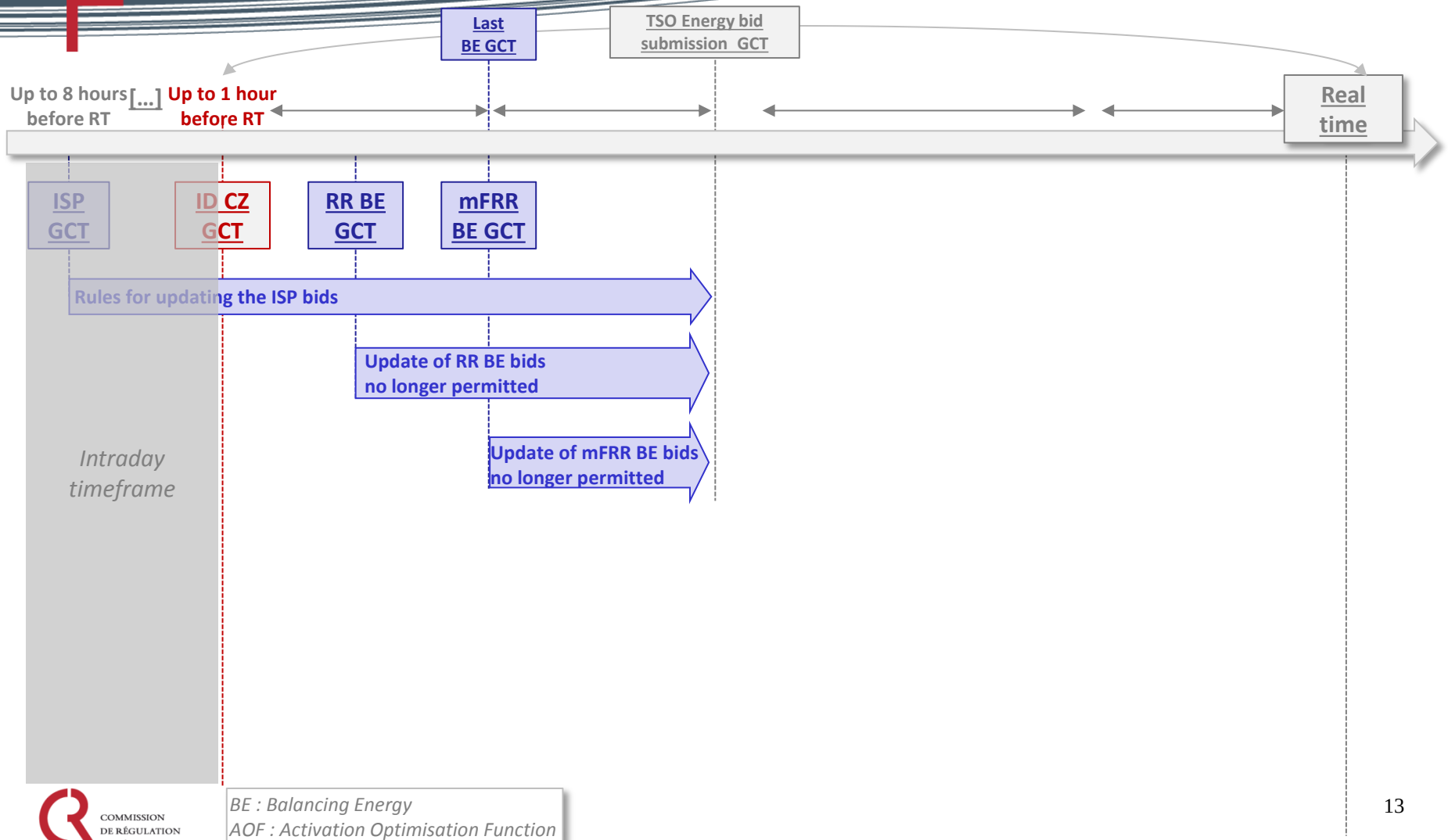
How would the target be reached?

Concept of a **Coordinated Balancing Area**

- TSOs are obliged to cooperate in a **Coordinated Balancing Area (CoBAs)** with two or more TSOs
- Each CoBA includes the exchange of Standard Product(s) for a given process
- Regional Implementation Models allow to gain experience before implementing targets at EU level
- Sharing and exchange of Balancing Reserves is not mandatory but encouraged
- Functions are performing central tasks (CMO lists activation processes, common procurement,…)

Activation Optimisation Function within a CoBA

How should it work ?



