Capacity Remuneration Mechanism

Detailed Info Session

22/03/2024

Disclaimer

This document constitutes a commercial presentation for the Belgian Capacity Remuneration Mechanism (CRM) and is to be considered as an educational document facilitating understanding of all other CRM documents that together form the official legal and operational framework. As an in-depth session, the commercial presentation sets out specific principles governing the CRM, focusing on the outlook for the operational rollout for the CRM 2024 and further based on the current regulatory framework and purposely simplifying items – such as definitions – to facilitate understanding. Elia refers any readers wishing to gain a complete understanding to all relevant legal and explanatory references:

• The Law and its implementing Royal Decrees

▶ https://economie.fgov.be/nl/themas/energie/bevoorradingszekerheid/capaciteitsremuneratiemechanis

• The Functioning Rules, as approved by the Royal Decree of 30th of August 2023

▶ https://www.ejustice.just.fgov.be/mopdf/2023/09/15_1.pdf#Page36

• The Capacity Contract, as approved by the CREG on 31st of August 2023

▶ https://www.elia.be/-/media/project/elia/elia-site/electricity-market-and-system/adequacy/crm/2023/20230929_crm-capacity-contract-approved-by-creg-on-31082023_en.pdf

This commercial presentation is based on the current understanding and state of play, which may evolve as certain regulatory (Functioning Rules, Capacity Contract) and legal (Royal Decree, Law) documents still need to be formally approved and/or adopted or might evolve over time. All information in this presentation is based on the 4th version of the CRM's functioning rules, last submitted by Elia to the CREG on 1st of February 2024, making the information subject to potential changes CREG can propose. This document has no legal value and if it is in any way inconsistent with existing legal or regulatory documents, then the latter shall prevail. The main objective of this document is to highlight the customer's obligations and opportunities within the Capacity Remuneration Mechanism.

All illustrative cases are fictive and are meant as relatable examples. Any similarities with real market parties are coincidental and unintended.

Disclaimer

This presentation represents the current design of the Belgian Capacity Remuneration Mechanism. At this time several changes are being introduced to the regulatory framework (Electricity Law, Royal Decrees governing the CRM and where relevant EC notification). At the time of this presentation these changes have not entered into force, but are expected to do so in the coming months. Amongst others, these are:

- The introduction of the Y-2 auction in 2025 for delivery 2027-2028.
- The introduction of multi-year contracts for existing capacity.
- The exemption of the payback obligation for DSM

Where relevant, this presentation already includes these evolutions.

This presentation has been prepared targeting Belgian Market Actors and does not dive into the specificities for the Cross-Border participation to the Belgian CRM. A dedicated session is planned for foreign Market Actors to elaborate on the Cross-Border specificities.

Today’s Detailed Session

Purpose of Today’s session

Right to remuneration

Availability Obligation

- Availability monitoring
- Availability Testing
- Unavailability Penalties

Payback Obligation

Secondary Market

Final notes

Purpose of Today's session

Right to remuneration

Availability Obligation

- Availability monitoring
- Availability Testing
- Unavailability Penalties

Payback Obligation

Secondary Market

Final notes

The purpose of Today's session is to provide energy market players with the knowledge required to assess their participation to the CRM

Today's session is

- **In-depth,** the session is focused on more complex subject matter and will go into all details and minutiae needed to assess participation.
- **Non-exhaustive**, not all intricacies of the CRM will be covered, as the session will only focus on rights, obligations and risk management for CRM participants
- **Applied**, the session will not only cover theory, but will provide example cases.

In-depth: This session aims at giving a complete understanding of the rights and obligations of all types of CMUs in the CRM, so they can assess their participation.

TODAY'S SESSION COVERS…

RIGHTS:

- **Remuneration for contracted capacity**

OBLIGATIONS:

- **Availability obligation**
  - **Availability Monitoring**
  - **Availability Testing**
- **Payback Obligation**

RISK MITIGATION:

- **Secondary Market** (Transfer rights & obligations to another party)

FOR

- **Energy Constrained units / Non-energy Constrained units**
- **Units with Daily Schedule / Units without Daily Schedule**
- **Exceptions and exemptions**

BY

- **Explaining Definitions**
- **Outlining theory**
- **Clarifying using examples**

TO

Help market parties assess their CRM Participation

Non-exhaustive: Not all aspects of the CRM will be covered in this session, familiarity with the basic modalities of the CRM is assumed.

For a basic run-down on all of the CRM's modalities mentioned below, we refer to the General Info Sessions.

GETTING TO A CONTRACT:

- **Types of Contracts**
  In what ways can I engage with the CRM?
- **Eligibility**
  Can I participate?
- **Prequalification:**
  Administration for possible participation to the CRM
- **Financial Security Obligation:**
  Financial Securities are needed to hedge for the risk of deficiency
- **Auction:**
  Bidding to get selected
- **Contract:**
  Formalisation of participation

PREPARING FOR DELIVERY:

- **Pre-Delivery Monitoring**
  The dresence and/oror development progress of CMUs needs to be monitored to estimate the risk of deficiency.

DELIVERY PERIOD:

- **Availability Obligation**
  In return for a capacity remuneration, CMU's are required to be present in the market during adequacy relevant moments. Elia will monitor (or test) CMU's to see if they deliver up to their part of the bargain
- **Payback Obligation**
  The purpose of the remuneration is to cover missing money. If a CMU makes windfall profits, excessive revenues captured need to be paid back.
- **Secondary Market**
  The Secondary Market is a risk management tool in which CMUs can trade their capacity excesses or shortages with other prequalified CMUs.

Non-covered topics
Covered topics

Purpose of Today's session

Right to remuneration

Availability Obligation

- Availability monitoring
- Availability Testing
- Unavailability Penalties

Payback Obligation

Secondary Market

Final notes

CMUs can see missing money remunerated if they are present in the market at Adequacy Relevant Moments. The potential remuneration is limited by a price cap and a total capacity to be remunerated.

$$Total\ Remuneration = Capacity\ Remuneration\ per\ MW\ per\ y * Total\ Contracted\ Capacity$$

Idea of a CRM yearly fix revenue?

Max **84 600€/MW** /y

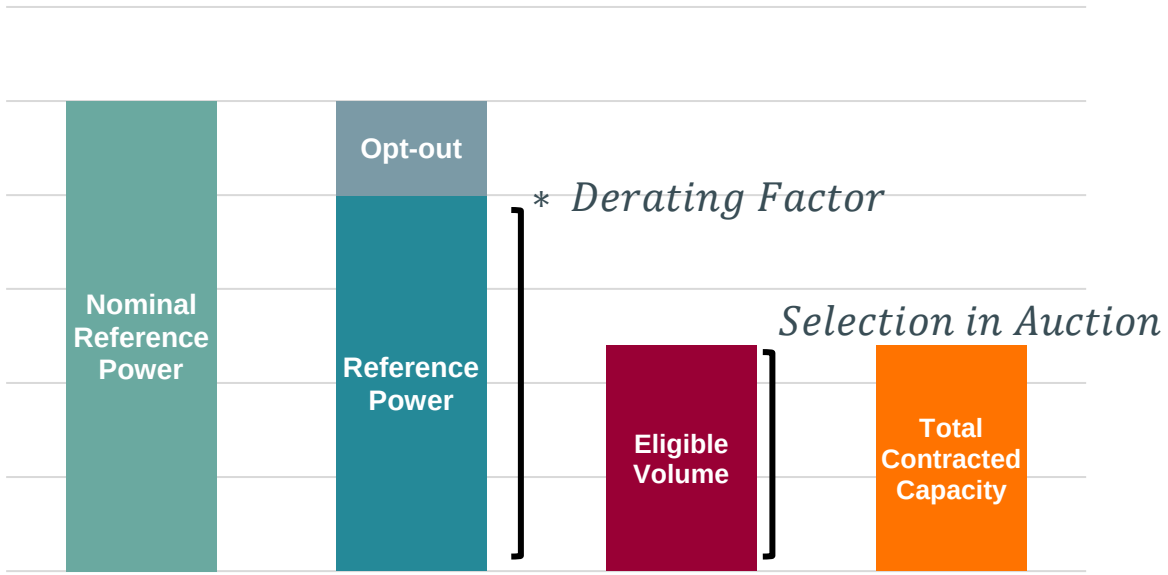
For new capacities

Max **26 000€/MW** /y

For existing capacities

(2023 figures)

Exact remuneration €/MW/y depends on bid in auction (Pay-as-bid)



Purpose of Today's session

Right to remuneration

Availability Obligation

- Availability monitoring
- Availability Testing
- Unavailability Penalties

Payback Obligation

Secondary Market

Final notes

The Availability Obligations consist of two components: the Availability Monitoring and the Availability Testing

Capacity Market Unit
Obligations during Delivery Period

Availability Obligations

Availability Monitoring

Verify availability of CMU's through centrally collected data

"Did you follow through on your side of the deal?"

Availability Testing

Verify availability by performing tests on CMU's
(only if not visible in monitoring)

"We couldn't verify in Availability Monitoring whether you followed through on your side of the deal. Would you be able to follow through when specifically asked?"

Payback Obligation

Ensure a pay-back of energy market revenues when the Reference Price exceeds the Strike Price
(Next chapter)

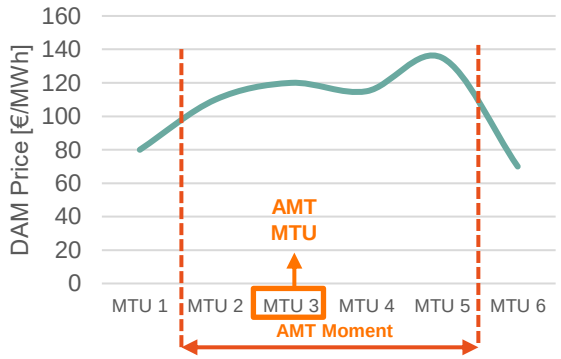
The Availability Obligation can be described in a stepwise process

