

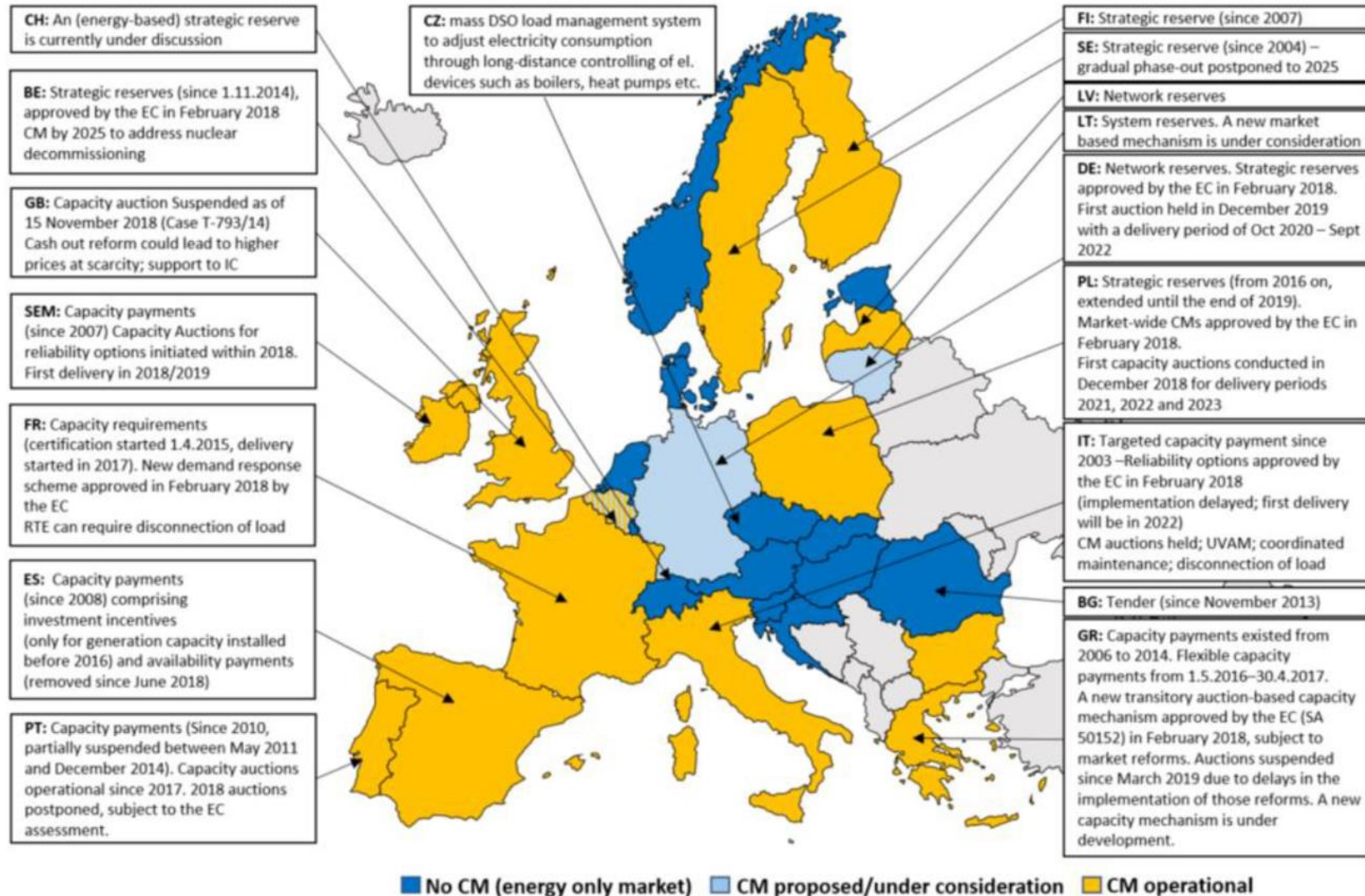
# Cross-border participation in capacity mechanisms

Stakeholder Workshop on ENTSO-E draft methodologies, common rules & terms of operation

12 February 2020, Brussels

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# Capacity mechanisms in the European Union



Diversity of capacity mechanism representative of market designs aiming at addressing differentiated security of supply issues.

# Agenda

❑ Introduction

❑ Draft Methodologies for consultation:

1. Methodology for calculating the maximum entry capacity for cross-border participation
2. Methodology for sharing cross-border revenues in capacity mechanism
3. Common rules for the carrying out of availability checks
4. Common rules for determining when a non-availability payment is due
5. Terms of the operation of the registry
6. Common rules for identifying capacity eligible to participate in capacity mechanism


❑ Overview and next steps

# ENTSO-E is required to develop a methodology in each of 6 areas

Article 26 (11) of Regulation 2019/943 mandates ENTSO-E to submit methodologies related to cross-border participation in capacity mechanisms by ACER by July 2020

*By 5 July 2020 the ENTSO for Electricity shall submit to ACER:*

- (a) a methodology for calculating the **maximum entry capacity** for cross-border participation as referred to in paragraph 7*
- (b) a methodology for **sharing the revenues** referred to in paragraph 9;*
- (c) common rules for the carrying out of **availability checks** referred to in point (b) of paragraph 10;*
- (d) common rules for determining when a **non-availability payment** is due;*
- (e) terms of the **operation of the registry** as referred to in point (a) of paragraph 10;*
- (f) common rules for **identifying capacity eligible to participate** in the capacity mechanism as referred to in point (a) of paragraph 10.*



These support IEM Regulation obligation to enable direct cross-border participation of capacity providers located in Member States which are electrical neighbours

# 1. Methodology for calculation of maximum entry capacity

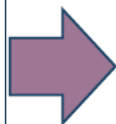
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# ENTSO-E is proposing to use the European Resource Adequacy modelling to calculate the maximum entry capacities

## Article 26(7) 2019/943

*“...regional coordination centres established pursuant to Article 35 shall calculate on an annual basis the maximum entry capacity available for the participation of foreign capacity. That calculation shall take into account the expected availability of interconnection and the likely concurrence of system stress in the system where the mechanism is applied and the system in which the foreign capacity is located.”*



## Principles for calculating Maximum Entry Capacity

**Maximum Entry Capacity for foreign participation in CM calculation shall take into account:**

The expected availability of interconnection

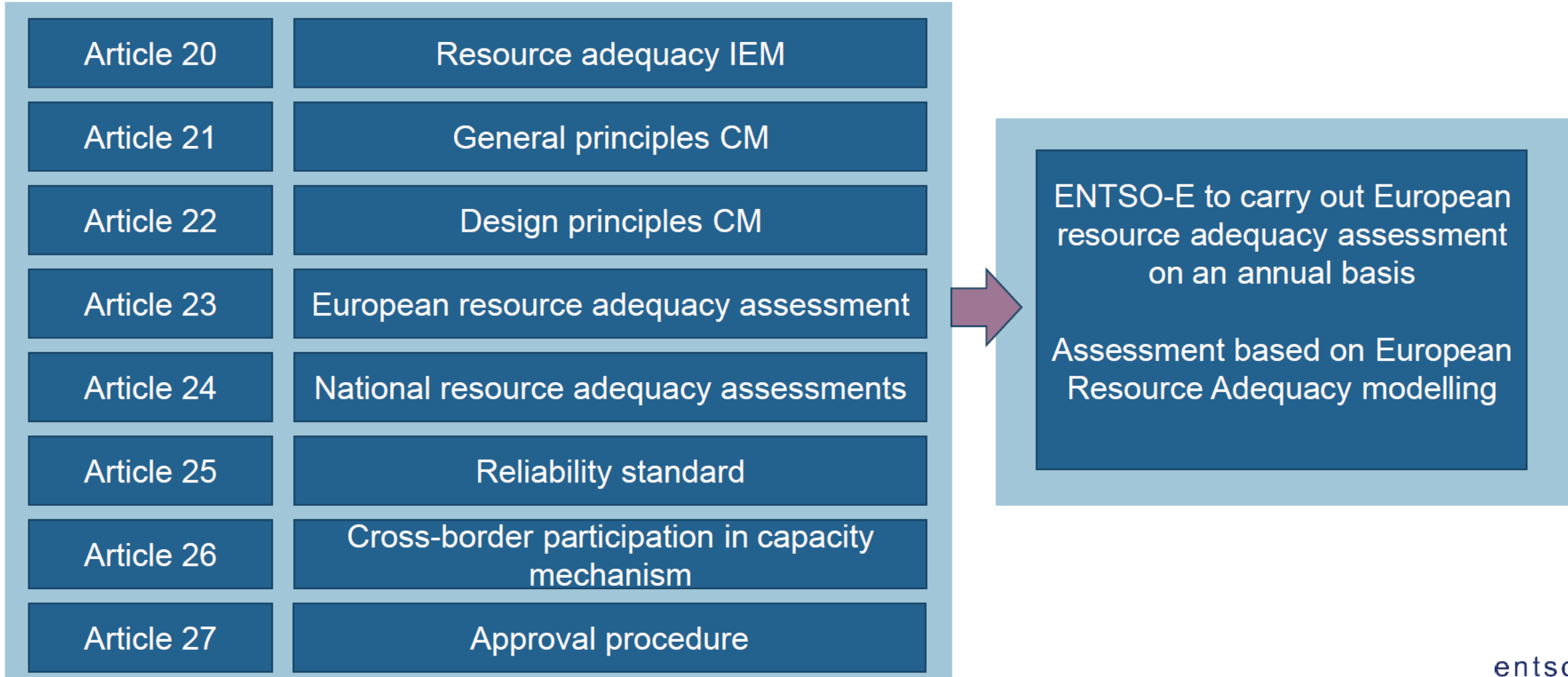
Available resource (foreign capacity)

The likely concurrence of system stress in the system where the mechanism is applied and the system in which the foreign capacity is located