BE : Balancing Energy
AOF : Activation Optimisation Function
FAT : Full Activation Time

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Activation Optimisation Function within a CoBA

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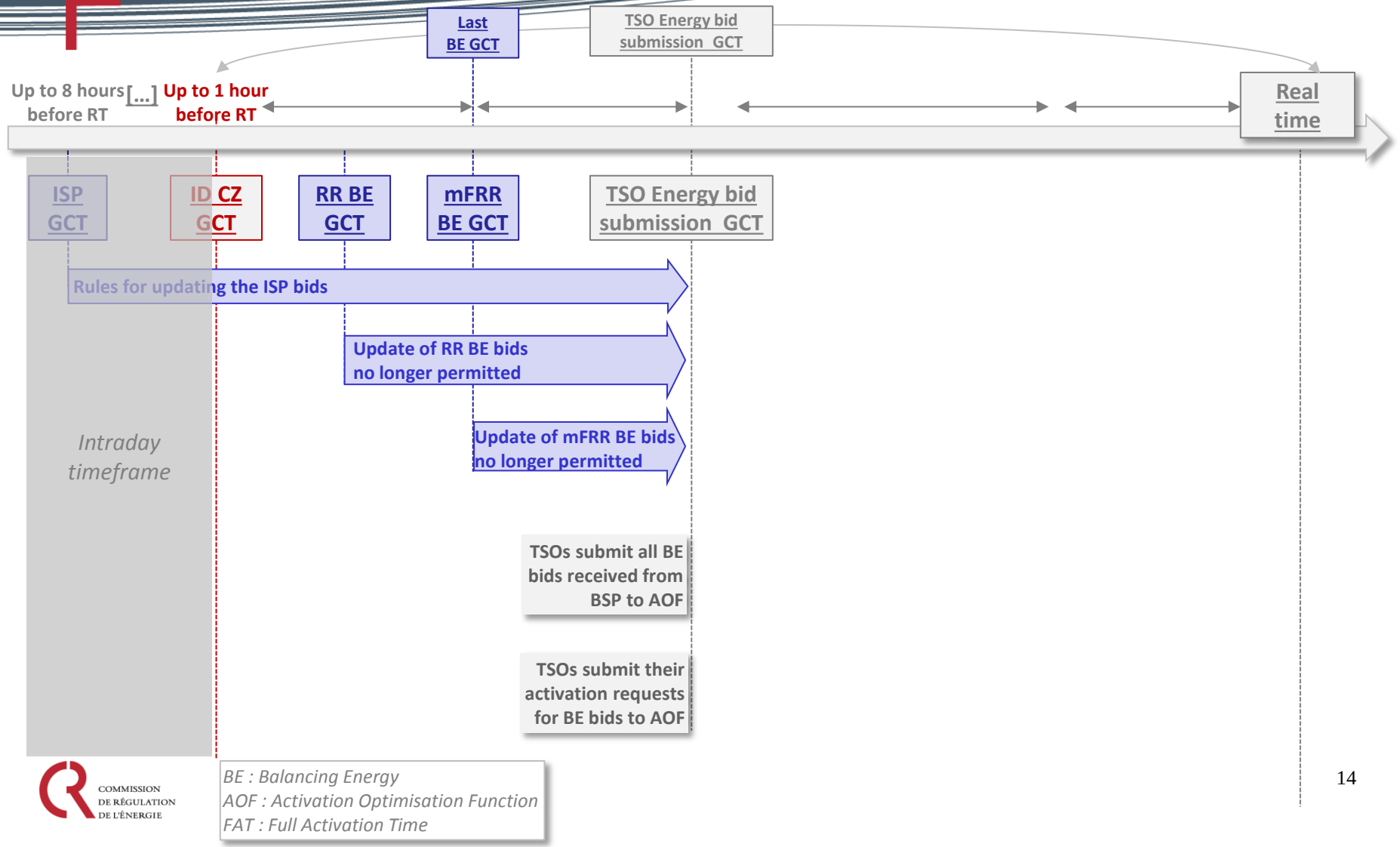