I. Identify AMT MTUs/Moments or I. Identify Test Moments

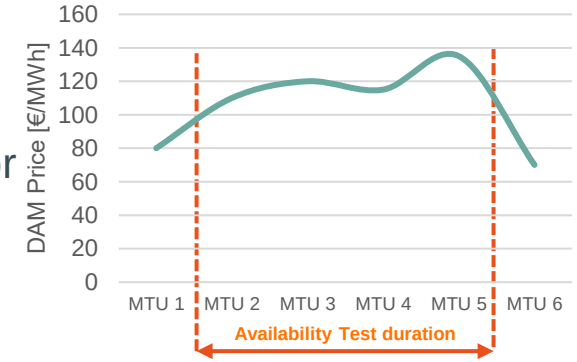
II. Establish Obligated Capacity

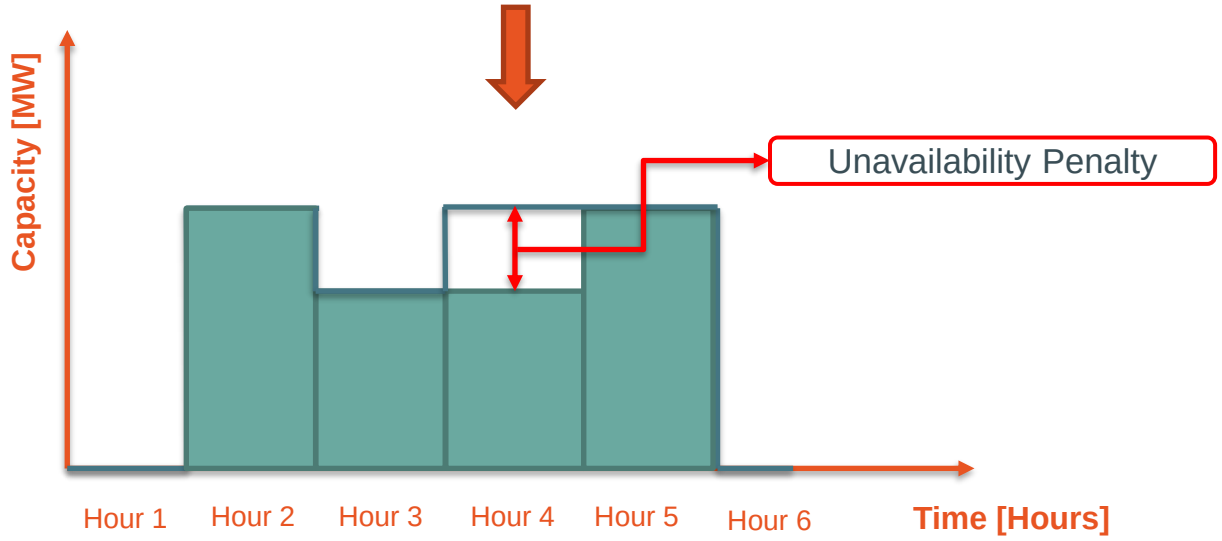
III. Establish Available Capacity

IV. Availability Penalty (if needed)



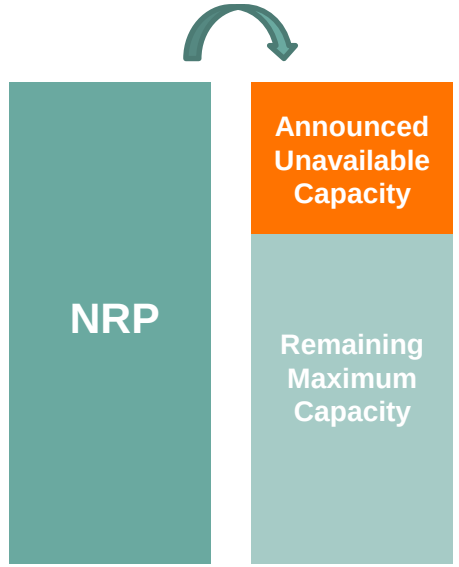
or





Announced Unavailabilities

- At any time during the Transaction Period, a Capacity Provider must notify Elia when he becomes aware of a limitation on the capacity that was contracted
    - Forced outages, …
- The remaining capacity is defined as the **Remaining Maximum Capacity**



- An Unavailability has to be notified, but a Capacity provider can choose whether or not to apply it in the determination of the Unavailability Penalty (if applicable)
    - An Announced Unavailability is penalized less severely
    - Such Announced Unavailability can be declared **at most 75 calendar days per Delivery Period**
- Regardless the Capacity Provider's choice, he always has the possibility to find an alternative on the Secondary Market

Scheduled Maintenance

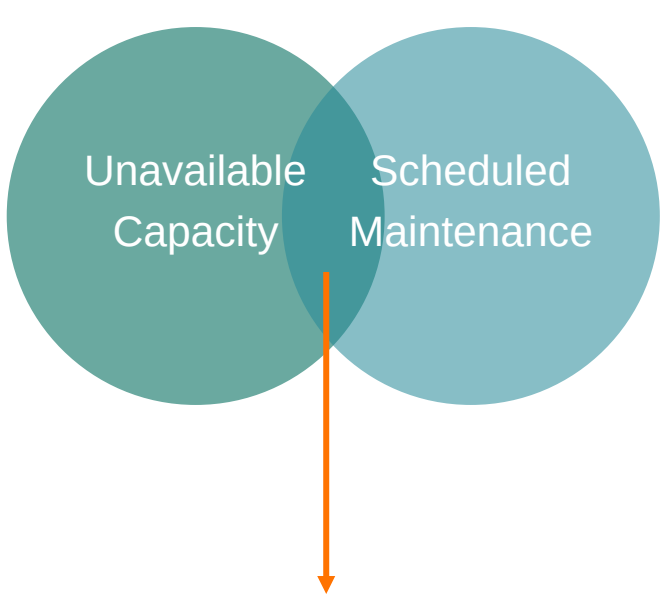
- Long-term Unavailabilities that are known a longer time in advance can be notified as Scheduled Maintenance
- A correctly submitted Scheduled Maintenance leads to an exemption of the Unavailability Penalty
- Can only be used outside of the Winter Period

Comparison regular Unavailable Capacity and Scheduled Maintenance

Can be notified in real-time or even afterwards

Can be used during winter (though limited) and summer

Results in reduction of Unavailability Penalty



Budget of days

Must be notified in advance

Can only be used in summer

Results in exemption of Unavailability Penalty

Purpose of Today's session

Right to remuneration

Financial Security Obligation

Availability Obligation

- Availability monitoring
  - Availability Testing
  - Unavailability Penalties

Payback Obligation

Secondary Market

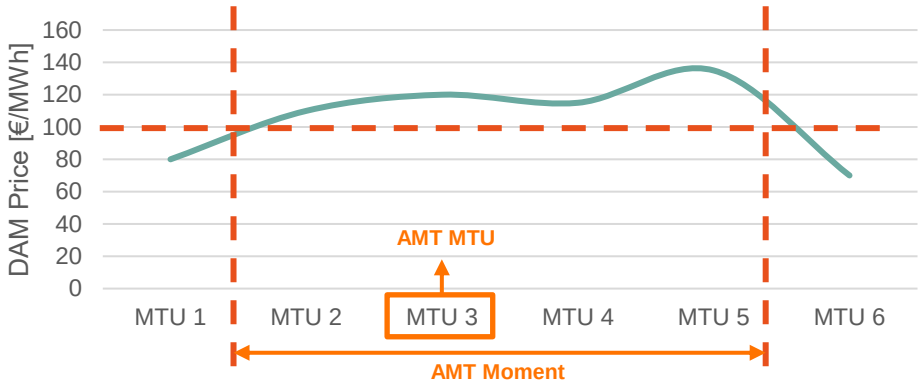
Final notes

Availability Monitoring is triggered when a pre-defined price level is surpassed

This price level is triggered on the Day-ahead market:

- Most relevant for structural adequacy issues
- Transparency (e.g. contract applications)
- Liquidity (25-30% of BE total load)
- Technology-open (slow-ramping)

→ Define single “AMT-price” leading to an Availability Monitoring Trigger when surpassed in DAM



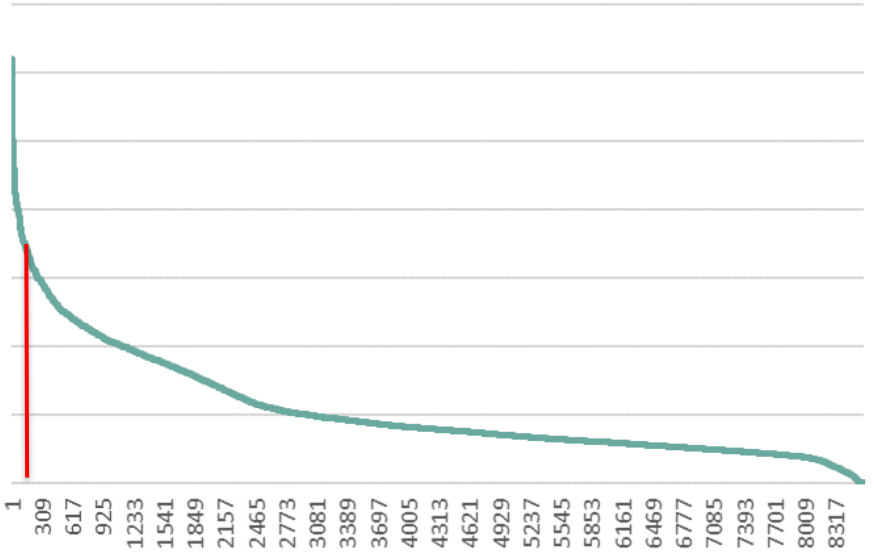
AMT
No AMT

- AMT is announced at 15h00 CET in Day-Ahead
- For each AMT MTU, Capacity Market Units will have an **Obligated Capacity**
- The Availability Monitoring assesses **Available Capacity**

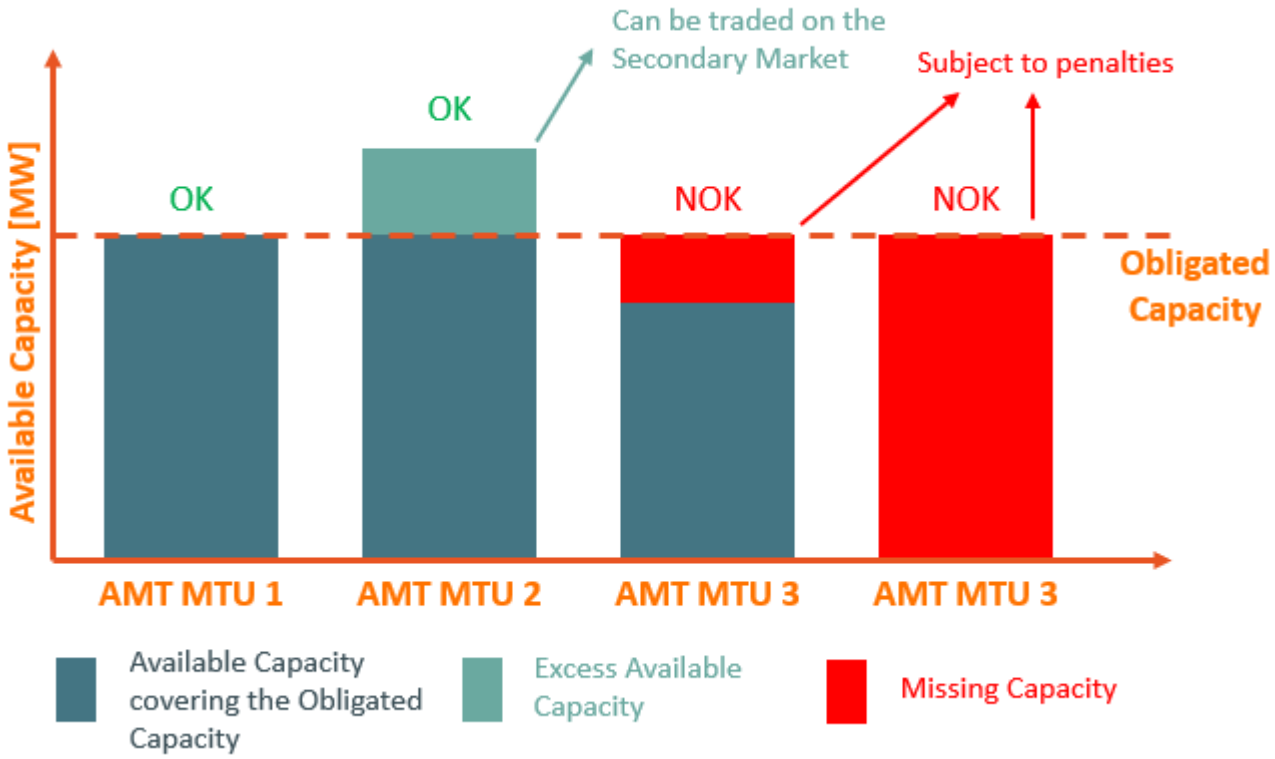
The AMT Price is determined based on simulations that are performed once all Auctions for a Delivery Period are cleared