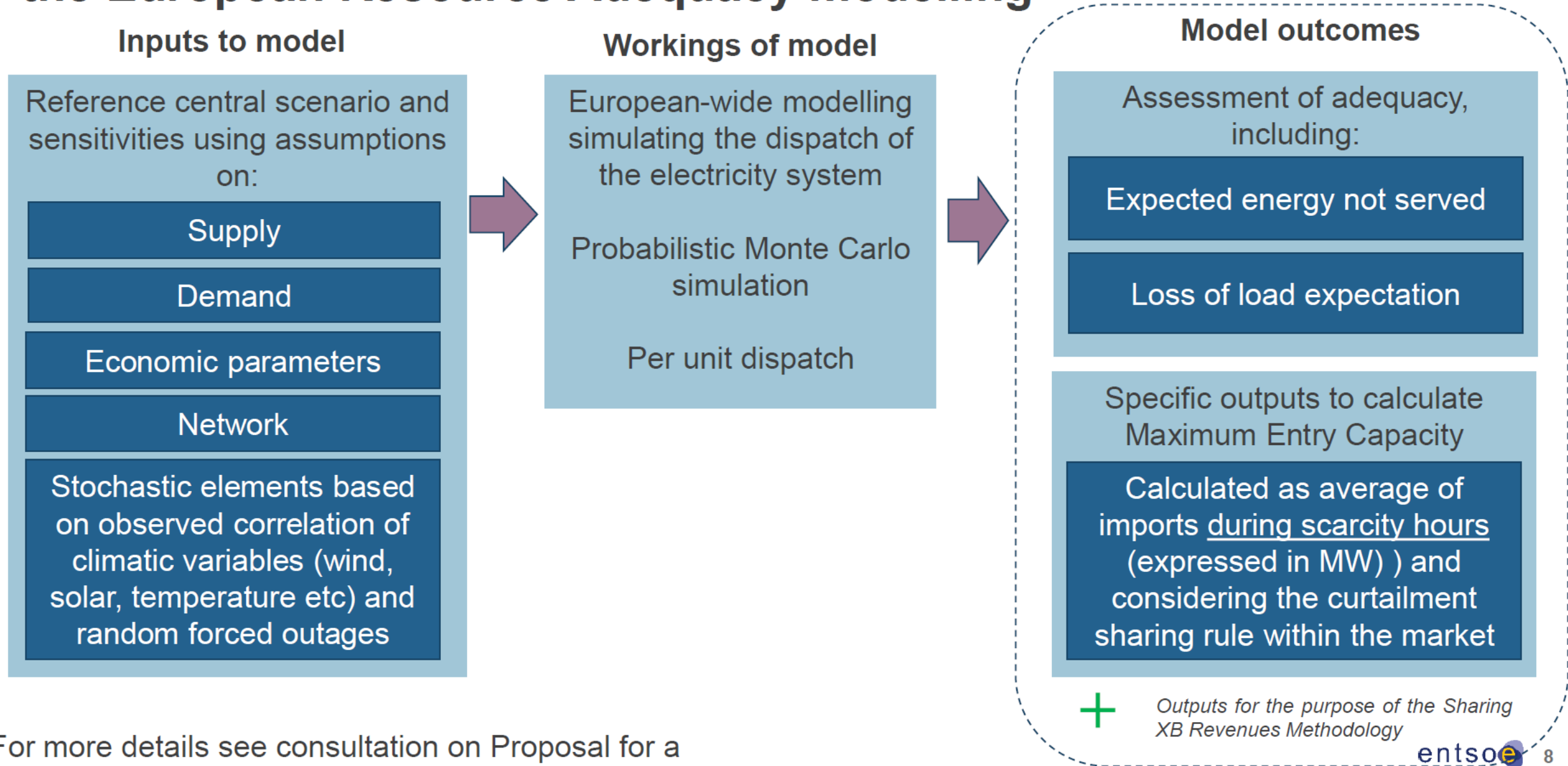
The European Resource Adequacy Assessment (ERAA) provides a robust framework for estimating the extent to which interconnection can be relied upon to provide resource adequacy

# The methodology for cross border entry capacity is routed in the resource adequacy articles of (EU) 2019/943

Regulation EU 2019/943 on the internal market for electricity  
Chapter 4: resource adequacy



# The calculation of Maximum Entry Capacity can be an output of the European Resource Adequacy modelling





# Methodology is applicable for both NTC and Flow Based borders

## NTC based approach

- Transmission capacity is “independent” of the import/export position of the markets
- Each border is “independent” from each other (from the market perspective)



Max entry capacity is determined per border based on the flow per NTC border from ERAA adequacy assessment for all relevant scarcity situations

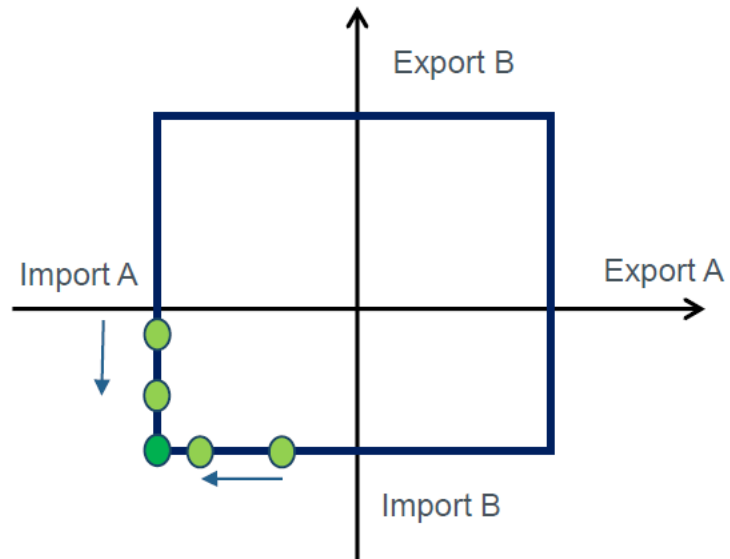
## Flow based approach

- Transmission capacity is linked to import/export position of the markets
- (Commercial) Flows per border are not “independent” from each other



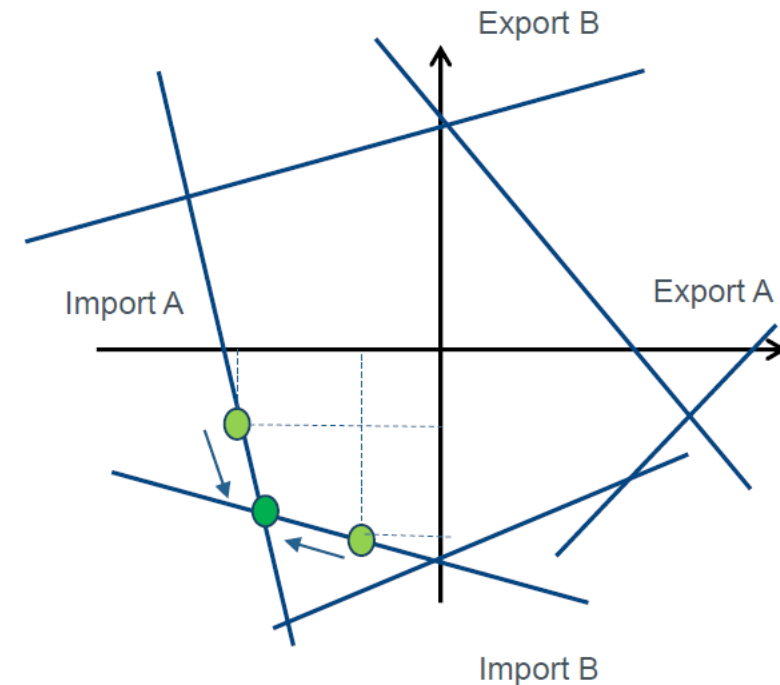
Max entry capacity is determined based on the total import of the market with CM and split per border, based on the ratio of exports per border over the total export within the flow based area, for all relevant scarcity situations

## NTC based approach



Transmission capacity is “independent” of the import/export position of the markets

## Flow based approach

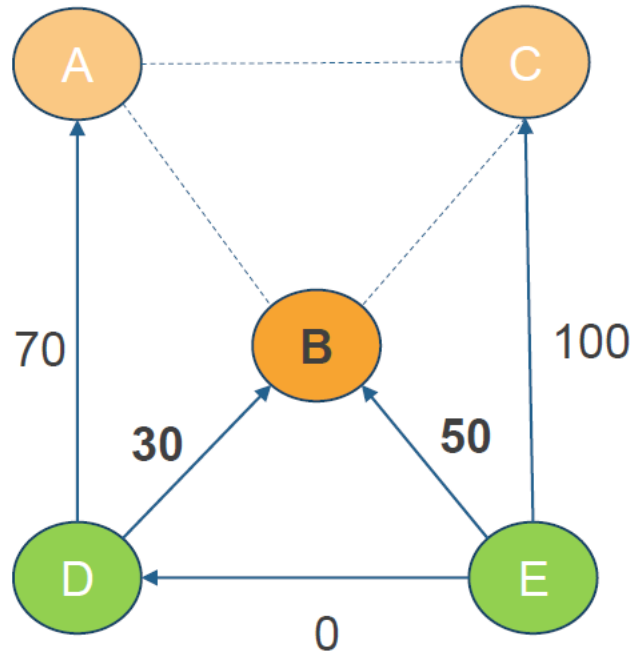


Transmission capacity is linked to import/export position of the markets

# Example: NTC borders

## Positions after market coupling

- *A net importer | D net exporter*
- *B net importer | E net exporter*
- *C net importer*



## Numerical example NTC

- $B_{import} = 80 \text{ MW}$
- $D_{export} = 100 \text{ MW}$
- $E_{export} = 150 \text{ MW}$
- $A \rightarrow B = 0$
- $C \rightarrow B = 0$
- $D \rightarrow B = 30 \text{ MW}$
- $E \rightarrow B = 50 \text{ MW}$

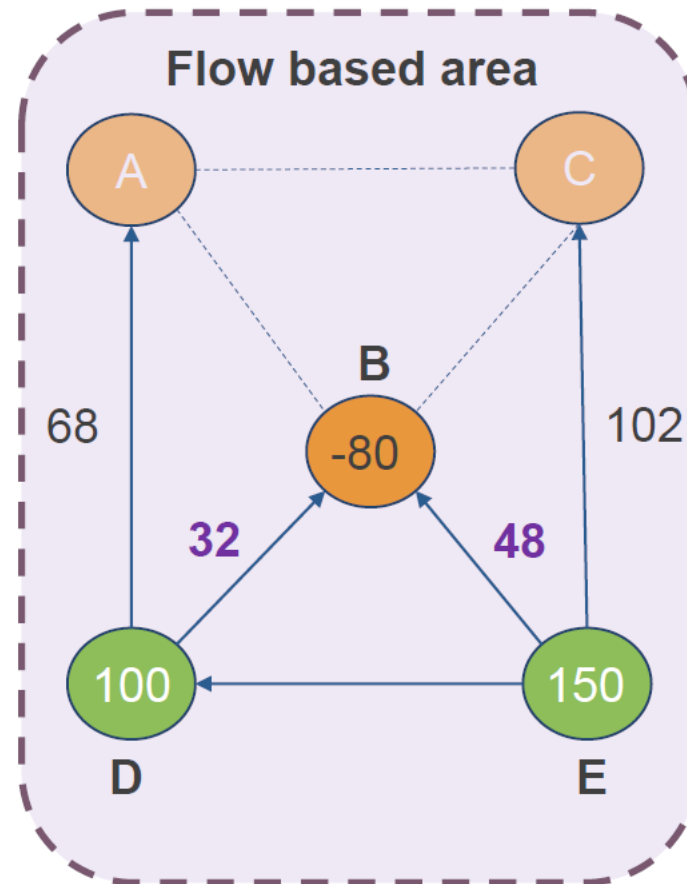
# Example: Flow-Based borders

## Positions after market coupling

- *A net importer | D net exporter*
- *B net importer | E net exporter*
- *C net importer*