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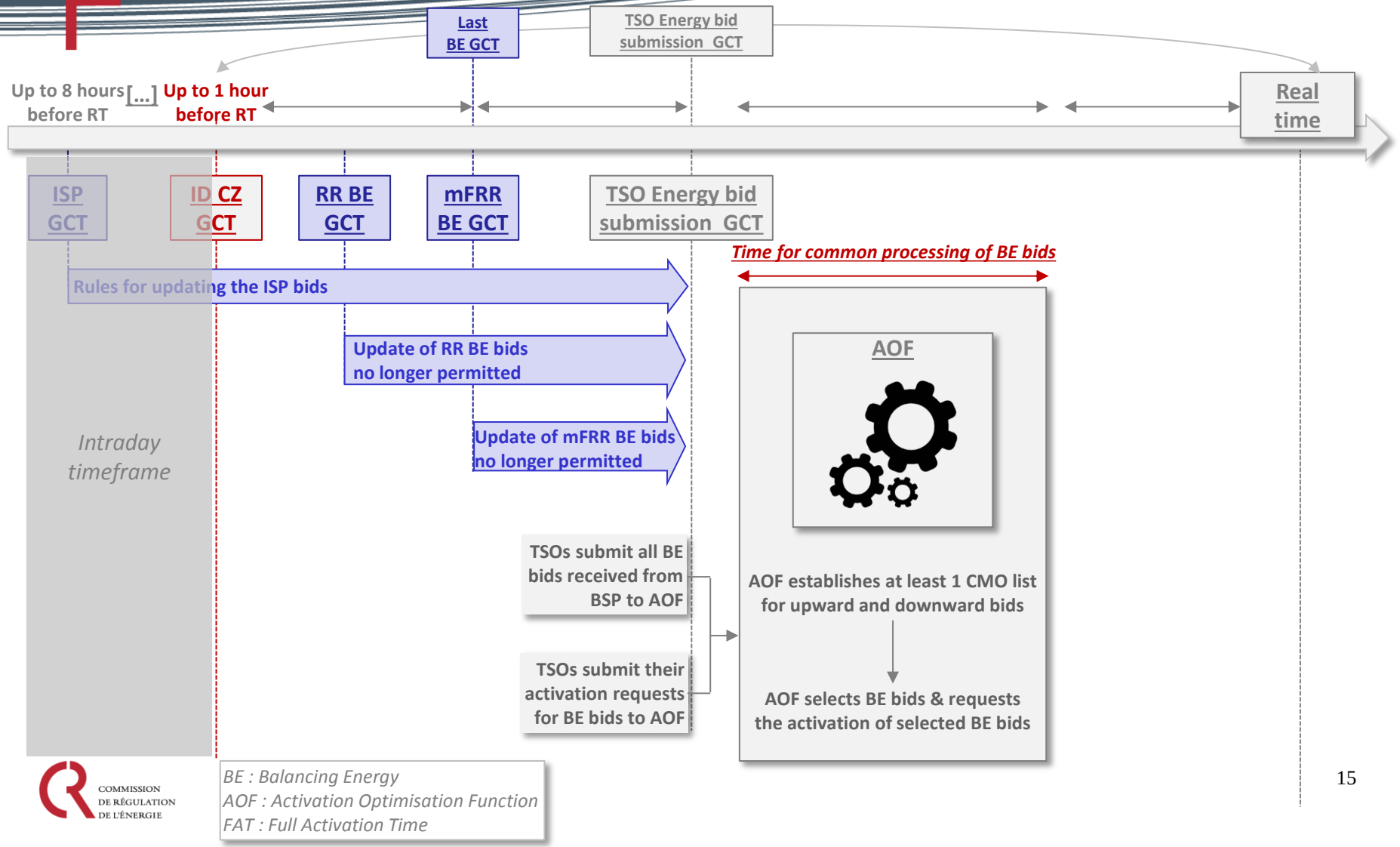