- Ensures the most accurate modeling of the Belgian energy market for the Delivery Period
- The AMT Price is determined as the minimum of:
  - The median value of the price in each simulation year that is surpassed during 100 hours; and
  - The tenth percentile lowest value of the price in each simulation year that is surpassed during 20 hours

- **Every MTU when the AMT Price is exceeded is defined as an AMT MTU**
- **Not every AMT MTU is effectively monitored by Elia**
  - **Every AMT MTU can be monitored by Elia**
- **The maximum amount of AMT Moments that Elia can monitor per year is 30**



Following the trigger, the availability is monitored during the AMT moment



General principles:

- All holders of a contracted capacity are obliged to cover their Obligated Capacity
  - Based on Contracted Capacity
- In case of underperformance the party is liable to penalties
- This obligation applies regardless of outages, but the penalty can take into account Announced Unavailabilities
- Available Capacity is determined for every AMT MTU individually

How is the trigger communicated?

Current system:

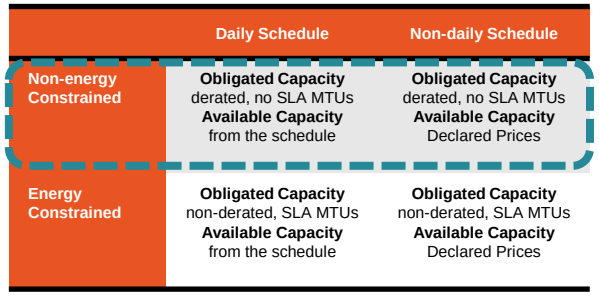
- AMT price is published on the Elia website
- AMT moments are published the day in advance on the Elia website. It is the responsibility of the capacities to check this publication.

The determination of both the Obligated Capacity and the Available Capacity depends on the type of CMU

- Obligated Capacity
  - Non-energy Constrained: derated Contracted Capacity
  - Energy Constrained CMU: non-derated Contracted Capacity, but limited to SLA
- Available Capacity
  - Daily Schedule: based on Availability Plan and Daily Schedule
  - Non-daily Schedule CMU: based on Declared Prices

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

Obligated Capacity for Non-energy Constrained CMUs



	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

The Obligated Capacity is equal to the total ex-ante contracted (i.e. derated) capacity

This applies to both highly and lowly derated CMUs:

- A highly derated CMU will be expected to be unavailable at more AMT hours, but is only required to cover the relatively small part of their Nominal Reference Power and is able to sell a large part of its capacity on the secondary market at AMT hours where it is available
- A lowly derated CMU is expected to have a low volume tradeable on the secondary market and a high volume to be covered in case of unavailability, but is expected to be available during most AMT hours and is able to trade the secondary volume more frequently

The Obligated Capacity is equal to:

$$Total\ Contracted\ Capacit(CMU,t) - P_{announced,unavailable,maintenance}\ (CMU,t) \cdot Derating\ Factor(CMU,t)$$

Example

OCGT

- **Non-energy Constrained**

- **NRP:** 100MW
- **Derating Factor:** 92%
- **Contracted Capacity:** 92MW

- **Obligated Capacity:** 92MW

- The majority of the time the unit will actually have 100MW available. He can then trade the excess capacity away on the Secondary Market
- In case of an outage the unit is expected to seek compensating capacity on the Secondary Market

These two effects are expected to cancel each other out

Derating factors from 2023 Y-4 calibration report are used

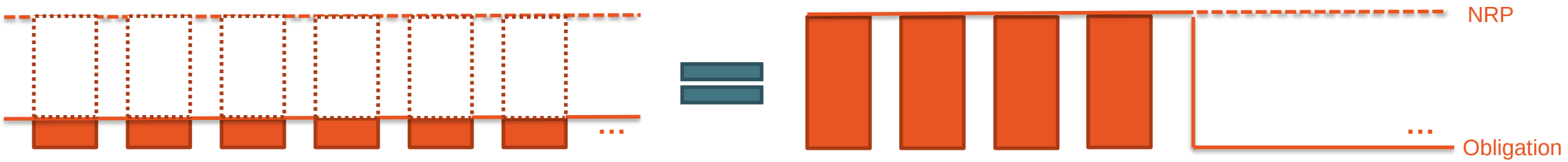
Obligated Capacity for Energy Constrained CMUs

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

The Obligated Capacity is equal to the total ex-ante non-derated contracted capacity

The Obligated Capacity is only imposed during a limited set of MTUs

A CMU with an SLA of 1 hour has a derating of 19%



- Whether a CMU provides the product on the left or the right is equivalent for adequacy
- The product on the right is estimated to better fit the reality of an Energy Constrained CMU
- The energy constraint is chosen by the operator of the asset
  - The availability is according to the dispatching of the energy reservoir: almost certain unavailability as the AMT Moment gets longer

+ degrees of freedom in defining CMU:

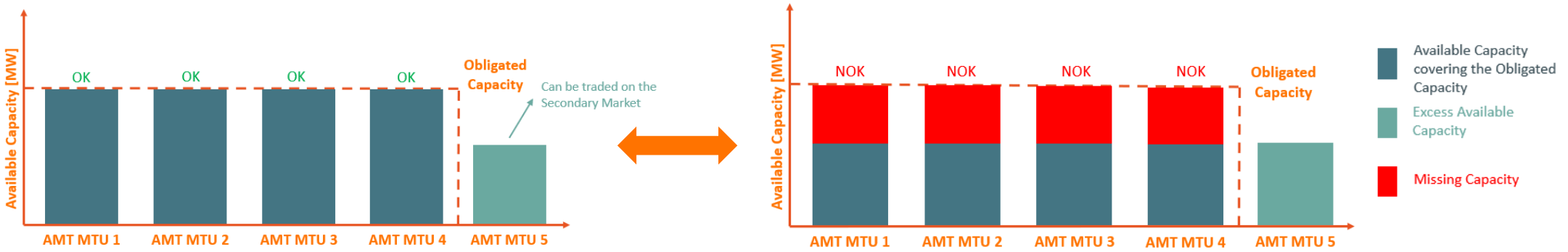
- SLA Duration
- Self-derating (partial opt-out)

Principle of equivalence with respect to adequacy by derating

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

The Obligated Capacity is equal to the non-derated total contracted capacity for each AMT hour, taking into account their SLA

- Considering their nature, Energy Constrained units cannot be expected to have an Obligated Capacity during every AMT hour
- Their Obligated Capacity is limited by their Service Level Agreement (SLA)
- In case of a SLA of 1 hour and 4 consecutive AMT MTUs:



- Full capacity demanded at all AMT MTUs, except when energy/activation constraints are met
- Unavailability after 4 MTUs is already taken into account when determining derating factors and does not pose an adequacy issue
- Penalties apply to unavailability according to the specified constraints (i.e.: 1 hour)

Obligated Capacity for Energy Constrained CMUs

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

The Obligated Capacity is equal to:

$$\frac{Total\ Contracted\ Capacity_{ex-ante}(CMU,t)}{Derating\ Factor(CMU,t)} + Contracted\ Capacity(CMU,t)_{ex-post} - P_{Announced,Unavailable,Maintenance}(CMU,t)$$

Example

OCGT

- **Non-energy Constrained**
- **NRP:** 100MW
- **Derating Factor:** 92%
- **Contracted Capacity:** 92MW
- **Obligated Capacity:** 92MW
- The majority of the time the unit will actually have 100MW available. He can then trade the excess capacity away on the Secondary Market
- In case of an outage the unit is expected to seek compensating capacity on the Secondary Market

Battery

- **Energy Constrained: SLA 4**
- **NRP:** 10MW
- **Derating Factor:** 57%
- **Contracted Capacity:** 5,7 MW
- **Obligated Capacity:** 10MW
- The CMU has an Obligated Capacity limited to its SLA
- During all other MTUs, it can trade away capacity on the Secondary Market

The hours for which there is an Obligated Capacity are called the SLA MTUs

Derating factors from 2023 Y-4 calibration report are used

The SLA MTUs form a subset of all identified AMT Moments

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- In case of high amounts of AMT Moments Energy Constrained CMUs won't be able to dispatch all the time due to technological constraints
- Based on their behavior Elia determines the SLA MTUs for each CMU individually
  - Limited to one activation per day
  - Total duration limited to the SLA of the CMU

Methodology for SLA MTUs

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

All AMT MTUs occurring on a day

AMT MTUs where the unit actually activated

Determination of activation depends on type of CMU:
- **Daily Schedule CMU**: Daily Schedule
- **Non-daily Schedule CMU**: Required Volume

In case no activation took place, all AMT MTUs are retained and availability is determined as Unproven Availability

Set of AMT MTUs with highest measured power

Determination depends on type of CMU:
- **Daily Schedule CMU**: Daily Schedule
- **Non-daily Schedule CMU**: Measured Power

The determination of both the Obligated Capacity and the Available Capacity depends on the type of CMU

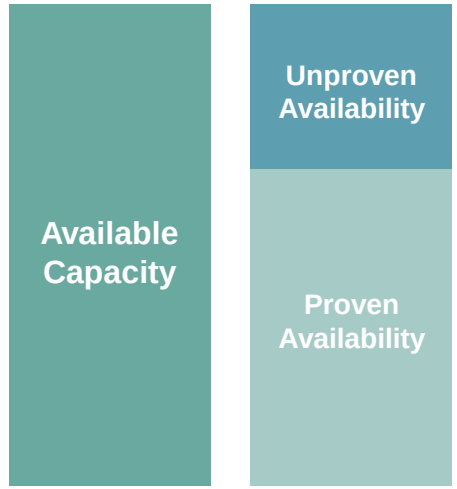
- Obligated Capacity
  - Non-energy Constrained: derated Contracted Capacity
  - Energy Constrained CMU: non-derated Contracted Capacity, but limited to SLA

Available Capacity
- Daily Schedule: based on Availability Plan and Daily Schedule
- Non-daily Schedule CMU: based on Declared Prices