## Contributions to Market B

- $A \rightarrow B = 0$
- $C \rightarrow B = 0$
- $D \rightarrow B = B_{import} \times \frac{D_{export}}{D_{export} + E_{export}}$
- $E \rightarrow B = B_{import} \times \frac{E_{export}}{D_{export} + E_{export}}$



## Numerical example

- $B_{import} = 80 \text{ MW}$
- $D_{export} = 100 \text{ MW}$
- $E_{export} = 150 \text{ MW}$
- $D \rightarrow B = 80 \times \frac{100}{(100+150)} = 32 \text{ MW}$
- $E \rightarrow B = 80 \times \frac{150}{(100+150)} = 48 \text{ MW}$

## 2. Methodology for sharing cross-border revenues in capacity mechanisms

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# ENTSO-E must develop a “Revenue Sharing Methodology”

To the extent that the allocation of Maximum Entry Capacity to eligible foreign capacity providers results in revenue, this Revenue Sharing Methodology aims to describe how this revenue could be shared among the concerned TSOs

## Article 26(9) 2019/943

“...any revenues arising through the allocation referred to in paragraph 8 shall accrue to the transmission system operators concerned and shall be shared between them in accordance with the methodology referred in point (b) of paragraph 11 of this Article or in accordance with a common methodology approved by both relevant regulatory authorities. If the neighbouring Member State does not apply a capacity mechanism or applies a capacity mechanism which is not open to cross-border participation, the share of revenues shall be approved by the competent national authority of the Member State in which the capacity mechanism is implemented after having sought the opinion of the regulatory authorities of the neighbouring Member States.”

The use of revenues resulting from the sharing under this methodology is out of scope. Treatment of revenues referred to in Art 19(2)

## 1 - CM-CM situation, both open to direct cross border participation

**ENTSO-E methodology**  
Art. 26(11) - ENTSO-E methodology to be submitted in July 2020

Or

Alternative approach developed by relevant NRAs

## 2 – Alternate set-up

Alternative approach developed by the NRA where the CM applies

# A methodology framed under the principle of reciprocity

Art. 26(9) 2019/943 *“If the neighbouring Member State does not apply a capacity mechanism or applies a capacity mechanism which is not open to cross-border participation, the share of revenues shall be approved by the competent national authority of the Member State in which the capacity mechanism is implemented after having sought the opinion of the regulatory authorities of the neighbouring Member States.”*



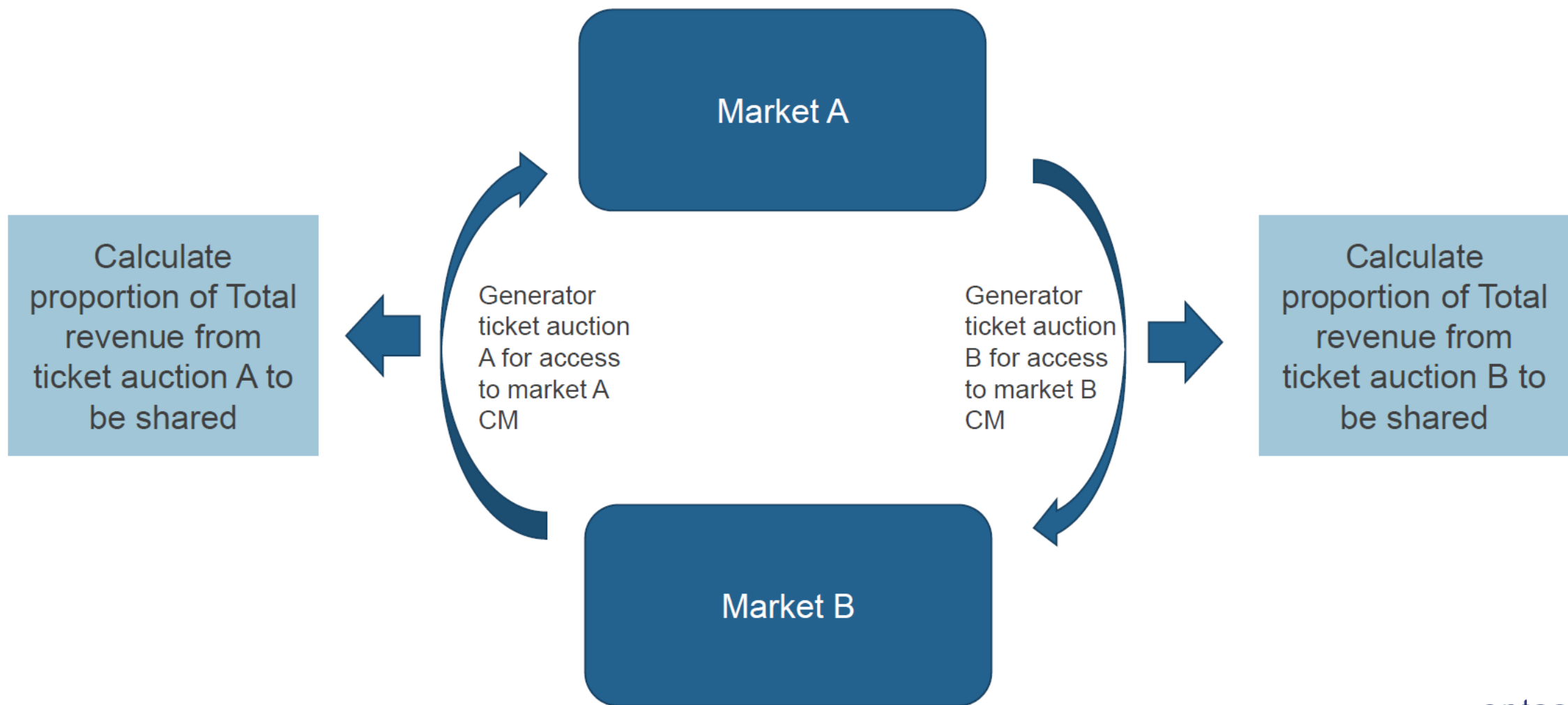
The methodology applies to the following scope :

- i. 2 Member States which are electrical neighbours ...
- ii. In both of which a CM applies ...
- iii. In both cases open to direct\* cross-border participation ...
- iv. During the same delivery period.

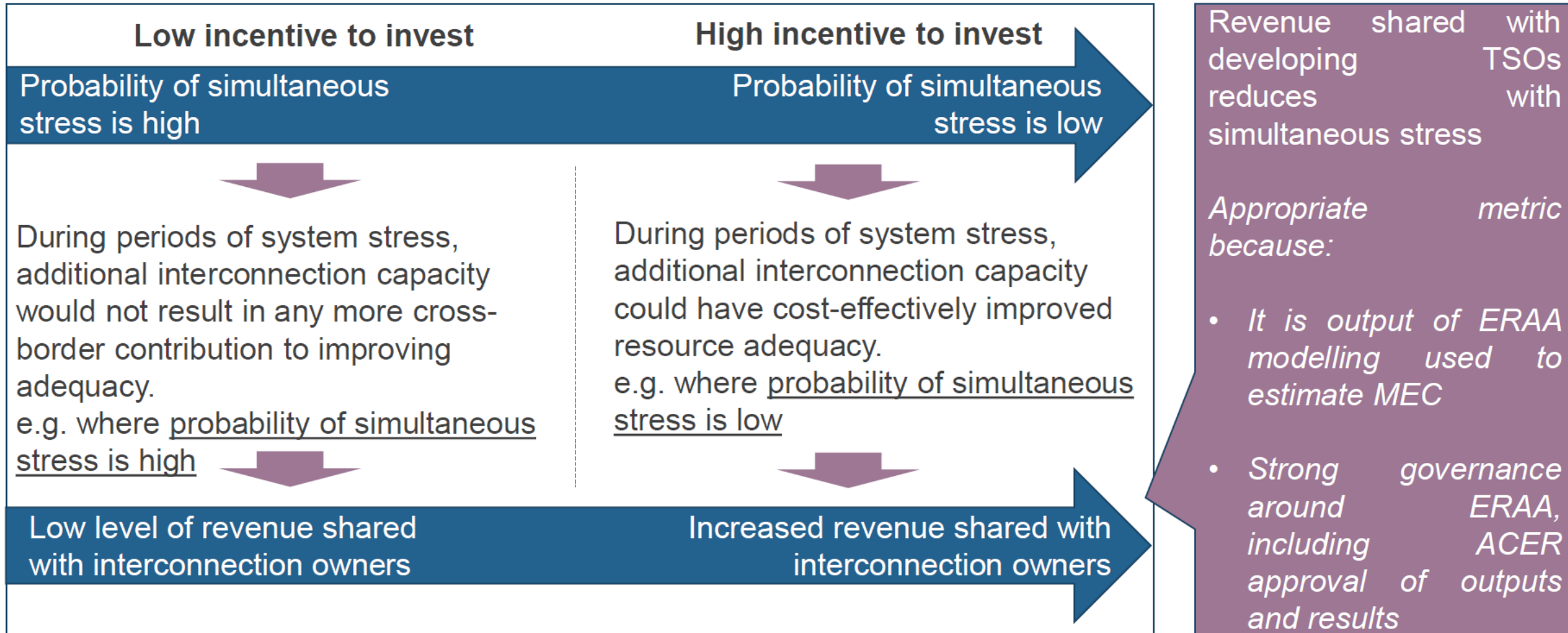
\* Revenue Sharing Methodology explicitly excludes application of methodology in case of interconnectors directly participating in the sense of Article 26(2) i.e. interconnectors cannot directly participate beyond 2023, and revenues in interim are covered by appropriate regulatory frameworks.