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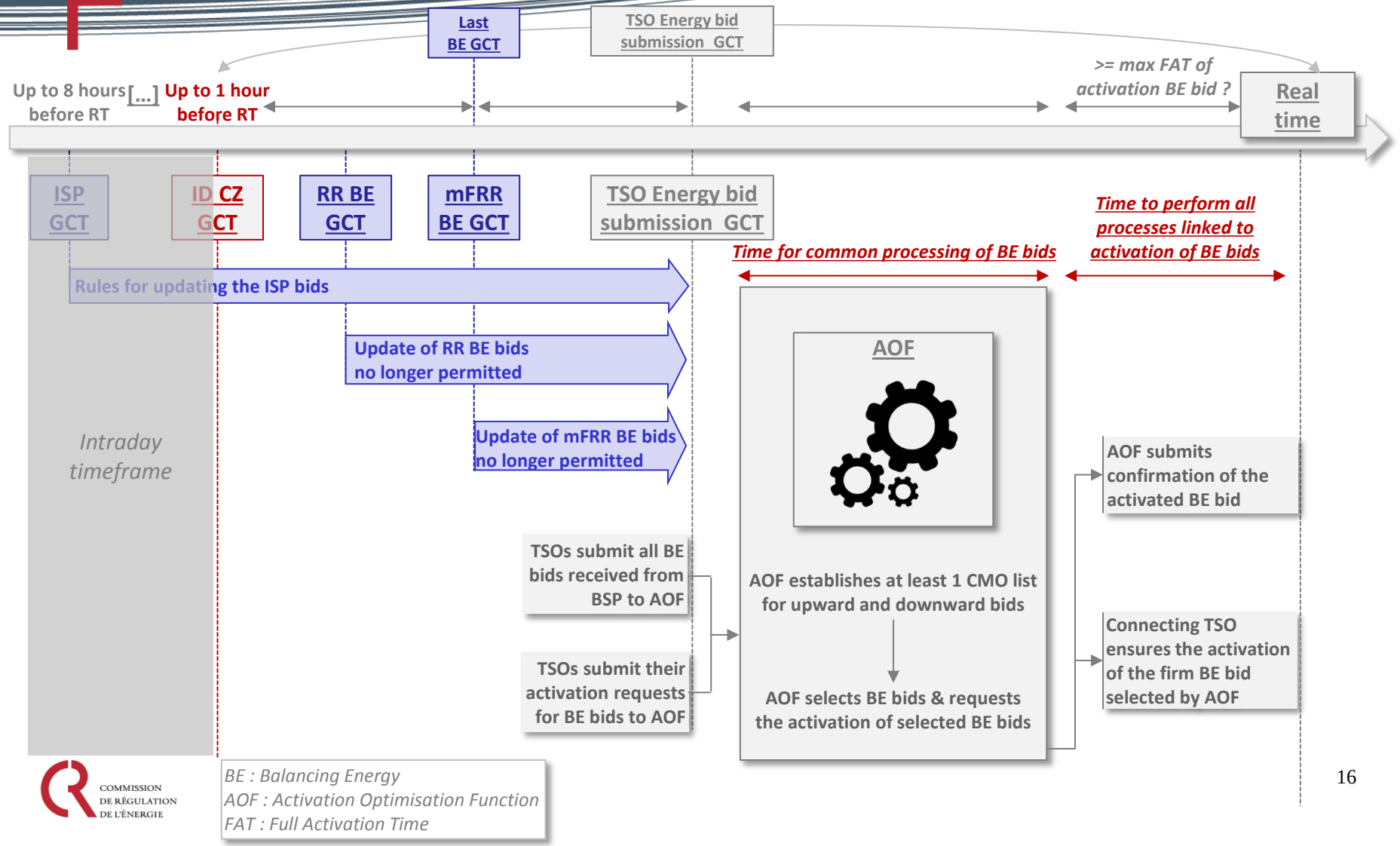

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ACER's expectations

delivered through its Reasoned opinion on the Network Code (March 2014)

- Integration of balancing markets is a very challenging goal (difficulties in drafting the FG and NC, scarce experience). The NC must therefore **define a new standard**.

MAIN PRINCIPLES

1. Reduce balancing needs with adequate incentives on BRPs

2. Efficient balancing actions to be performed by TSOs

3. Foster competition between BSPs

ACER's expectations

Where do we start?

- Integration of balancing markets is a very challenging goal (difficulties in drafting the FG and NC, scarce experience). The NC must therefore **define a new standard**.

FIRST STEPS

- Proposals for Standard Products and pricing methodology
- Activation purposes of Balancing Energy bids from the CMO Lists
- High-level principles for the different algorithms and optimisation processes
- Early definition and configuration of the first CoBAs and their interaction with the Pilot Projects.

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The need to **develop balancing projects**

- In spite of some past and on-going initiatives *(CMO for Manual Reserves in the Nordic region, limited exchanges of surpluses between some MS, or extension of imbalance netting process…)*
- **Few initiatives have emerged so far** to develop cross-border balancing, with a relatively limited geographical scope and low coordination to ensure compatibility of different practices…
- …providing **very limited experience** on the integration of electricity balancing markets.

With the on-going market integration process involving timeframes prior to balancing timeframe *(e.g. day ahead and intraday)*, implementation of cross-border balancing markets **constitutes a necessary next step.**

Imbalance netting
- *I-GCC*
- *E-GCC*

BSP-TSO model
- *FRA-GER and FRA-SWI exchanges of RR*

TSO-TSO with « margins »
- *BALIT (FR-UK)*
- *BALIT extension*
- *Moyle & East West*
- *Future exchanges on Britned*
- *Nordic – Baltic Cooperation*
- *GER-AUS exchanges*