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

Availability can be either Proven or Unproven

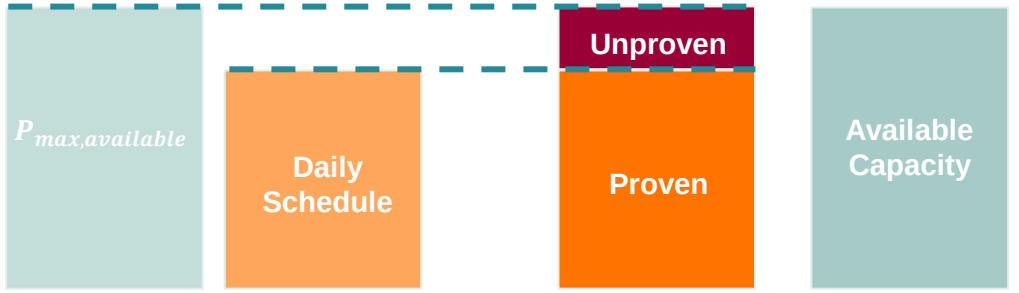
- The Belgian CRM remunerates availability, not delivery
- When backed up by actual measurements, Elia considers it **Proven Availability**
- Unless proven otherwise, the remaining part is considered **Unproven Availability**
- Both Proven and Unproven Availability are equivalent for the total Available Capacity
- High amounts of Unproven Availability might lead to an **Availability Test**



Available Capacity for Daily Schedule CMUs

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- Elia disposes of information that is submitted in the context of the Availability Plan and the Daily Schedule
- The total Available Capacity is set by the Availability Plan
  - This is equal to the Remaining Maximum Capacity
- The proportion that is actually deployed according to the Daily Schedule counts as Proven Availability



Available Capacity for Non-daily Schedule CMUs

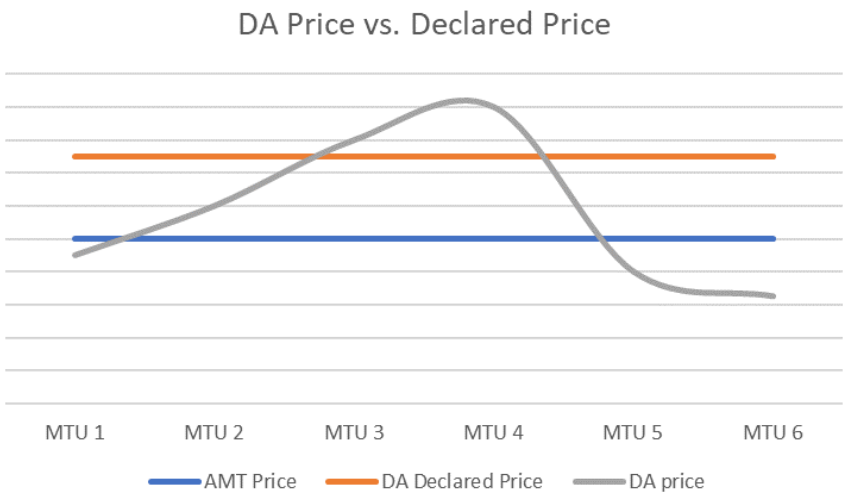
	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

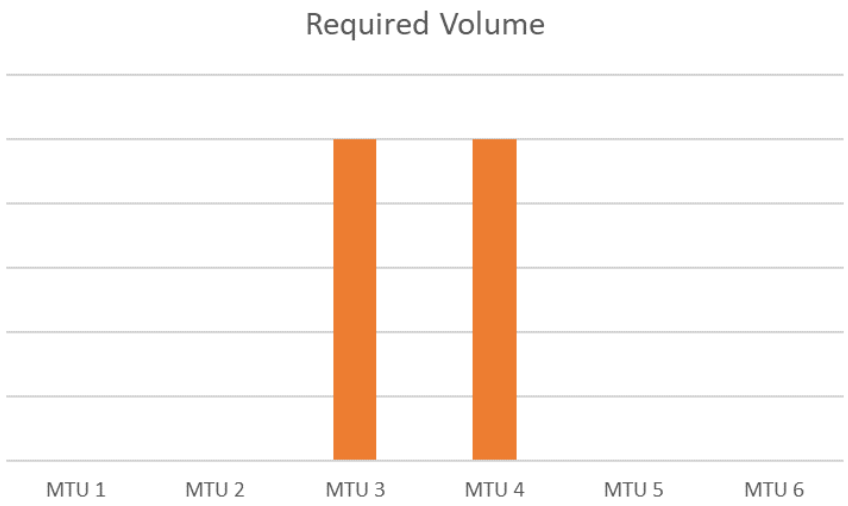
- Elia does not have Availability Plans/Schedules for smaller CMUs
- Solely using Measured Power does not lead to an accurate view on availability
- Elia uses the design of the **Declared Prices**

Declared Prices
Base idea

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- Non-daily Schedule CMUs have to submit a Day-Ahead Declared Price to Elia
  - Value that represents the CMU's variable cost
- From the moment this Declared Price is exceeded on the Day-Ahead market, the CMU is expected to dispatch it NRP
  - We define the **Required Volume** as the NRP



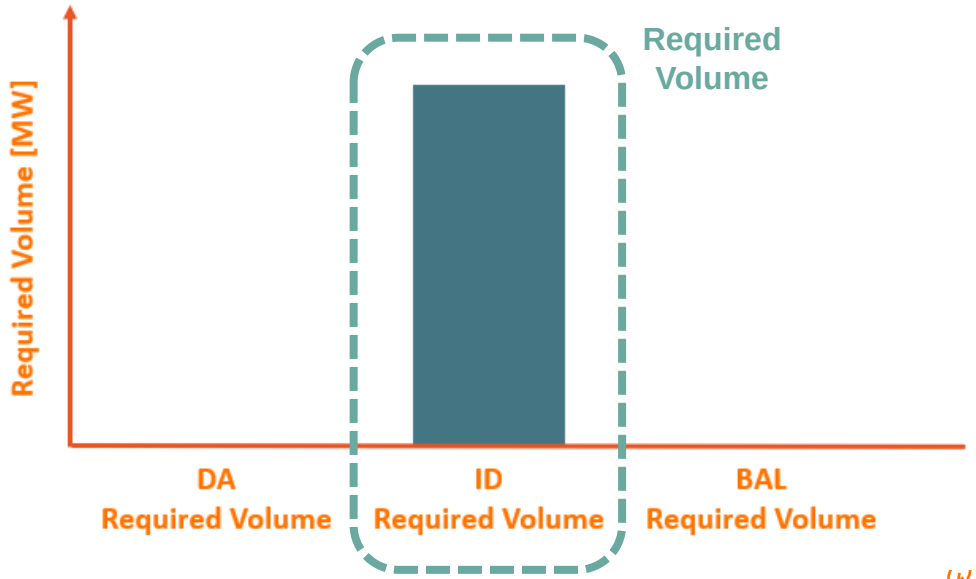


Declared Prices

Multiple markets

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- On top of the obligatory submission of a Day-Ahead Declared Price, a CMU can submit prices for Intraday and Balancing
- Each Declared Price is compared to its respective reference price, the highest Required Volume among the three Declared Prices is retained

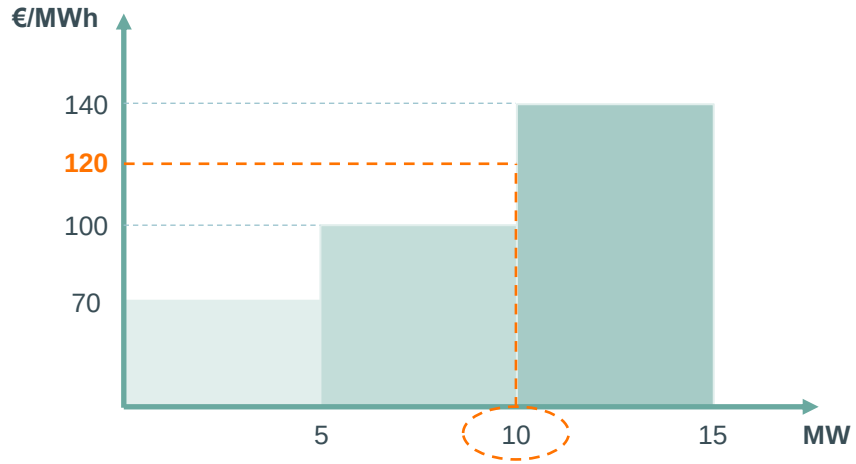


	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

Declared Prices
partial Declared Prices

- CMUs can also submit **Partial Declared Prices** to account for partial activations
  - In this case, the Declared Prices effectively represent their own mini Merit Order
  - Every partial Declared Price has an Associated Volume, i.e. the cumulative volume that activates at that price
  - The highest Associated Volume for which the partial Declared Price is surpassed sets the Required Volume

partial Declared Price	Associated Volume
70	5
100	10
140	15

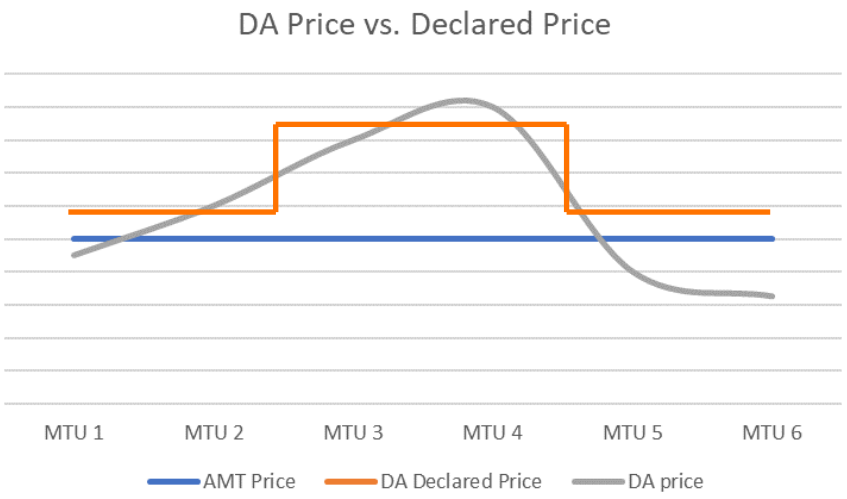


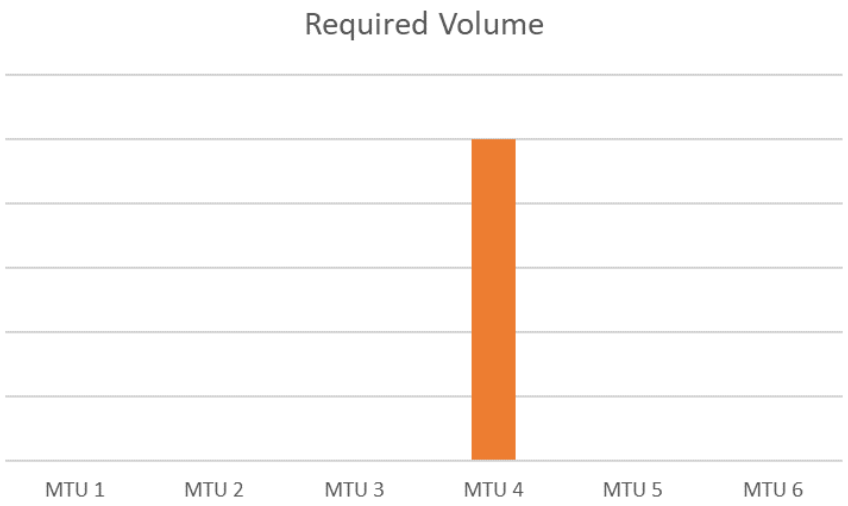
Declared Prices

Variation throughout the day

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- CMUs can submit a timeseries of Declared Prices that reflects varying costs throughout the day