# One border, one direction

Revenue Sharing Methodology is applied to Total Revenue from each ticket auction in isolation of the Total Revenue from neighbouring market



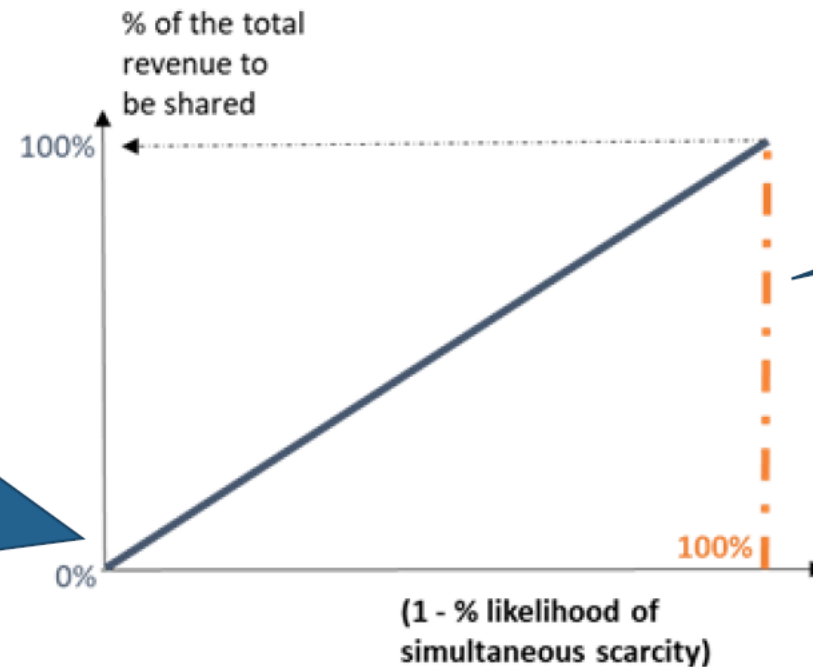
# Revenue sharing with neighbouring TSO should provide appropriate incentives for transmission capacity development



# Sharing methodology option 1

Purpose of methodology – a greater contribution to adequacy from interconnected capacity results in greater investment

*Option 1 :*



Neighbouring markets do not experience any simultaneous stress i.e. IC could be limiting factor to improve adequacy

Neighbouring markets experience perfectly correlated simultaneous stress i.e. IC not limiting factor to improve adequacy

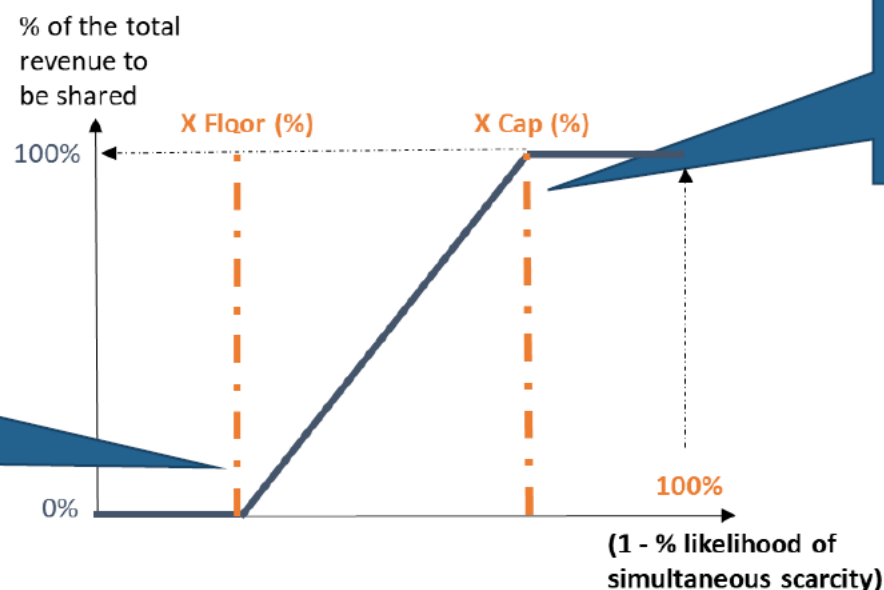


## Sharing methodology option 2

A cap and floor is applied to option 1, such that:

- ❑ All Total revenue is shared when probability of simultaneous is below threshold level
- ❑ Zero Total revenue is shared when probability of simultaneous stress is above threshold level

**Option 2 (with cap and floor):**

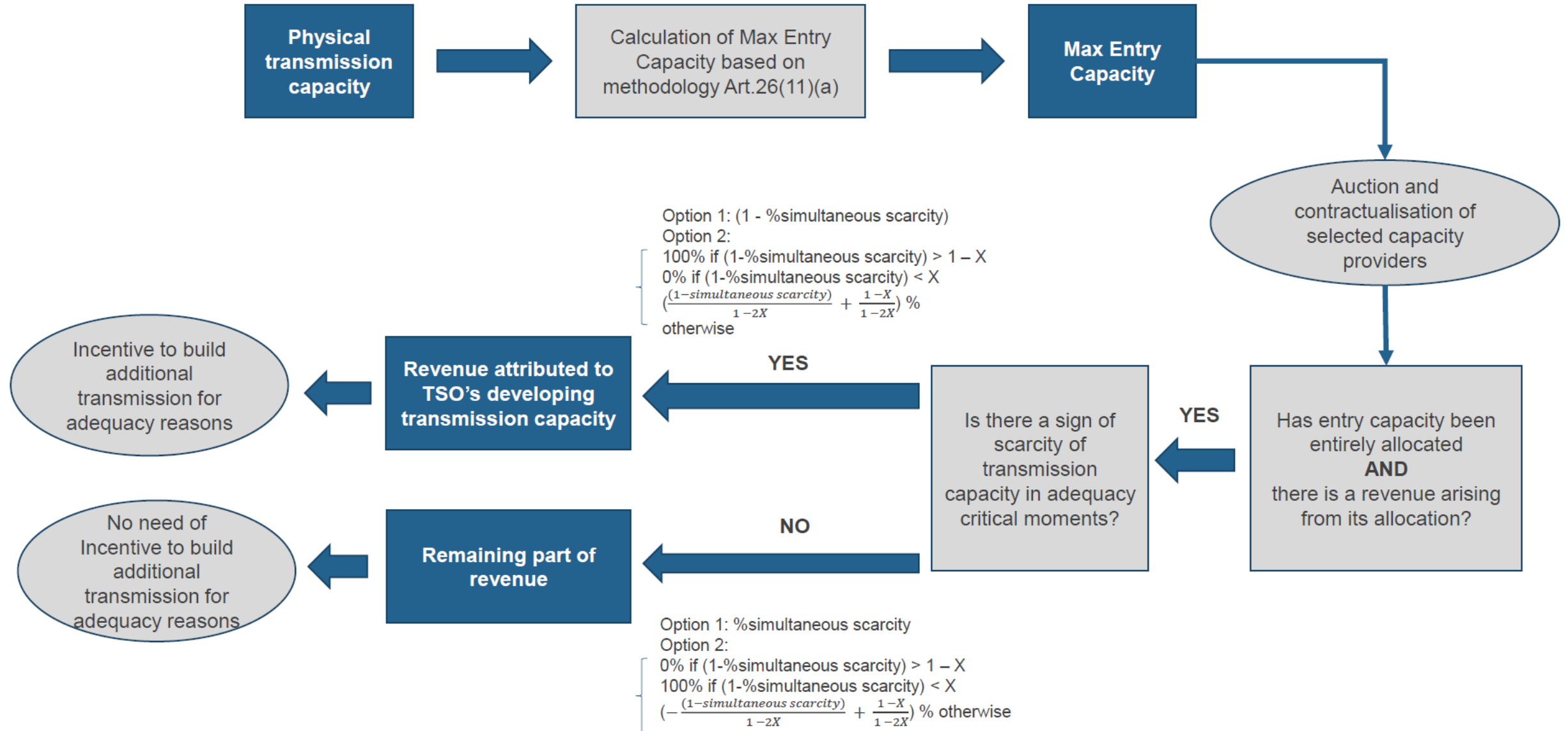


Potential threshold values  
for floor of 5% to 33%  
[i.e. 95% to 67% likelihood of  
simultaneous stress]

Potential threshold values  
for cap of 66% to 95%  
[i.e. 5% to 34% likelihood of  
simultaneous stress]

Applying a cap and floor can be useful to: 1) reflect increased likelihood of uncertainties and inaccuracies in the analysis at the extremes; and 2) to take systematic decisions based on the overall dynamic of the interconnection.

# Illustrative example



### 3. Common rules for carrying out availability checks

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# ENTSO-E must develop principles to facilitate the checks on X-b participation

Availability checks are needed in capacity mechanisms to establish if contracted capacity is made available during the delivery period at the amount of availability obligation entailed by the capacity contract.

*Article 26(2) 2019/943*

*“Member States shall ensure that foreign capacity capable of providing equivalent technical performance to domestic capacities has the opportunity to participate in the same competitive process as domestic capacity...”*

*Article 26(3) 2019/943*

*“Member States shall not prevent capacity which is located in their territory from participating in capacity mechanisms of other Member States”*



ENTSO-E clarifies the processes while proposing guidelines by which capacity mechanisms should abide following design principles laid out in *Article 22(1)*.

In particular, availability checks processes for Domestic and Foreign capacity should follow **principles of transparency and non-discrimination**.