TSO-TSO with CMO
- *Common Nordic market*
- *German TSOs cooperation*

Source: CRE

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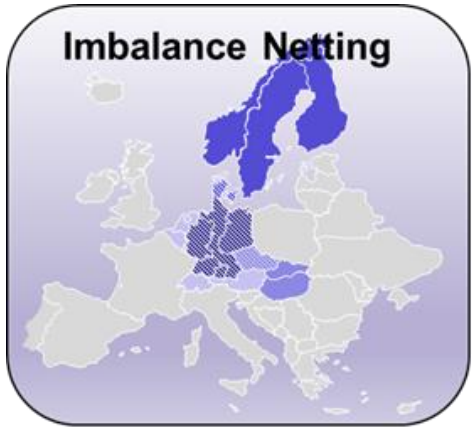
Objectives of the Pilot Projects

- ACER initially requested ENTSO-E to **promote coordination between TSOs** regarding cross-border balancing mechanisms as a necessary step towards the integration of balancing markets in the EU.

- ENTSO-E launched **pilot projects** with the aim to:
  - Gain bottom-up experience in terms of implementation of inter TSO regional balancing mechanisms;
  - Acquire experience about product definitions and pricing mechanisms;
  - Analyse governance issues (roles and responsibilities);
  - Test and enhance the balancing target model identified in the Framework Guidelines.

Overview of the Pilot Projects



FCR : Frequency Containment Reserves
FRR : Frequency Replacement Reserves

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Focus on RR Pilot Project

The TERRE initiative

Replacement Reserves

WHAT?	Design and test the feasibility of a multi-TSO coordinated cross-border exchange of Balancing Energy from RR
WHO?	Terna, RTE, National Grid, National Grid Interconnectors Limited, REN, Swissgrid, REE and ADMIE.
HOW?	Design phase (started in 2014) – *H1 2015* Implementation phase – *possibly beginning in Q1 2016*
STATUS?	Design ongoing for : - Definition of standard products - Matching process : algorithm process and quantitative simulations

What potential savings?
The TERRE project

MODEL	EXAMPLE	POTENTIAL
BSP-TSO	Swiss BSPs bidding in the French balancing market	**< €10 M / year** *Source: CRE*
TSO-TSO without CMO	BALIT mechanism between RTE and National Grid	**approx. €10-20 M / year** *Source: CRE*
TSO-TSO with CMO	Coordination between 4 Nordic TSOs	**approx. €200 M / year** *Source: EC*
	TERRE PROJECT	

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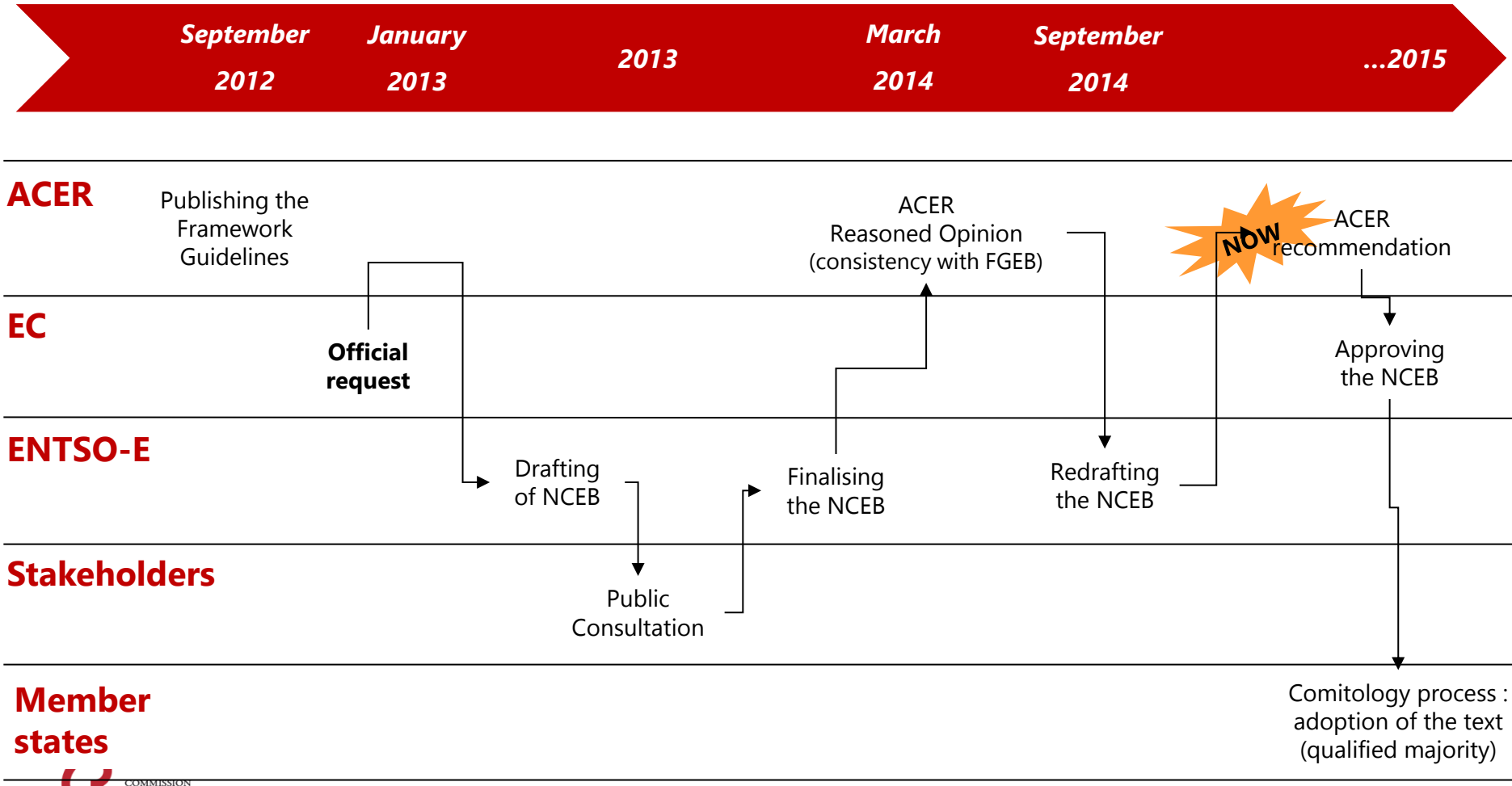
The process to elaborate the **NC Electricity Balancing**