Example – Required Volume in case of multiple price references

DSM

- **NRP**: 5MW
- The highest Associated Volumes for which the Declared Price was surpassed on the different markets:

	BAL	INT	DA
…			
14:00	2	3	3
14:15	4	3	5
14:30	1	2	0
14:45	2	1	3
…			

1 For the same MTU, the maximum is taken between the three references

	BAL	INT	DA
…			
14:00	2	3	3
14:15	4	3	5
14:30	1	2	0
14:45	2	1	3
…			

2 Each maximum is the Required Volume for that MTU

	BAL	INT	DA	Required Volume
…				
14:00	2	3	3	3
14:15	4	3	5	5
14:30	1	2	0	2
14:45	2	1	3	3
…				

Available Capacity based on the Declared Prices

method 1

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- Used when the CMU's (lowest) Declared Price is not exceeded
  - In other words, when the Required Volume equals 0
- The unit is not expected to dispatch its capacity, but is assumed to be present
  - If the prices had been higher, we would have expected you to dispatch
- The Available Capacity is calculated as

$$P_{Available}(CMU, t) = P_{Max,Remaining}(CMU, t)$$

- All this capacity is considered as **Unproven Availability**

Available Capacity based on the Declared Prices

method 2

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- Used when the CMU's (highest) Declared Price is exceeded
  - In other words, when the Required Volume equals the NRP
- The unit is expected to dispatch its full NRP
  - Based on your Declared Prices, we expect you to dispatch
- The Available Capacity is calculated as

?

$$P_{Available}(CMU,t) = MIN(P_{Max,Remaining}(CMU,t); V_{Act}(CMU,t))$$

- All this capacity is considered as **Proven Availability**

Active and Passive Volume

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- The Active and Passive Volume serve as a first step to calculate the Available Capacity
  - Active Volume: the part of the Capacity that reacted to market price signals
  - Passive Volume: the part of the CMU that did not react to market price signals
- Its calculation starts on Delivery Point level and depends on whether the Delivery Point is injection or offtake

	Injection	Offtake
Initial Active Volume $V_{Act,initial,i}$	$-P_{measured,i}$	$P_{Baseline,i} - P_{measured,i}$
Initial Passive Volume $V_{Pas,initial,i}$	$NRP_i + P_{measured,i}$	$P_{measured,i} - Unsheddable\ Margin_i$

- The final initial Active Volume is equal to the sum over all the Delivery Points of the CMU

This is only an initial determination. The initial Active and Passive Volume are, if necessary, corrected for participation in ancillary and re-dispatching services to reach the final Active and Passive Volume (see later)

The normal offtake at a similar moment t without price signal. It is calculated again continuously (see later)

Provided by CMU during Prequalification

Example – Initial Active and Passive Volume

Battery

- **Injection**
- **One single Delivery Point**
- **NRP**: 10MW
- **Measured Power**: 7MW

- **Initial Active Volume**: 7MW
- **Initial Passive Volume**: 10MW – 7MW = 3 MW

DSM

- **Offtake**
- **3 different Delivery Points:**

	DP 1	DP 2	DP 3
NRP	2	2	2
Measured Power	3	3	4
Baseline	5	4	6
Unsheddable Margin	3	3	3

- **The initial Active and Passive Volumes are calculated per Delivery Point**

	DP 1	DP 2	DP 3
Initial Active Volume	5 – 3 = 2	4 – 3 = 1	6 – 4 = 2
Initial Passive Volume	3 – 3 = 0	3 – 3 = 0	4 – 3 = 1

- **Initial Active Volume**: 2 + 1 + 2 = 5
- **Initial Passive Volume**: 0 + 0 + 1 = 1

Available Capacity based on the Declared Prices

method 2

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- Used when the CMU's (highest) Declared Price is exceeded
  - In other words, when the Required Volume equals the NRP
- The unit is expected to dispatch its capacity
  - Based on your Declared Prices, we expect you to dispatch
- The Available Capacity is calculated as

$$P_{Available}(CMU,t) = MIN(P_{Max,Remaining}(CMU,t); V_{Act}(CMU,t))$$

- All this capacity is considered as **Proven Availability**

Example – Available Capacity

Method 2

Battery

- **Injection**
- **One single Delivery Point**
- **NRP**: 10MW
- **Measured Power**: 7MW

- **Initial Active Volume**: 7MW
- **Initial Passive Volume**: 10MW – 7MW = 3 MW

DSM

- **Offtake**
- **3 different Delivery Points:**

	DP 1	DP 2	DP 3
NRP	2	2	2
Measured Power	3	3	4
Baseline	5	4	6
Unsheddable Margin	3	3	3

- **The initial Active and Passive Volumes are calculated per Delivery Point**

	DP 1	DP 2	DP 3
Initial Active Volume	5 – 3 = 2	4 – 3 = 1	6 – 4 = 2
Initial Passive Volume	3 – 3 = 0	3 – 3 = 0	4 – 3 = 1

- **Initial Active Volume**: 2 + 1 + 2 = 5MW
- **Initial Passive Volume**: 0 + 0 + 1 = 1MW

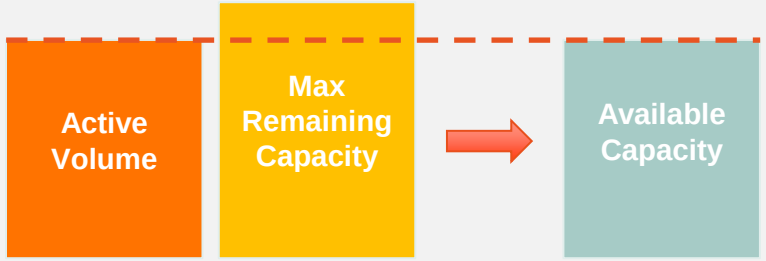
Example – Available Capacity

Method 2

$$P_{Available}(CMU,t) = MIN(P_{Max,Remaining}(CMU,t); V_{Act}(CMU,t))$$

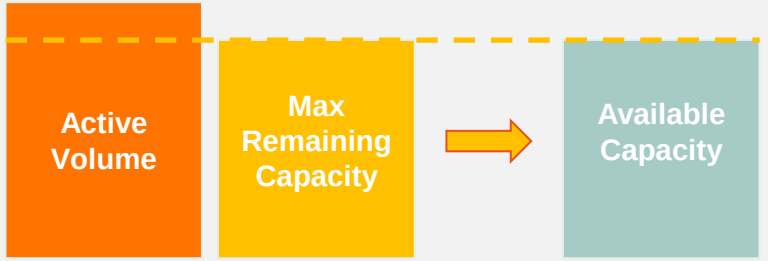
Battery

- **NRP**: 10MW
- **Active Volume**: 7MW
- **Passive Volume**: 3MW
- **Max Remaining Capacity**: 10MW



DSM

- **NRP**: 6MW
- **Active Volume**: 5MW
- **Passive Volume**: 1MW
- **Max Remaining Capacity**: 4MW



Available Capacity based on the Declared Prices

method 3

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- Used when some CMU's (partial) Declared Prices are exceeded
  - In other words, when 0 < Required Volume < NRP
- The unit is expected to partially dispatch its capacity
  - Based on the Declared Prices, we expect you to dispatch some of your capacity. If the prices had been any higher, we would have expected you to dispatch even more
- The Available Capacity is calculated as

$$P_{Available}(CMU,t) =$$

$$MIN(P_{Max,Remaining}(CMU,t); MIN\left(V_{Act}(CMU,t); V_{req}(CMU,t)\right) + MIN(V_{pas}(CMU,t); NRP(CMU,t) - V_{req}(CMU,t)))$$

- This capacity is partially considered as **Proven Availability**, and partially as **Unproven Availability**

Available Capacity based on the Declared Prices

method 3

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

- The $P_{Available}$ is calculated as

$$MIN[P_{Max,Remaining}(CMU,t);\ MIN\left(V_{Act}(CMU,t);V_{req}(CMU,t)\right)+MIN\left(V_{pas}(CMU,t);NRP(CMU,t)-V_{req}(CMU,t)\right)]$$

measurements — Declared Prices — **Proven Availability**

measurements — Declared Prices — **Unproven Availability**

Example – Available Capacity

Method 3

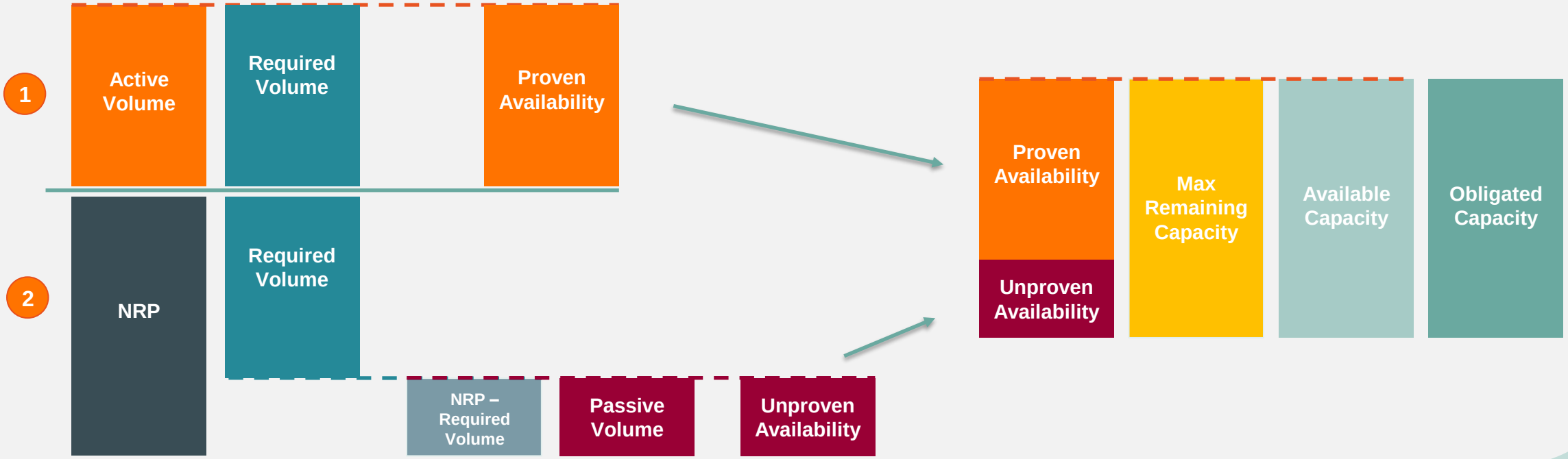
Battery

- **NRP**: 10MW
- **Max Remaining Capacity**: 10MW
- **Required Volume**: 7MW
- **Obligated Capacity**: 10MW
- **Active Volume**: 7MW
- **Passive Volume**: 3MW

$$MIN[P_{Max,Remaining}(CMU,t);\ MIN\left(V_{Act}(CMU,t);V_{req}(CMU,t)\right)+MIN\left(V_{pas}(CMU,t);NRP(CMU,t)-V_{req}(CMU,t)\right)]$$