# Defining 'Availability' checks

## Objective

To verify performance of contracted capacity i.e. measure energy that could be delivered in case of stress event, rather than actual delivered energy



## 'Availability'

Identified as 'availability' – possibility of activation at level of contracted capacity in delivery period

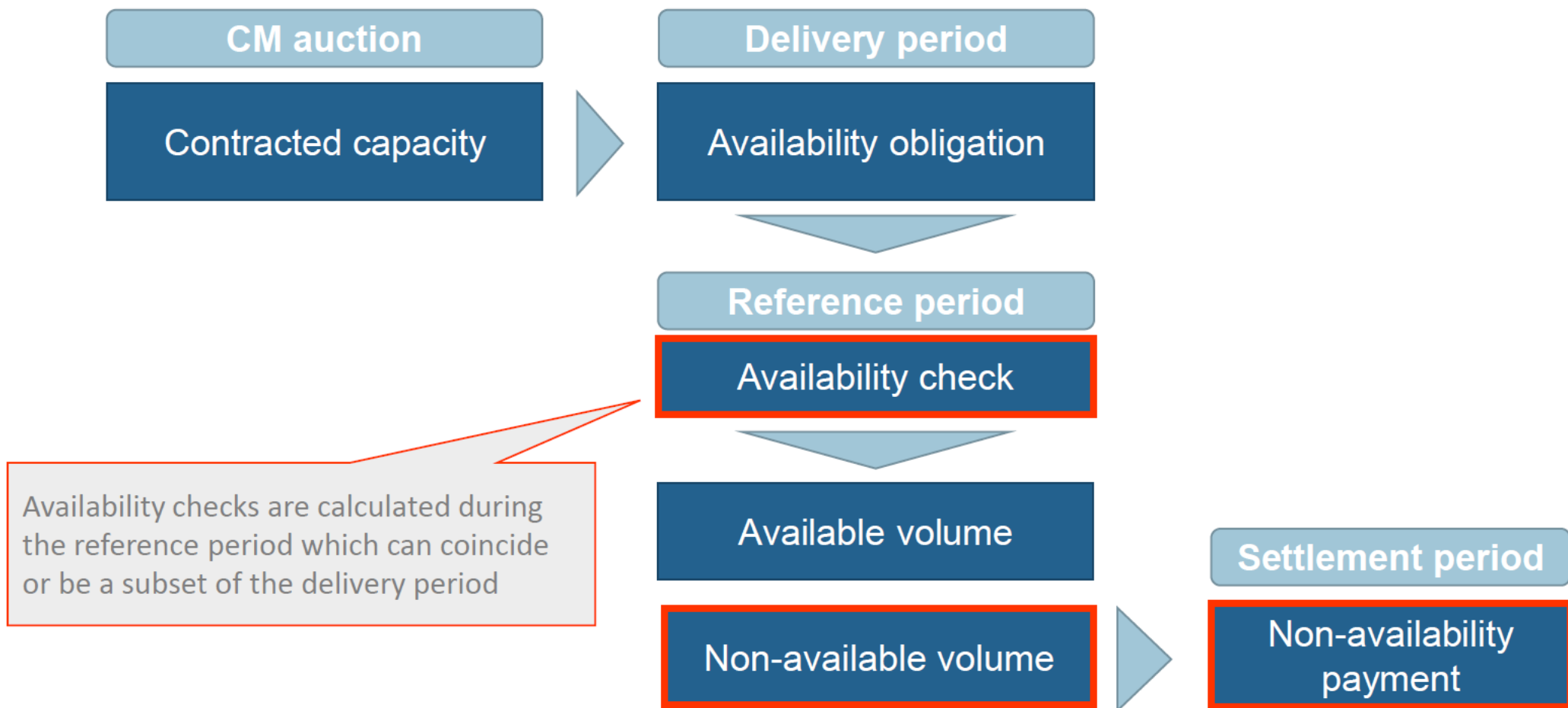
To be verified by Foreign TSO where capacity is located.

Possibility defined in terms of availability:

- a) in the energy and / or balancing market and / or ancillary services markets
- b) Or to deliver energy upon request of the TSO and / or in particular system conditions



# Overview of the availability calculations



# Current practices on Availability checks

We see different methodologies applied currently throughout Europe in relation to availability checks and non-availability payments e.g. due to different obligations (to offer or deliver energy), different market structures, or particular security of supply issues.

## France

- Energy infeed
- Commitments linked to the energy market
- Bids and accepted quantities in the balancing market
- Contracted ancillary services
- Activation tests (potential rebate applied)

## Italy

- Bids and accepted quantities in the energy market
- Bids and accepted quantities in the ancillary services and balancing market

## UK

- Energy infeed
- Contracted reserve volumes
- Activation tests

These differences are of utmost importance when addressing the task of defining the common rules for availability checks applying to cross-border participation.

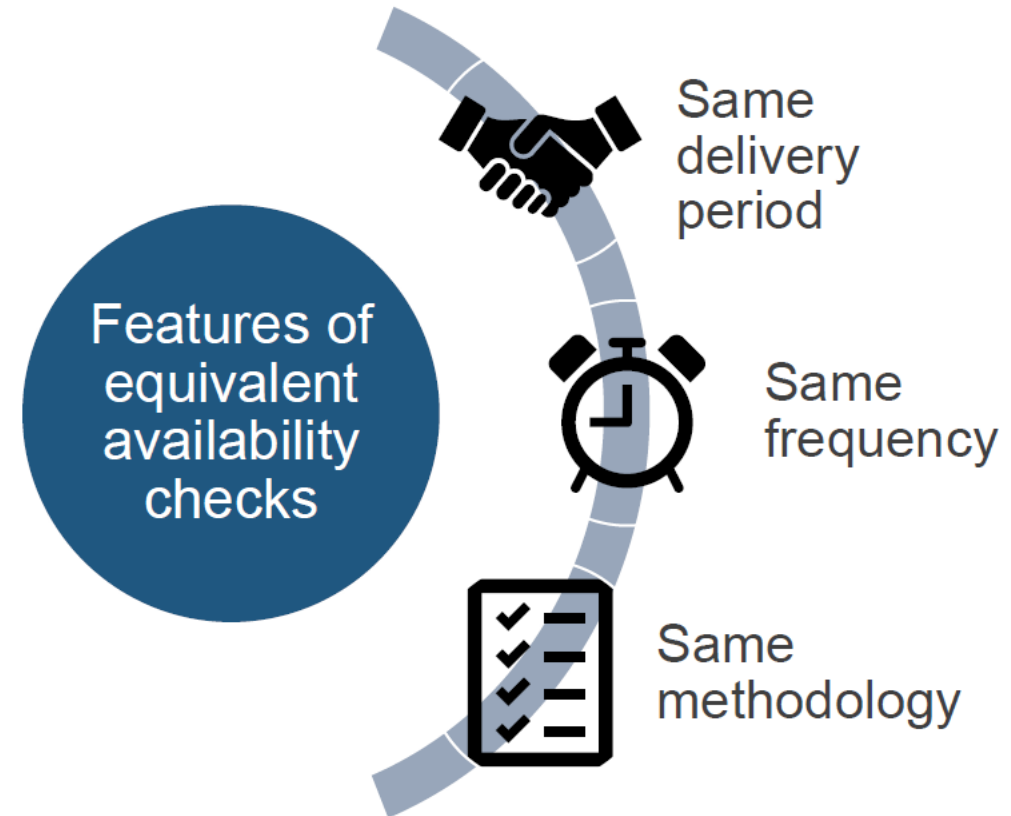
# Common rules should be as-equivalent-as-possible

The core principle of non-discrimination means that foreign contracted capacity should be subject to **availability checks carried out as equivalently as possible for domestic capacities.**

This is particularly important to establish a level-playing field

## Trade-off in developing methodology

In drafting common rules for availability checks, balance was sought between a need for harmonisation on common principles, and equally important need of not imposing single design choice to all capacity mechanisms, while maintaining a level playing field



# Availability can be tested by monitoring or activation

**1. Activation testing:** energy produced or demand response measured upon request

Costs makes this the less preferable option

OR

**2. Monitoring** of availability through the market (energy delivered, bids / commitments submitted, outage information etc)

Need to define equivalent markets for x-b capacity to bid into in line with domestic availability checks

# Further principles for a framework of cross-border participation

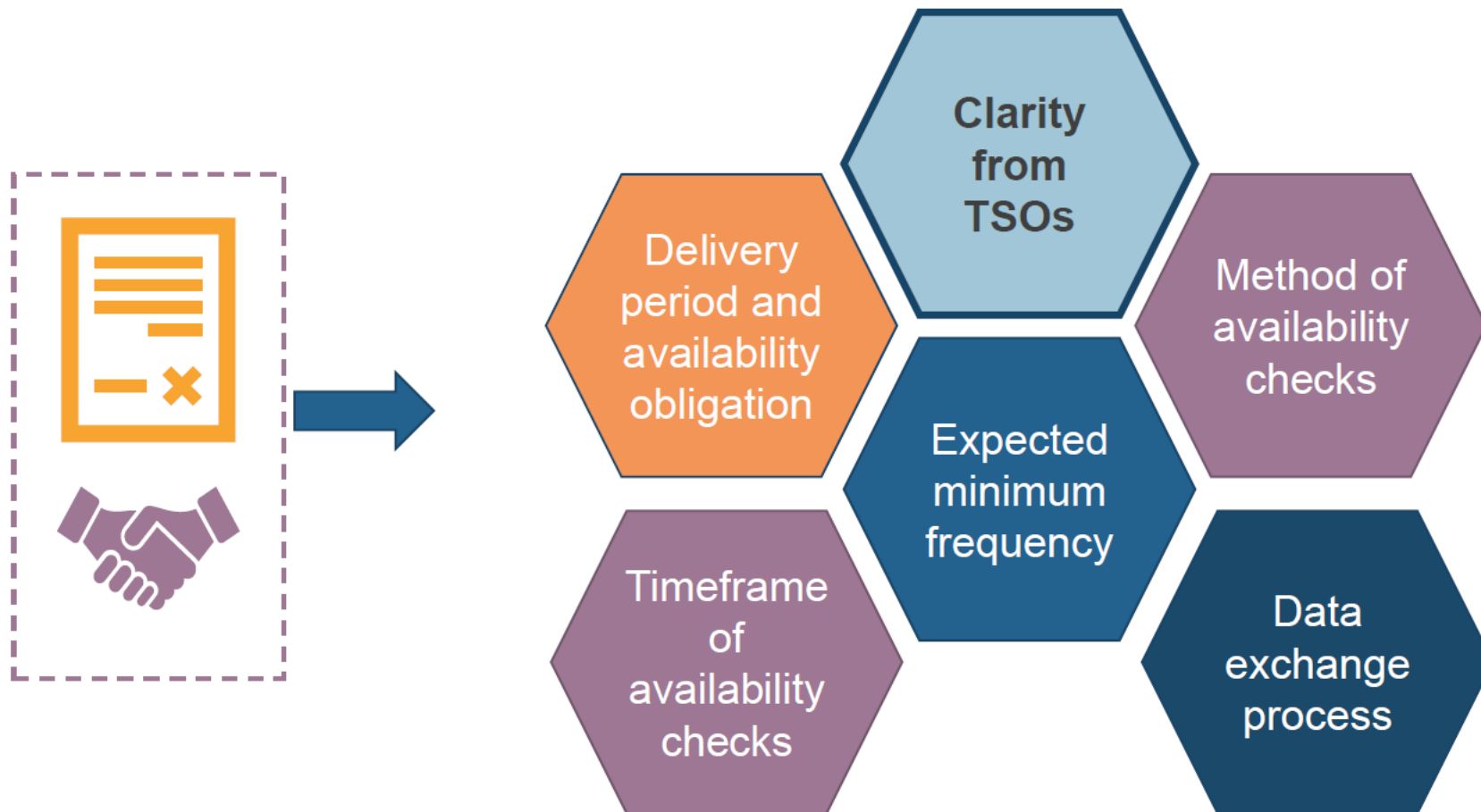
In addition to non-discrimination, system impact and likelihood are important principles for setting guidelines