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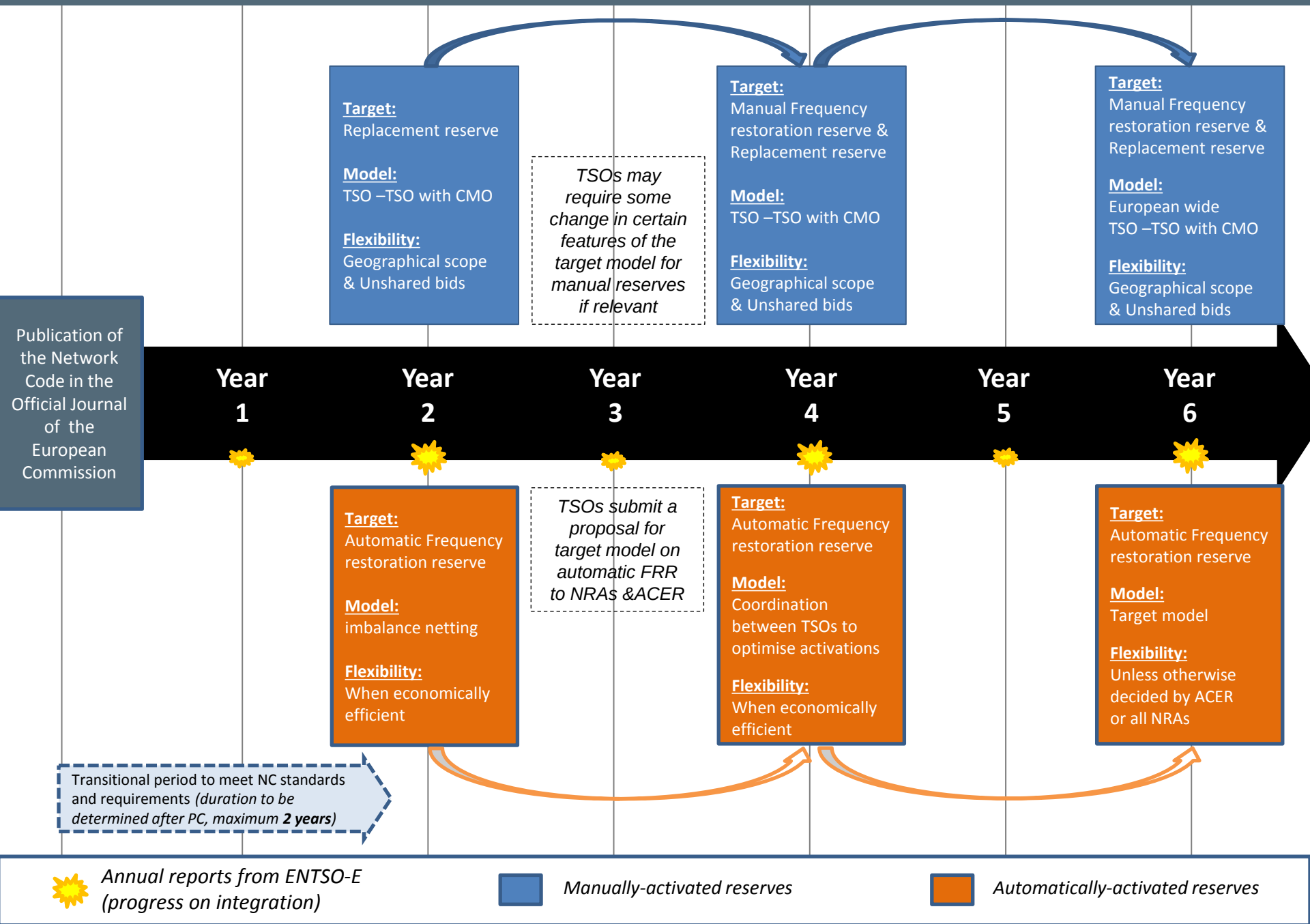
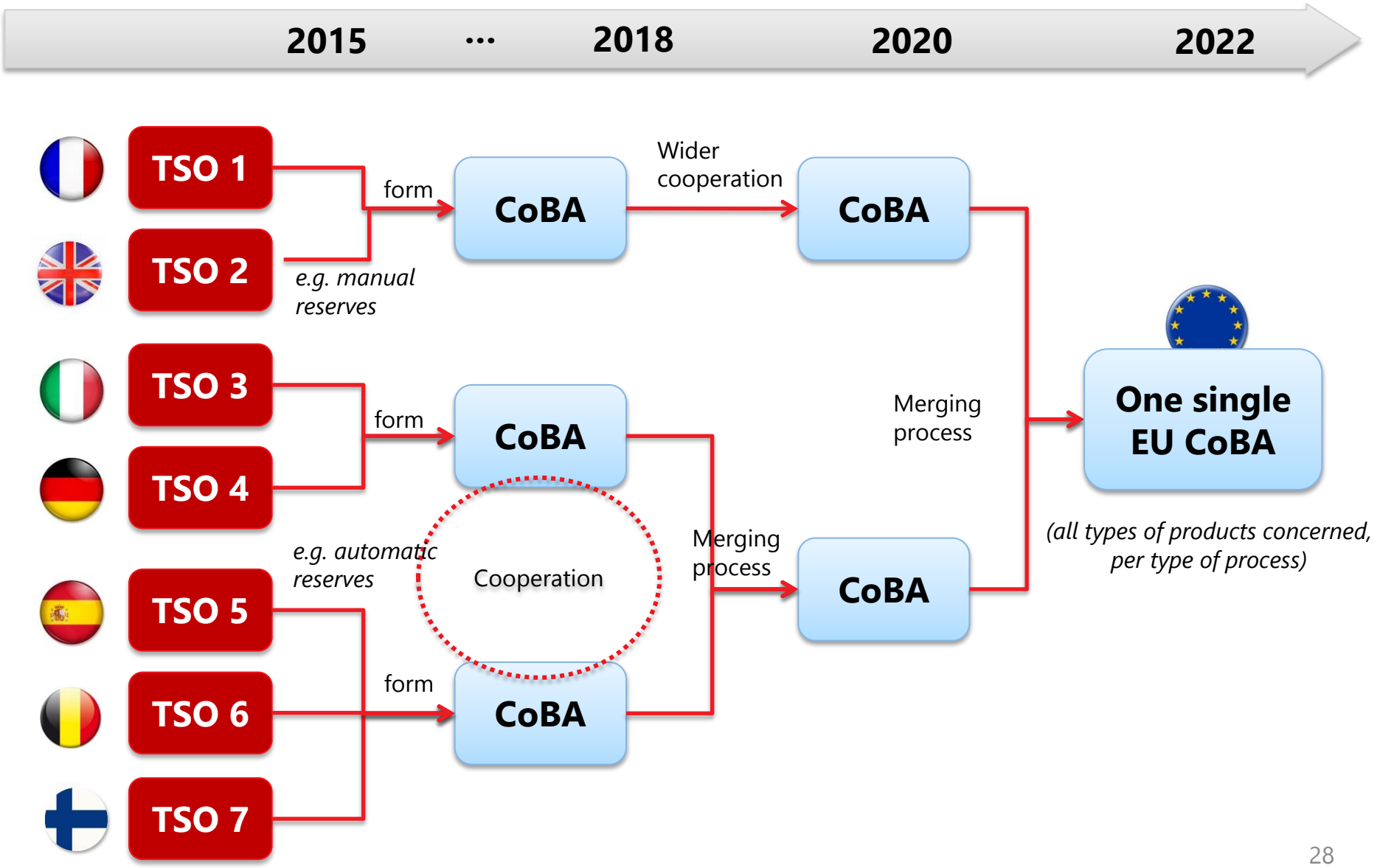