measurements — Declared Prices: Proven Availability

measurements — Declared Prices: Unproven Availability



Example – Available Capacity

Method 3

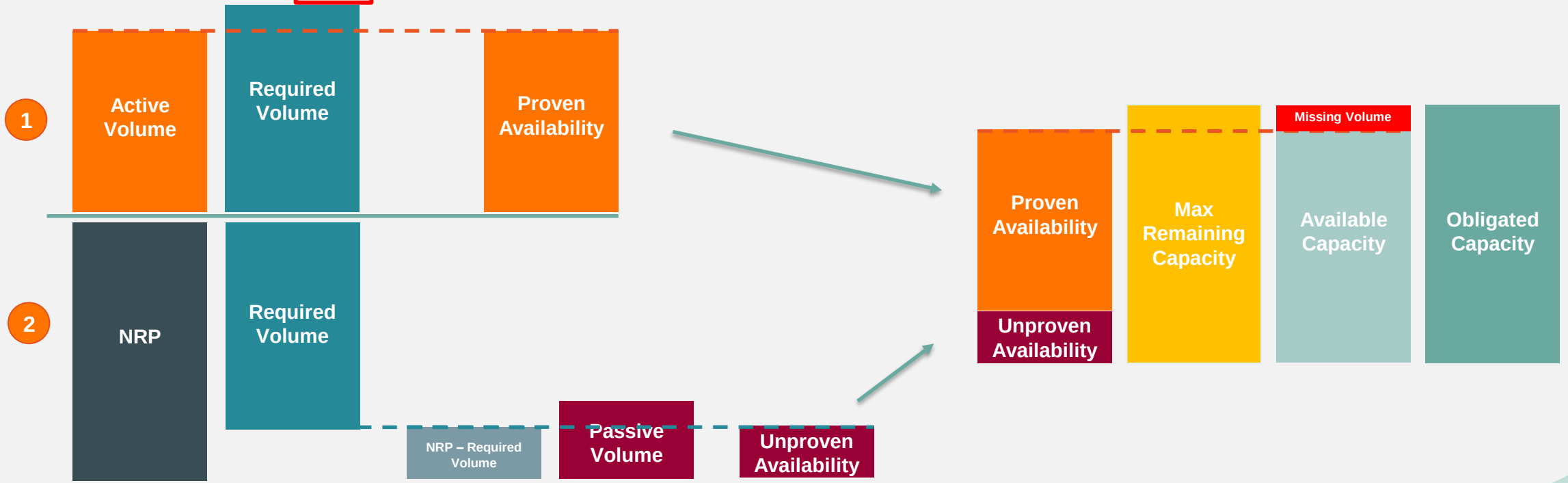
Battery

- **NRP**: 10MW
- **Max Remaining Capacity**: 10MW
- **Required Volume**: 8MW
- **Obligated Capacity**: 10MW
- **Active Volume**: 7MW
- **Passive Volume**: 3MW

$$MIN[P_{Max,Remaining}(CMU,t);\ MIN\left(V_{Act}(CMU,t);V_{req}(CMU,t)\right)+MIN\left(V_{pas}(CMU,t);NRP(CMU,t)-V_{req}(CMU,t)\right)]$$

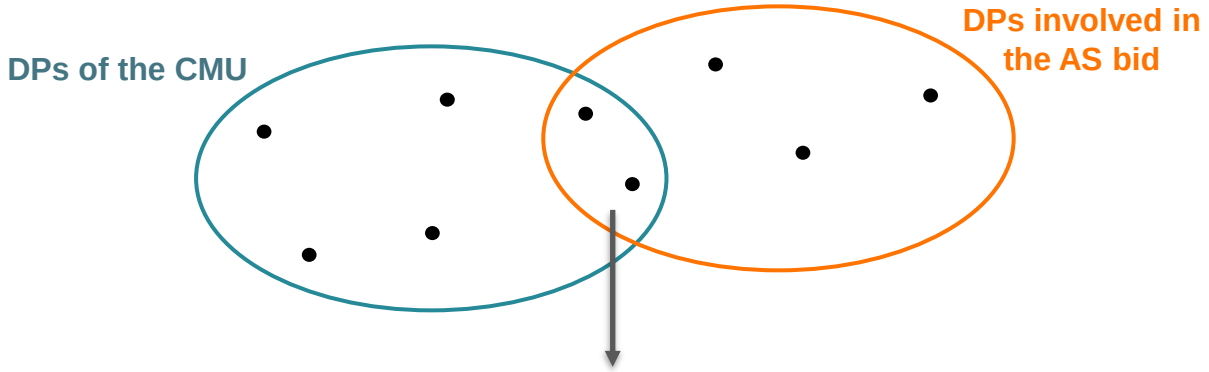
measurements | Declared Prices → Proven Availability

measurements | Declared Prices → Unproven Availability



Inclusion of Ancillary Services

- Practical problem: the Delivery Points of the CMU might not be identical to those involved in the AS bid



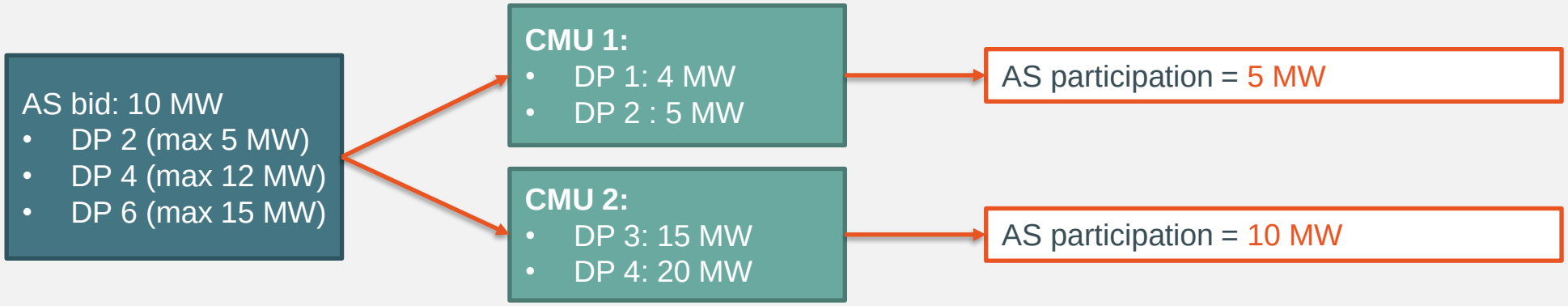
Need to establish for how much we can at most take into account the volumes involved in the AS

- Elia considers the participation to AS as the minimum of:
  - The volume of the accepted frequency-related AS bid;
  - The maximum volume the Delivery Point is allowed to delivery in these AS as established in the related AS contractual framework;
  - The NRP of the Delivery Point

Example – Inclusion of Ancillary Services

Battery

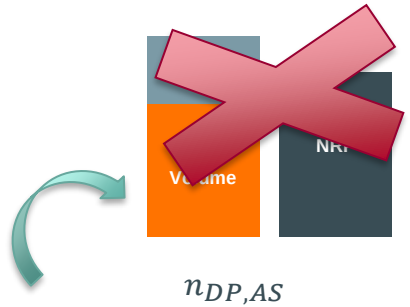
- **Elia considers the minimum of:**
  - The volume of the accepted frequency-related AS bid;
  - The maximum volume the Delivery Point is allowed to delivery in these AS as established in the related AS contractual framework;
  - The NRP of the Delivery Point



Corrections for Ancillary Services

FCR, aFRR, mFRR

- The corrections impact both the Active and the Passive Volume, and take place on a Delivery Point level
- Elia distinguishes:
  - Reservations, which are noted as $V_{reservation,i}$
  - Activations, which are noted as $V_{activation,i}$
- The correction for the Active Volume is equal to



$$MIN\left(\sum_{i=1}^{n_{DP,AS}} NRP_i(t) - \left(V_{initial,i}(t) - V_{activation,i}(t)\right), \sum_{i=1}^{n_{DP,AS}} V_{reservation,i}(t) - \sum_{i=1}^{n_{DP,AS}} V_{activation,i}(t)\right)$$

The correction cannot surpass the margin remaining on those Delivery Points

The Active Volume needs to be increased by the reservations and decreased by the activations

- The correction for the Passive volume is equal to

$$\sum_{i=1}^{n_{DP,AS}} V_{activation,i}(t)$$

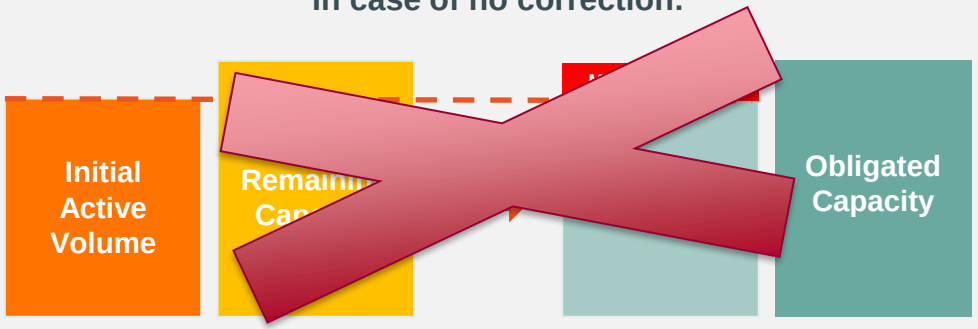
Example – corrections for Ancillary Services

Battery

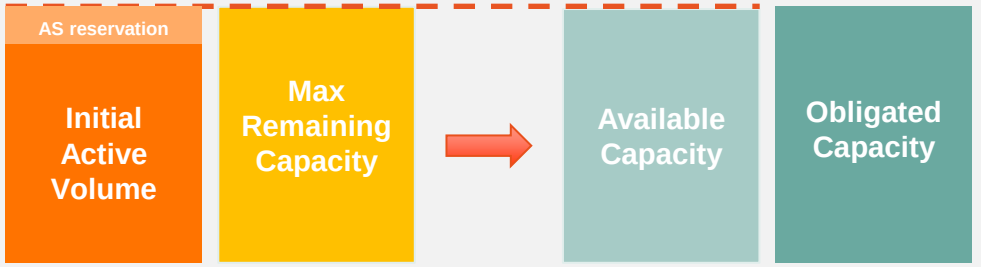
- **NRP**: 10MW
- **Max Remaining Capacity**: 10MW
- **Required Volume**: 10MW
- **Initial Active Volume**: 7MW
- **AS reservations**: 3MW

Method 2: $P_{Available}(CMU,t) = MIN(P_{Max,Remaining}(CMU,t); V_{Act}(CMU,t))$

In case of no correction:



With correction:



Corrections for Redispatching Services

Upwards and downwards

- The corrections impact both the Active and the Passive Volume, and take place on a Delivery Point level
- Elia distinguishes:
  - Upwards RD, which are noted as $V_{up,RD,i}$
  - Downwards RD, which are noted as $V_{down,RD,i}$
- The correction for the Active Volume is equal to

$$\sum_{i=1}^{n_{DP}} (V_{down,RD,i}\,(t) - V_{up,RD,i}(t))$$

The unit reduced its capacity at the request of Elia. Normally, this capacity would have been running (i.e. would have reacted to the price signal), so it needs to count towards the Active volume