**System impact:** Availability checks should not negatively affect system security or increase costs of maintaining the same level of system security

**Likelihood:** minimum frequency, non-zero probability of availability checks should be applied during the delivery period



**X-b TSO is responsible for carrying out availability checks,  
bilateral technical agreements between the CM Operator and XB  
TSO set out basis for undertaking them**



## 4. Common rules for determining when a non-availability payment is due

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# ENTSO-E must develop common rules determining when a non-availability payment is due

## Article 26(5)

*“Where capacity providers participate in more than one capacity mechanism for the same delivery period, they shall participate up to the expected availability of interconnection and the likely concurrence of system stress between the system where the mechanism is applied and the system in which the foreign capacity is located ...”*

## Article 26(6)

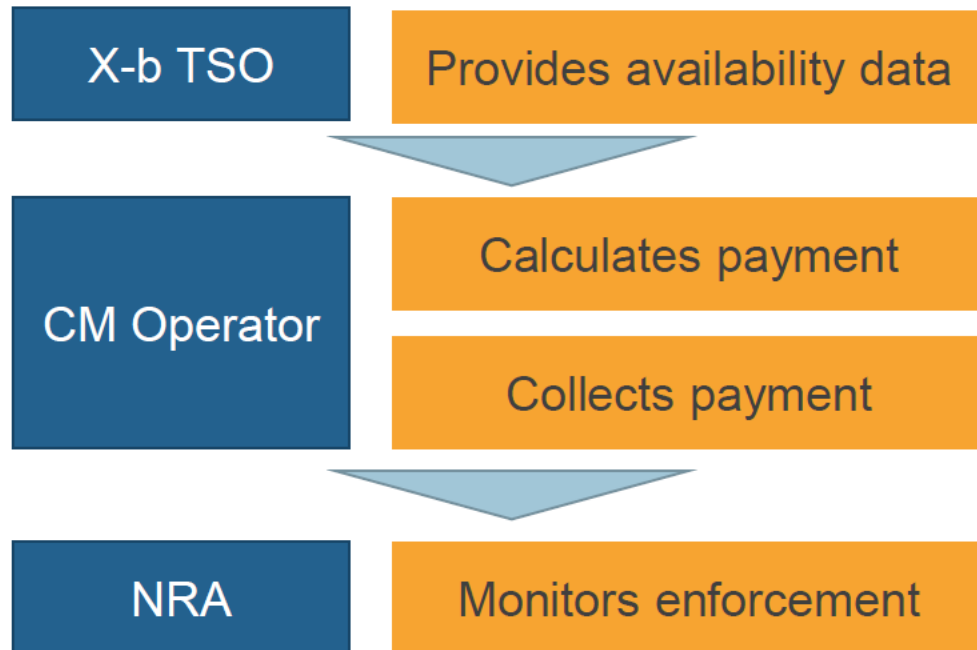
*“Where capacity providers participate in more than one capacity mechanism for the same delivery period, they shall be required to make multiple non-availability payments where they are unable to fulfil multiple commitments”*



In order to facilitate cross-border participation of capacity providers located in different Member States, the mechanisms in place need to implement common rules to apply non-availability payments to foreign capacity.

These rules should support the overarching principle that makes non-availability payments as equivalent as possible between domestic and foreign capacity providers.

# The CM Operator is responsible for collecting payments, based on data from x-b TSOs and on principle of non-discrimination



**Non discrimination** in relation to...

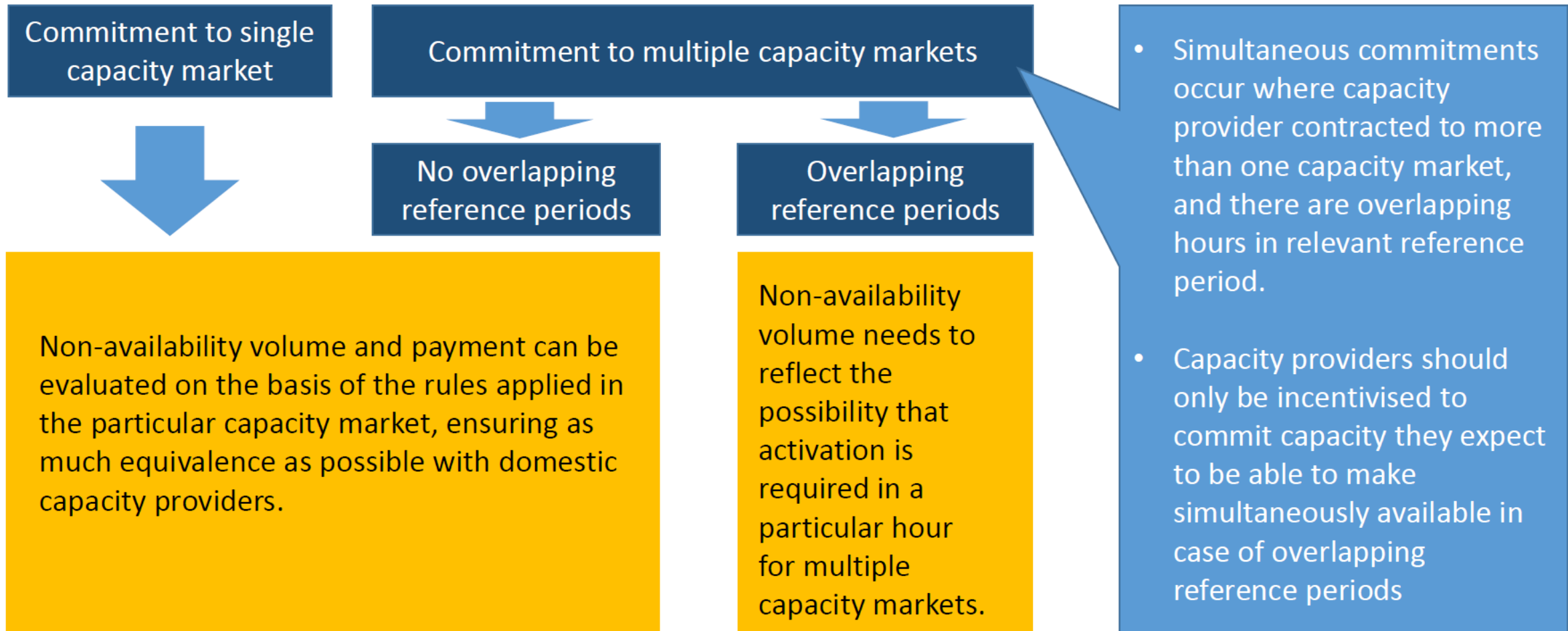
Amount of penalty imposed through the non-availability payment

Settlement timeframe

Non-availability payment methodology

# Where providers have multiple commitments, these should be taken into account in determining non-availability payments

Article 26(5) prescribes that multiple participation in capacity markets is allowed. But capacity cannot serve adequacy in two MSs at the same time and therefore non-availability volumes should be adjusted accordingly.



# Taking simultaneous commitments into account in calculating non-availability payment

Capacity cannot support adequacy in two MSs at the same time

Capacity should commit across CMs only if simultaneously available in a delivery period

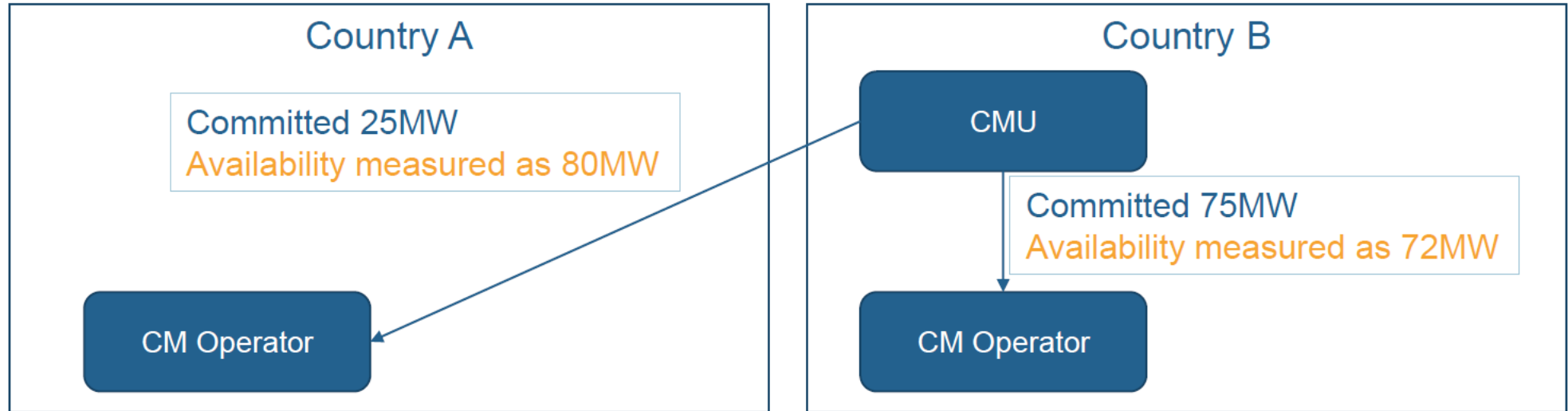
Non-availability payment if capacity is lower than sum of all commitments

$$\begin{aligned} \text{Non-availability volume in CM X} &= \text{Volume of capacity contracted in CM X} - \text{Availability as measured for CM X} \times \text{Share of CM X in total commitments} \\ & \text{(zero if negative)} \end{aligned}$$