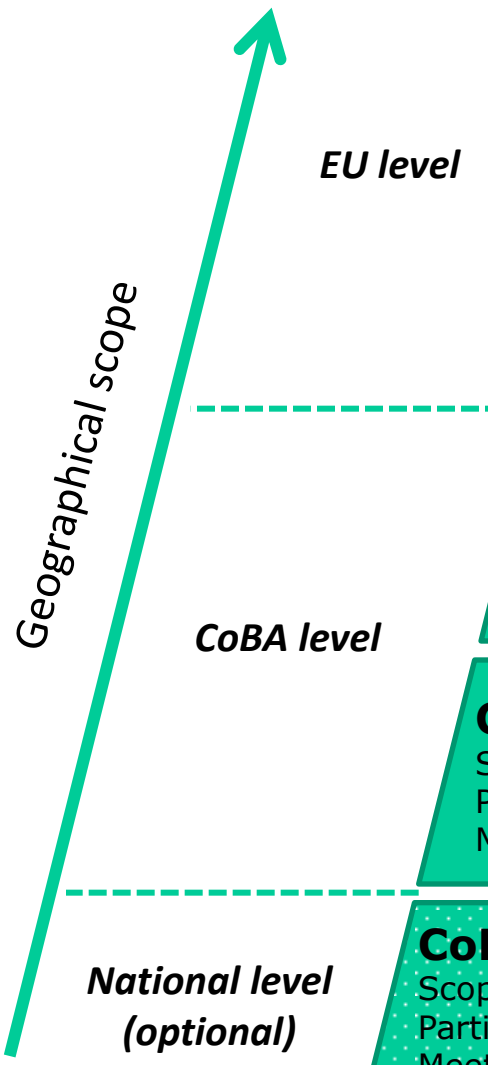
Annex: FG roadmap for the integration of balancing markets