- The correction for the Passive volume is equal to

$$\sum_{i=1}^{n_{DP}} (V_{up,RD,i}(t) - V_{down,RD,i}(t))$$

The unit increased its capacity at the request of Elia. Normally, this capacity would not have been running (i.e. would not have reacted to the price signal), so it needs to count towards the Passive volume

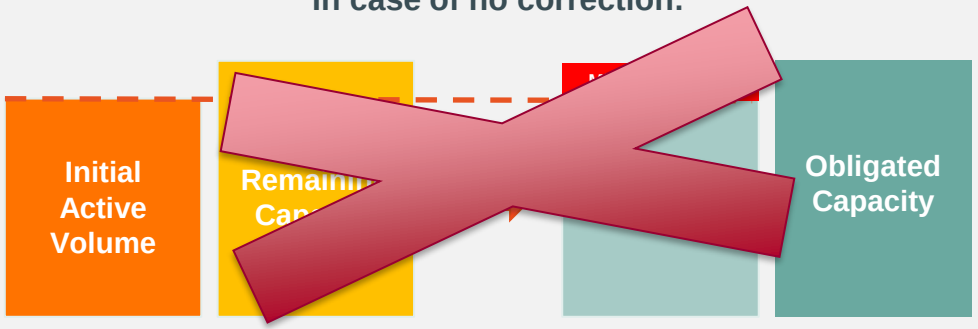
Example – corrections for downwards RD

Battery

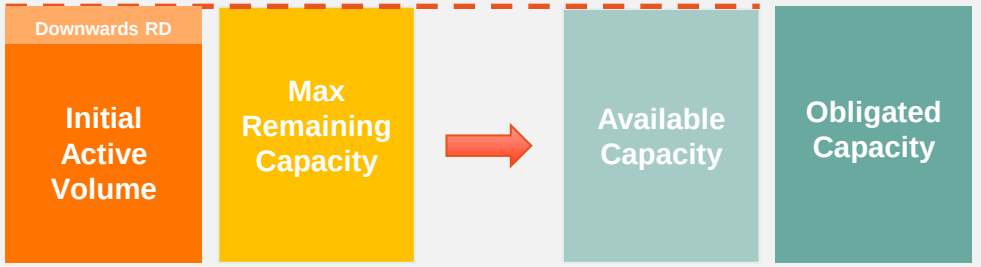
- **NRP**: 10MW
- **Max Remaining Capacity**: 10MW
- **Obligated Capacity**: 10MW
- **Initial Active Volume**: 7MW
- **Downwards RD**: 3MW

Method 2: $P_{Available}(CMU,t) = MIN(P_{Max,Remaining}(CMU,t); V_{Act}(CMU,t))$

In case of no correction:



With correction:



Example – corrections for upwards RD

Battery

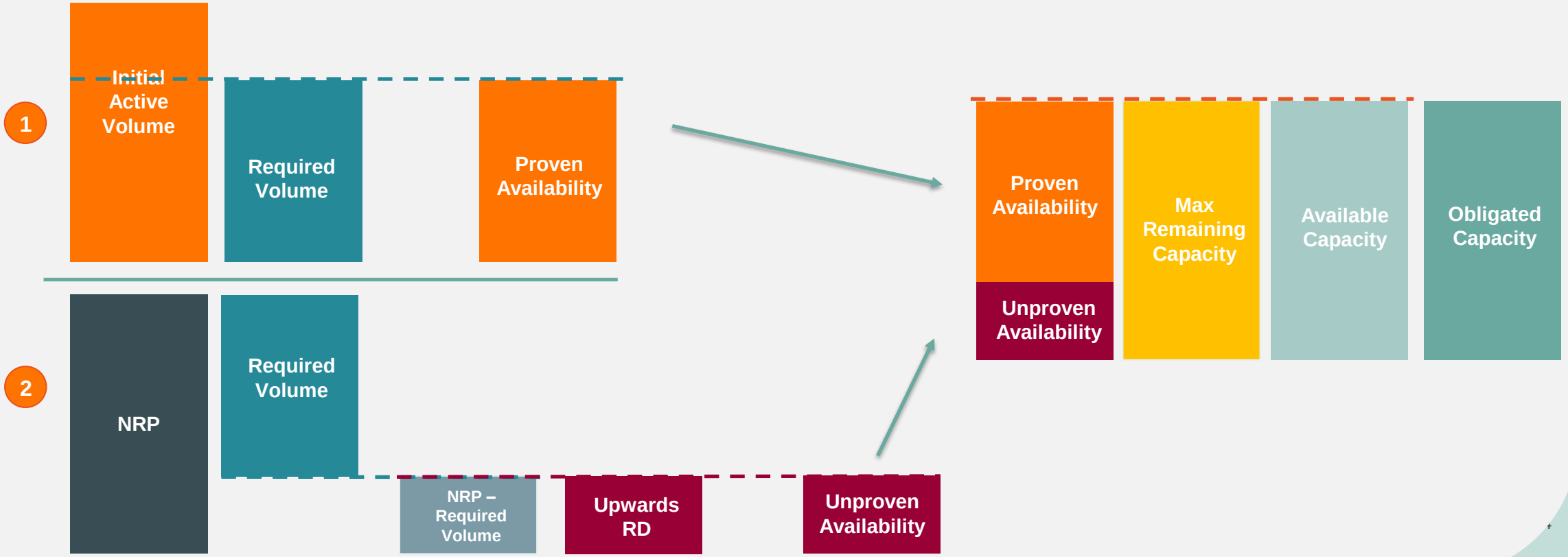
- **NRP**: 10MW
- **Max Remaining Capacity**: 10MW
- **Required Volume**: 7MW
- **Obligated Capacity**: 10MW
- **Initial Active Volume**: 10MW
- **Initial Passive Volume**: 0MW
- **Upwards RD**: 3MW

Method 3:

$$MIN[P_{Max,Remaining}(CMU,t);\ MIN\left(V_{Act}(CMU,t);V_{req}(CMU,t)\right)+MIN\left(V_{pas}(CMU,t);NRP(CMU,t)-V_{req}(CMU,t)\right)]$$

measurements | Declared Prices → Proven Availability

measurements | Declared Prices → Unproven Availability



Methodology for baselining

Offtake points

- Elia calculates a baseline consumption for offtake points for every AMT Hour based on past consumption
- For an AMT Moment on day A The determination of the baseline follows a step-wise process:
    1. Selection of representative days → days of the same 'category' as day A: weekday, weekend day, public holiday..
        - The amount of representative days depends on the type of day of A
        - The Capacity can request to exclude certain days due to e.g. strike, Announced Unavailabilities, …
    2. Selection of reference days from among the representative days
        - The amount of reference days depends on the type of day A
        - Selection happens on the highest average power during the
    3. Determination of quarter-hourly baseline
    4. Determination of hourly baseline

Category of day A	# Reference days	# Representative days
Working day	4	5
Weekend day/bank holiday	2	3
Mondays (only upon request of Capacity Provider)	2	3

Example – Baseline determination

DSM

- AMT Moment spanning 2 hours on a Tuesday 07/04/2026: 17:00 – 19:00

	Mon 30/03	Tue 31/03	Wed 01/04	Thu 02/04	Fri 03/04	Sat 04/04	Sun 05/04	Mon 06/04 (Easter Monday)	Quarter-hourly baseline
…									
17:00	2	3	2	3	1	1	0,5	0,5	2,33
17:15	2	2	3	4	1	1	0,5	0,5	3,33
17:30	3	3	4	2	2	1	0,5	0,5	3,33
17:45	4	3	3	1	2	0,5	0,5	0,5	3,33
18:00	4	3	3	2	2	0,5	0,5	1	3
18:15	3	4	2	3	2	0,5	0,5	1	3,66
18:30	4	3	4	3	1	0,5	0,5	1	3,66
18:45	3	5	3	2	2	0,5	0,5	2	3,125
…									
Avg	3,125	3,25	3	2,5	1,625				

- Selection of 5 representative days
- Selection of 3 reference days based on highest average net offtake during the corresponding period
- Determination of quarter-hourly baseline

The determination of both the Obligated Capacity and the Available Capacity depends on the type of CMU

- Obligated Capacity
  - Non-energy Constrained: derated Contracted Capacity
  - Energy Constrained CMU: non-derated Contracted Capacity, but limited to SLA
- Available Capacity
  - Daily Schedule: based on Availability Plan and Daily Schedule
  - Non-daily Schedule CMU: based on Declared Prices

	Daily Schedule	Non-daily Schedule
Non-energy Constrained	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** derated, no SLA MTUs **Available Capacity** Declared Prices
Energy Constrained	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** from the schedule	**Obligated Capacity** non-derated, SLA MTUs **Available Capacity** Declared Prices

Purpose of Today's session

Right to remuneration

Financial Security Obligation

Availability Obligation

Availability Monitoring

Availability Testing

Unavailability Penalties

Payback Obligation

Secondary Market

Final notes

Availability Monitoring alone is not enough

- The distinction between Proven and Unproven Availability allows CMUs to be considered as available when their variable costs are not covered
- Hypothetically, a Non-daily Schedule CMU could consistently declare very high prices
  - This results in a Required Volume = 0
  - The CMU then always has high Unproven Capacity
- The Capacity Provider would then receive remuneration without ever proving that he is really available

➢ Need for a complimentary mechanism

Availability Testing is used when Availability cannot be directly monitored

Objective of Availability Tests:

- ✓ Complementary to Availability Monitoring
- ✓ For “Unproven” capacity
- ✓ Capability to react to surprise signal in day-ahead

From Availability Obligation introduction:

“Section 9.5 describes the Availability Tests, as a complementary tool to the Availability Monitoring to verify whether the Capacity Provider has committed to the obligation.”

→ Availability testing is not meant to be “on top of” monitoring, but rather as a **last resort**.