# Worked example of simultaneous commitments

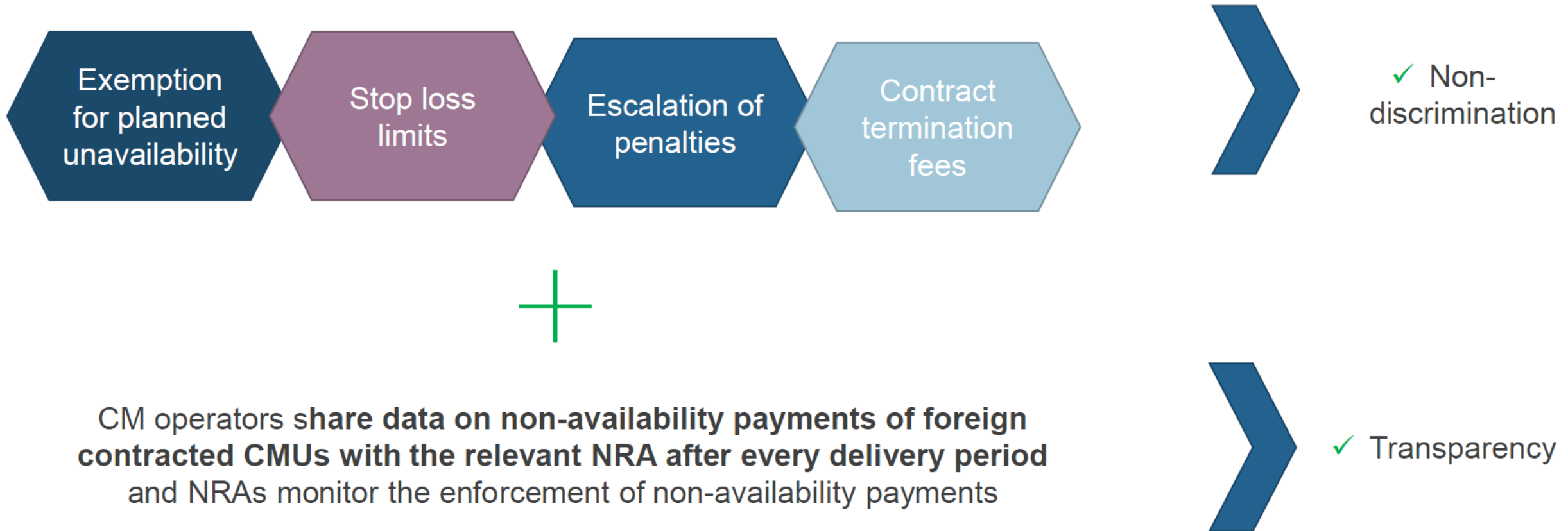
This is a simplified example related to a single hour in the relevant reference period for both markets



Country specific commitment	25MW	75MW
Total commitment = 100MW	Proportionate share in A = 25%	Proportionate share in B = 75%
Country share of availability	$80\text{MW} * 25\% = 20\text{MW}$	$72\text{MW} * 75\% = 54\text{MW}$
Country non-availability	$25\text{MW} - 20\text{MW} = 5\text{MW}$	$75\text{MW} - 54\text{MW} = 21\text{MW}$

# Non-discrimination implies non-availability payments should also account for features of native CM

The same non-availability payment calculation should apply for cross-border and domestic capacities, which framework can notably include specific design features such as:




# 5. Terms of Operation of the Registry

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# ENTSO-E must develop and operate a European registry of X-boarder CMUs


Article 26(10a) 2019/943

*“The transmission system operator where the foreign capacity is located shall: establish whether interested capacity providers can provide the technical performance as required by the capacity mechanism in which the capacity provider intends to participate, and **register that capacity provider as an eligible capacity provider in a registry set up for that purpose**”*



Article 26(15) 2019/943

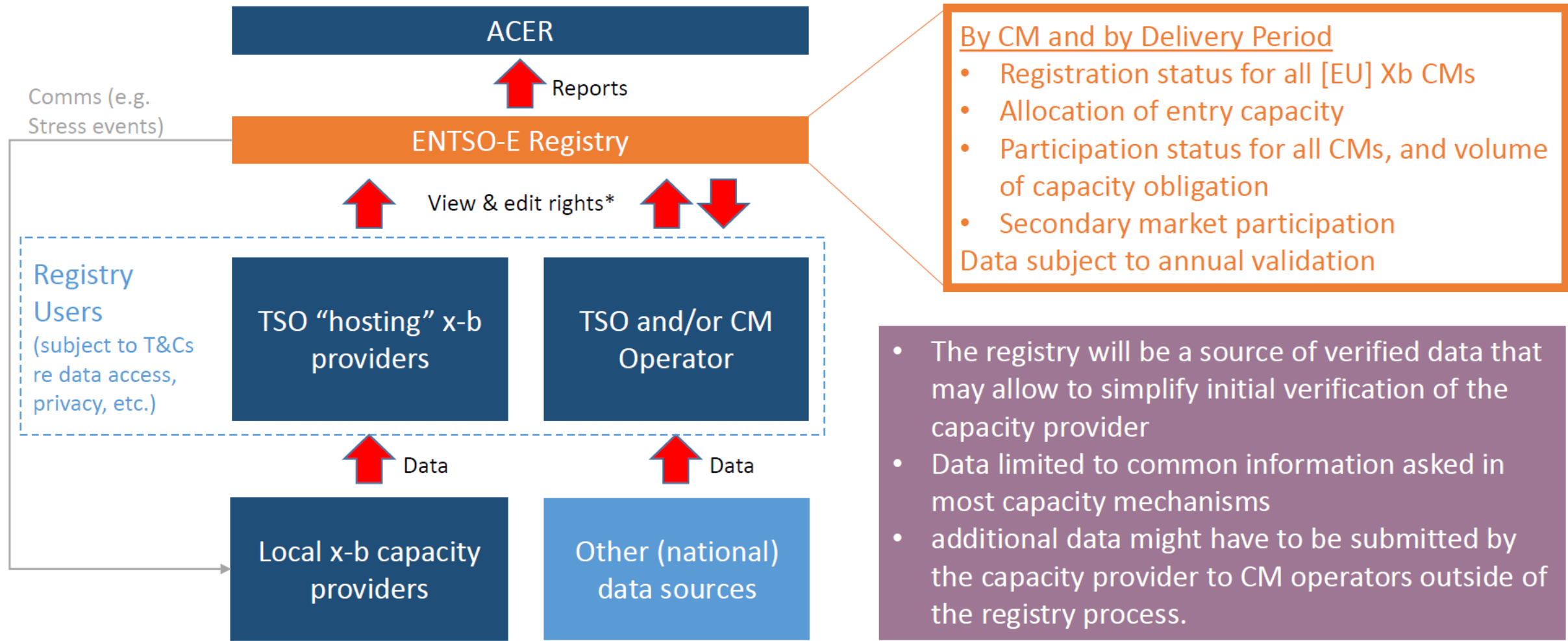
*“By 5 July 2021 the ENTSO for Electricity shall set up and operate the registry referred to in point (a) of paragraph 10. **The registry shall be open to all eligible capacity providers, the systems implementing capacity mechanisms and their transmission system operators.**”*



ENTSO-E proposes terms of the operation of the registry and defines common rules for identifying capacity eligible to directly participate in the capacity mechanism of another Member State

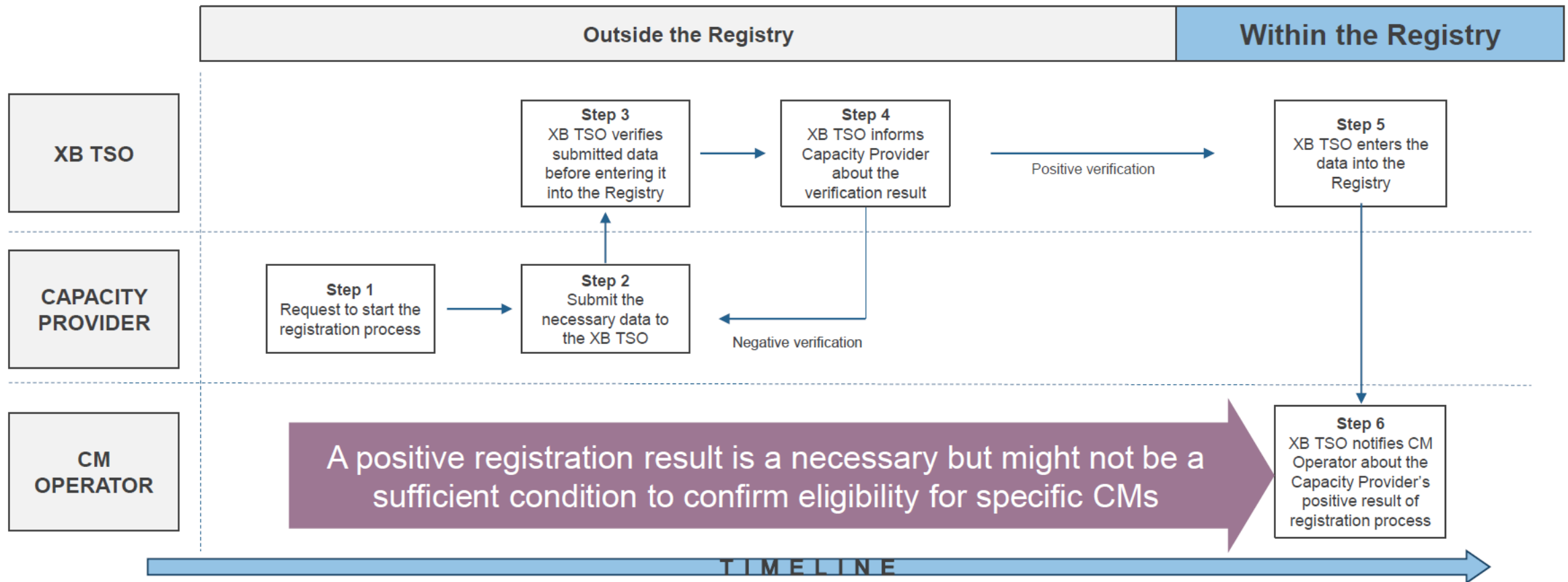
# The Registry facilitates information flow to support CMs

*Objective: enhance cooperation between TSOs and Capacity Mechanism Operators in order to facilitate cross border participation of foreign capacity providers*



\* Edit rights in relation to their systems only

# Registration Process



The registration of the capacity provider to the registry starts on the request of the capacity provider (step 1 in the graphic). After step 6 the capacity provider is registered in the registry




## 6. Eligibility Criteria

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# ENTSO-E must develop common rules for identifying eligible capacity


2019/943 Article 26(10a)

*“The transmission system operator where the foreign capacity is located shall: establish whether interested capacity providers can provide the technical performance as required by the capacity mechanism in which the capacity provider intends to participate, and register that capacity provider as an eligible capacity provider in a registry set up for that purpose”*



2019/943 Article 26(10e)

*“By 5 July 2020 the **ENTSO for Electricity** shall submit to **ACER**: common rules for identifying capacity eligible to participate in the capacity mechanism as referred to in point (a) of paragraph 10.”*



ENTSO-E proposes a common set of rules that cover the core aspects for identifying if capacity is eligible to directly participate in the capacity mechanism of another Member State

# Eligibility of capacity

**Challenge:** capacity mechanisms are tailored for each individual Member State's system and as a result of numerous processes being in place it is implausible to find common ground on the requests for data from capacity providers.