2015
…
2018
2020
2022
TSO 1
TSO 2
TSO 3
TSO 4
TSO 5
TSO 6
TSO 7
form
form
form
CoBA
CoBA
CoBA
CoBA
Wider cooperation
e.g. manual reserves
e.g. automatic reserves
Cooperation
Merging process
Merging process
One single EU CoBA
(all types of products concerned, per type of process)

ACER's proposal for COBA governance



AESAG *(chair: ACER)*
Scope : High level update on the development of projects
Participants: ACER, ENTSO-E, Stakeholders
Meetings: 4 per year

Balancing Expert Group *(BEG, chair: ENTSO-E/ACER)*
Scope :Target Model design (chair ACER) and inter-CoBA issues (chair ENTSO-E)
Participants: ACER, ENTSO-E, Stakeholders
Meetings: 4 per year

CoBA Stakeholder Group *(CSG, Chair lead NRA & TSO)*
Scope : information and exchanges on key arrangements of the Project
Participants: NRAs, TSOs, Stakeholders
Meetings: 3 per year (can be set back-to-back with IG meetings every other time)

CoBA Implementation Group *(CIG, Chair: lead NRA)*
Scope : decisions on key arrangements of the Project; roadmap monitoring
Participants: NRAs, TSOs
Meetings: 4-6 per year

CoBA National Workshop *(CNW, Chair: TSO)*
Scope: information and focus on impact on national regimes
Participants: TSO, NRA, stakeholders
Meetings: 3 per year

ACER Reasoned Opinion
Main principles (1/3)

1. Reduce balancing needs with adequate incentives on BRPs

- Only imbalances **remaining after intraday** to be balanced by TSOs;
- **Adequate and timely information to BRPs** for them to be balanced or help the power system to be balanced;
- **Implementation of Imbalance netting** - when efficient - by all TSOs.

ACER Reasoned Opinion
Main principles (2/3)

2. Efficient balancing actions to be performed by TSOs

- Clear **common principles for activation** and commitment to optimise the use of different processes;

- Necessary harmonisation of relevant requirements to ensure efficient **balancing exchanges between self & central dispatch systems.**

ACER Reasoned Opinion
Main principles (3/3)

3. Foster competition between BSPs

- Guarantee a **higher standardisation** of products, CMOs and GCTs;
- Adapt some arrangements to **facilitate participation of demand flexibility & intermittent generation**;
- Stepwise implementation of a **common pricing method** (pay-as-cleared based);
- Transparent and detailed common principles for the establishment of the methodologies and the terms and conditions.