Eligibility requirements – Existing generation								Eligibility requirements – New generation							
	GB	EI	FR	IT	PL	BE	GR		GB	EI	FR	IT	PL	BE	GR
Corporate credentials	✓	✓	✓	✓	✓	✓		Corporate credentials	✓	✓	✓	✓	✓	✓	✓
Facility address	✓	✓	✓	✓	✓	✓		Facility address	✓	✓	✓	✓	✓	✓	✓
Scale (MWs) and aggregation	✓	✓	✓	✓	✓	✓	✓	Intention to build (e.g. FID)	✓	✓	✗	✓	✓	✗	
Grid connection	✓	✓	✓	✓	✓	✓	✓	Grid connection offer	✓	✓	✗	✗	✓	✓	✓
Adequacy of metering equipment	✓	✓	✗	✓	✓	✓	✓	Construction plan/dates	✓	✓	✗	✓	✓	✓	✓
State aids received	✗	✗	✗	✓	✓	✓	✓	Existing authorisations/ permits of proof of application	✓	✓	✗		✓	✓	✓
Availability / other aspects of technical performance	✓	✓	✗	✓	✓	✓		Investment cost	✓	✓	✗	✓	✓	✓	✓
Financial standing / capacity?	✓	✓	✗	✓	✗	✓	✗ ✓	Financial commitment to proceed	✓	✓	✓	✓	✓	✓	✓
CO2 emissions index	✗	✗	✗	✓	✓	✓	✓	CO2 emissions index	✗	✗	✗	✓	✓	✓	
Other requirements for existing plant?	✓	✓	✓	✗	✓	✗	✗	Other requirements for new or refurbishing plants	✓	✓	✓	✗	✓	✗	✓

Finding common ground and establishing spectrum of data to be provided by X-b capacity providers seems implausible

# Provisional conclusions on process design

1

Eligibility requirements vary according to whether it is existing or new / refurbishing capacity that is being considered

2

CM designs differ, but with a degree of consistency as to the eligibility checks which are performed on capacity providers.

3

Aggregation is typically required for smaller capacities – but in many cases this does not reduce the eligibility checking burden

4

Eligibility checks on DSR may be undertaken under a longer period than for other capacity.

A “core” set of checks appears to be relatively common in today’s CMs

# Proposed eligibility checks

## Required data

Capacity provider provides details to its local TSO:

- Facility address
- Capacity and aggregation
- Technology type and fuel
- Metering points
- Network operator
- CO2 emission limits information

This must be the most up-to-date data to its TSO

Eligibility is confirmed by TSO where capacity market operator is located if the required data is provided in the predefined times

Registration is not equivalent to full eligibility. The CM operator ultimately determines CM eligibility.

## Other considerations

Aggregation is allowed:

- But data submitted separately for each sub-unit within an aggregated CMU
- If one sub-unit is ineligible then so is the whole aggregation
- If CMUs are connected at the distribution level they must be developed at the national level

Registry is verified annually

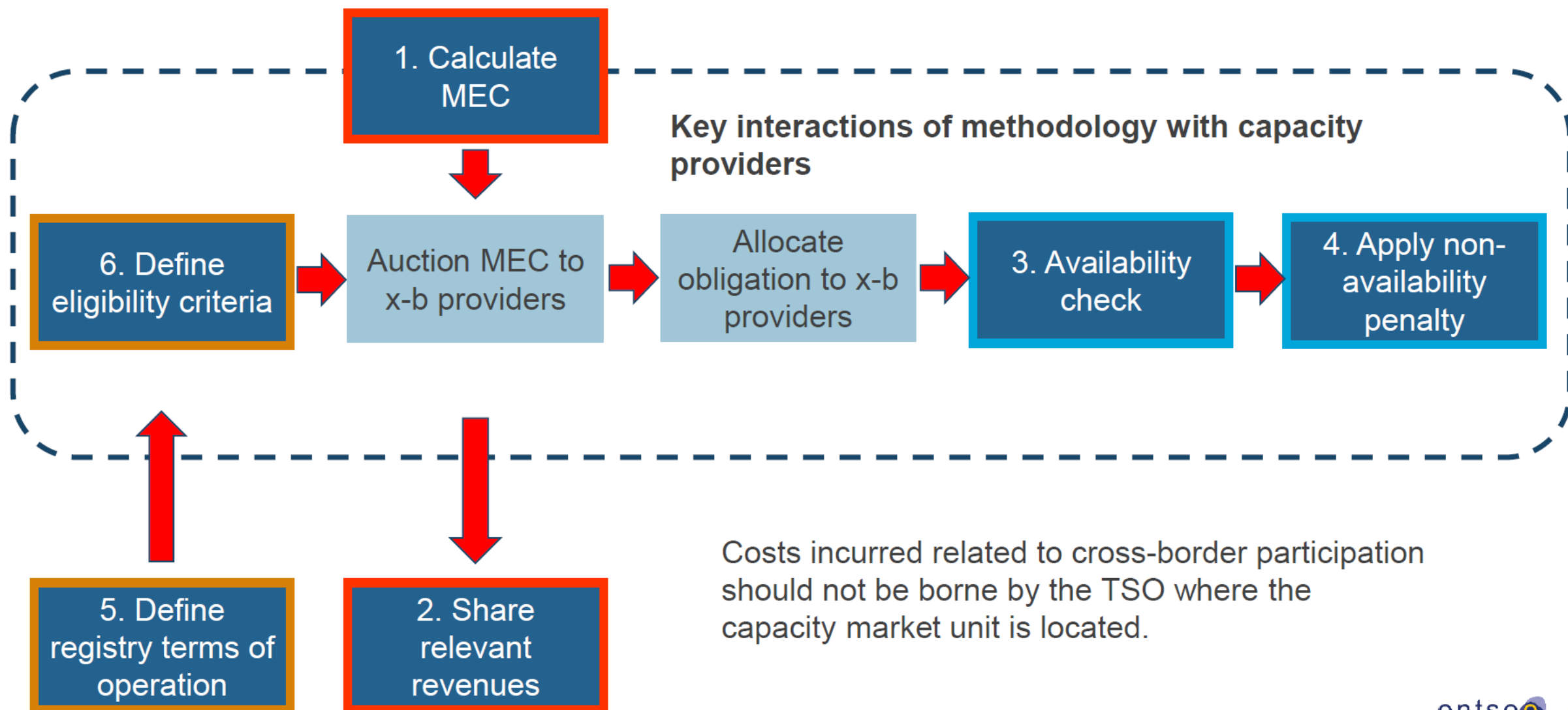
TSOs are to inform operators if data updates affect eligibility

# 7. Overview and Next Steps

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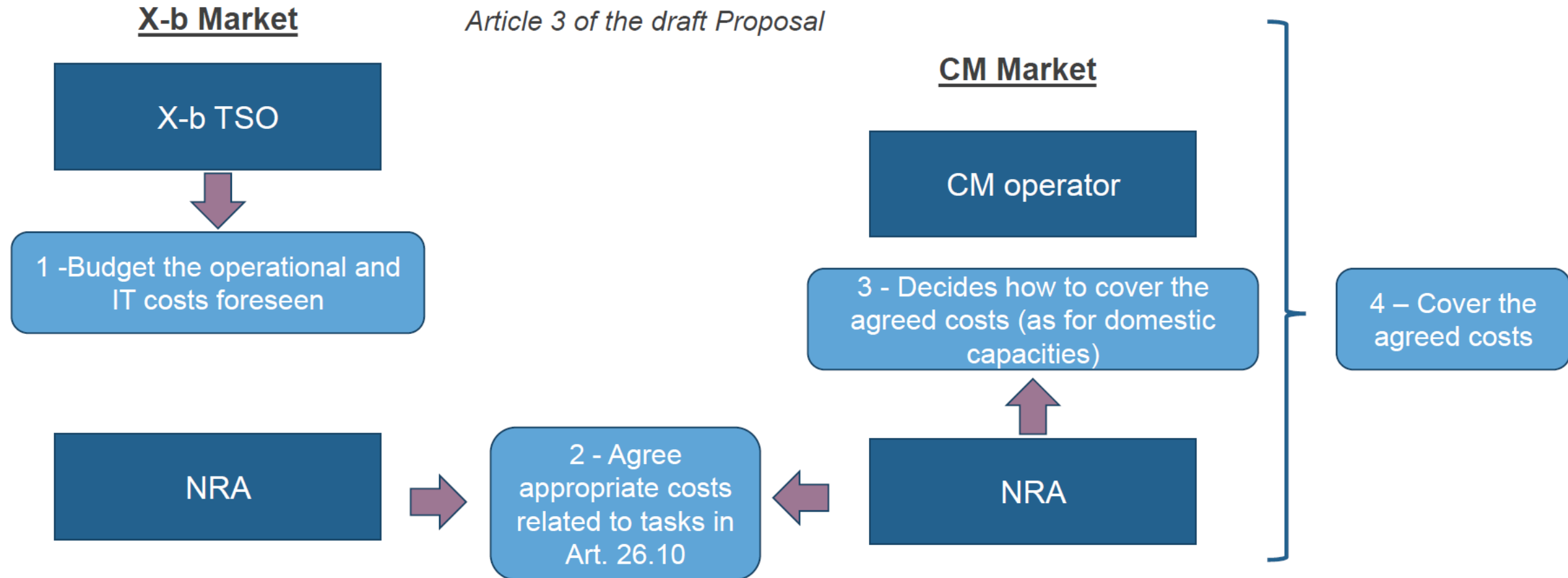
# Overview of building blocks of ENTSO-E methodology





# TSO cost coverage

Costs incurred related to the implementation of direct cross-border participation should not be borne by the TSO where the capacity market unit is located.



# Next steps

- **13/03:** End of the public consultation on rules, methodologies and terms of operations related to cross-border participation in capacity mechanisms
- **05/07:** Deadline for submitting the rules, methodologies and terms of operations to ACER.
- **Submission date + 3 months:** Approval of the rules, methodologies and terms of operations related to cross-border participation in capacity mechanisms