Principles for selection:

- ✓ Low Proven Availability in monitoring
- ✓ Previously failed Availability Tests
- ✓ Missing Capacity in monitoring
- ✓ Poor correlation between (Partial) Declared Prices and measured output in the delivery Point
- ✓ Avoid days with particularly low risk on adequacy

The final selection procedure for testing moments is designed to accurately measure availability, but is not disclosed publically to ensure market parties cannot specifically prepare for them

Principles of Availability Testing

- A Capacity Provider is notified on day D-1 that he is selected
- During day D, the Capacity Provider can choose freely within 24 hours to provide the Obligated Capacity for the duration of the test:
  - One quarter hour
  - Full SLA in case of failed previous test
- The **Obligated Capacity** is equal to

$$MIN(NRP(CMU,t) - P_{Unavailable,Announced}(CMU,t); \frac{Total\ Contracted\ Capacity(CMU,t)}{Derating\ Factor(CMU,t)}$$

- The **Available Capacity** is based on the Measured Power
  - Not based on nominations or Unproven Availability
  - Is still adapted for Ancillary Services and Redispatching

Purpose of Today's session

Right to remuneration

Financial Security Obligation

Availability Obligation

- Availability Monitoring
- Availability Testing

Unavailability Penalties

Payback Obligation

Secondary Market

Final notes

When a CMU fails to cover its Obligated Capacity, Missing Capacity is detected

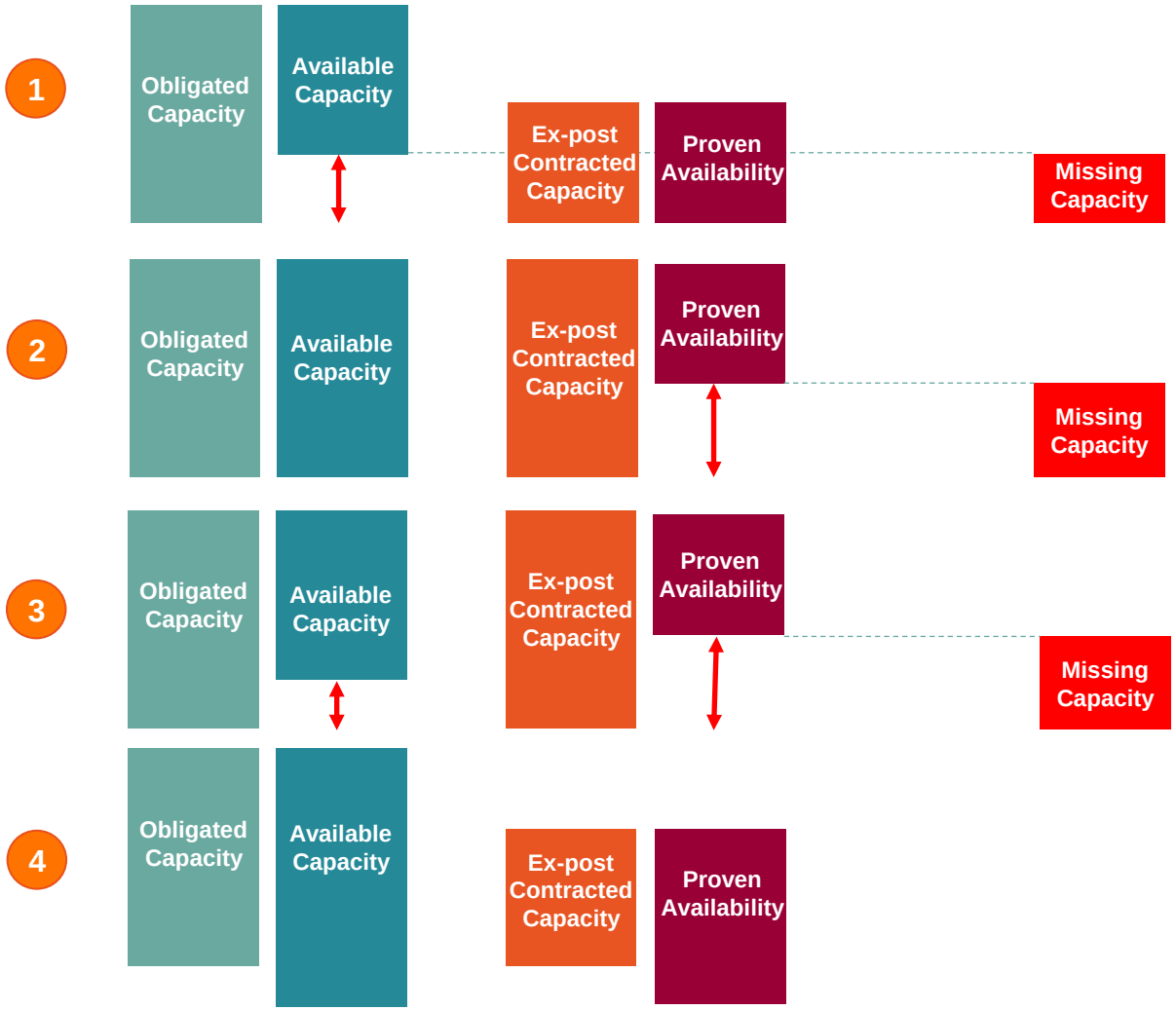
Missing Capacity can be found in two ways:

- Not enough **Available Capacity** to cover the **Obligated Capacity**: $Max(P_{obligated} - P_{Available}; 0)$ 1
- Not enough **Proven Availability** to cover the **ex-post Contracted Capacity**: $Max(Contracted\ Capacity_{ex-post} - P_{Proven}; 0)$ 2

This is combined in the general formula for Missing Capacity:

$$Missing\ Capacity = Max(\underbrace{P_{Obligated} - P_{Available}}_{1}; \underbrace{Contracted\ Capacity_{ex-post} - P_{proven}}_{2}; 0)$$

Missing Capacity
practical examples



Obligated Capacity is not covered by Available Capacity; Ex-post Contracted Capacity is covered by Proven Availability

- The difference between $P_{Obligated}$ and $P_{Available}$ sets the Missing Capacity

Obligated Capacity is covered by Available Capacity; Ex-post Contracted Capacity is not covered by Proven Availability

- The difference between $CC_{ex-post}$ and P_{Proven} sets the Missing Capacity

Both the Obligated Capacity and the Ex-post Contracted Capacity are not covered by either Available Capacity or Proven Availability

- The maximum between the two sets the Missing Capacity

Both the Obligated Capacity and the Ex-post Contracted Capacity are not covered

- No Missing Capacity ☺

The Missing Capacity can either be Announced or Unannounced

- The classification takes place based on the notifications of Announced Unavailabilities
- Announced Missing Capacity is penalized less severely; as such Capacity Providers have an incentive to accurately notify this
- **Announced Missing Capacity** is the amount of Missing Capacity covered by the Announced Unavailabilities

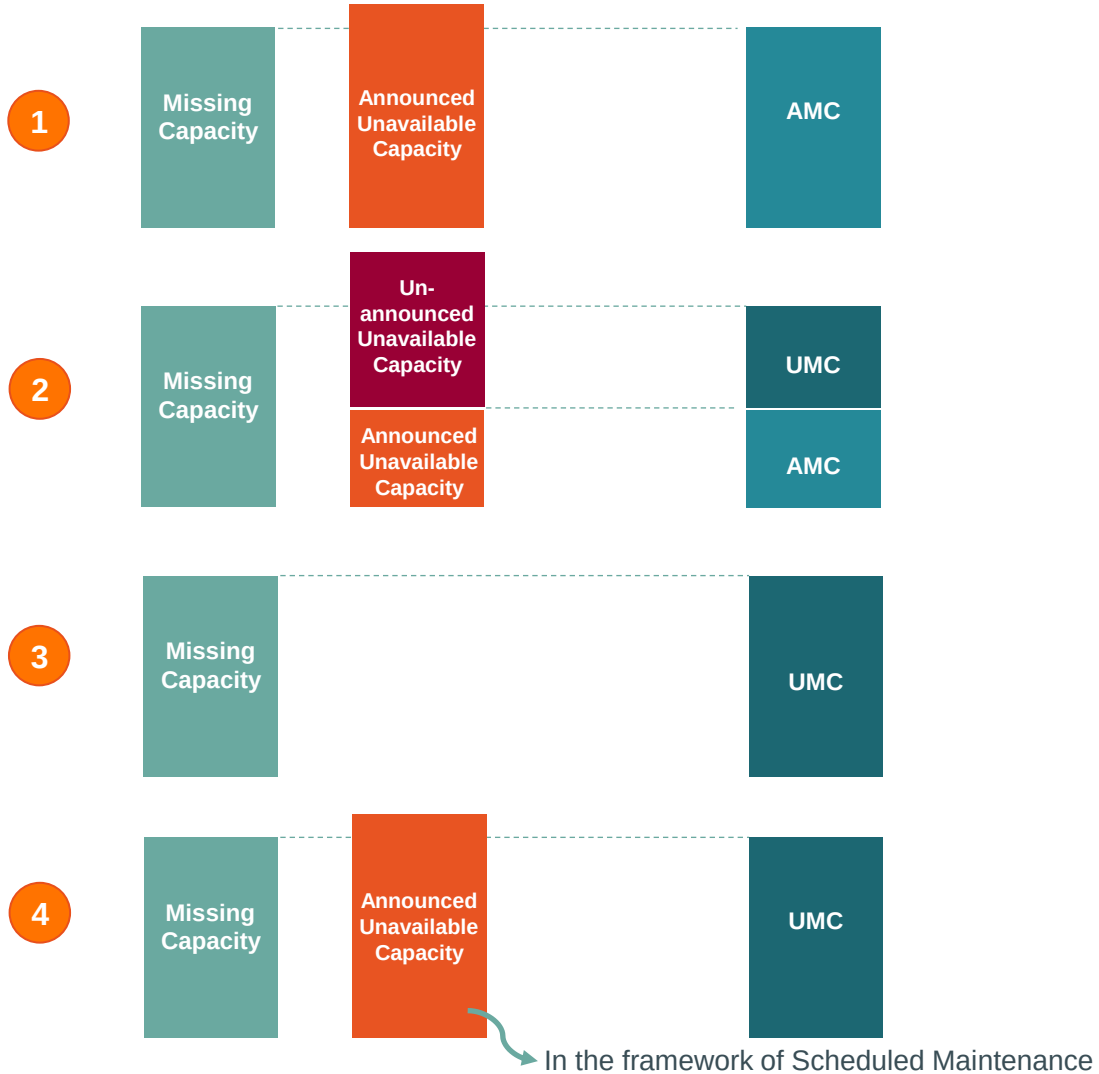
$$AMC = Min\left(P_{Unavailable,Announced}; MC\right)$$

- **Unannounced Missing Capacity** is the remaining proportion of the Missing Capacity

$$UMC = max(MC - AMC)$$

! **Missing Capacity during Scheduled Maintenance is always considered as Unannounced**

AMC and UMC
practical examples



All Missing Capacity is covered by Announced Unavailable Capacity; it is all counted as AMC

Only part of the Missing Capacity is covered by Announced Unavailable Capacity; the remainder is counted as UMC

No declaration of Unavailable Capacity was made; all Missing Capacity counts as UMC

Missing Capacity during Scheduled Maintenance is ALWAYS counted as UMC

Elements of the Unavailability Penalty

- UMC & AMC
- Penalty Factor X
- Weighted contract value
- The MTUs part of the AMT Moment where the penalty is calculated for

Penalty Factor X

	Winter Period 01/11/20xx – 31/03/20xx	Summer Period 01/04/20xx – 31/10/20xx
Announced Missing Capacity	0,9	0
Unannounced Missing Capacity	1,4	0,5

Weighted contract value

- A CMU's penalty depends on its remuneration. But what happens when a CMU has multiple contracts with different remunerations?

➢ We calculate the volume-weighted average of all contracts:

$$\frac{\sum_N (Capacity\ Remuneration_i * Contracted\ Capacity_i)}{\sum_N Contracted\ Capacity_i}$$

Where:

- N is the number of transactions (Primary or Secondary) with a Transaction Period covering the moment for which the penalty is calculated
- $Capacity\ Remuneration_i$ is the Capacity Remuneration from the Contract for Transaction i
- $Contracted\ Capacity_i$ is the Contracted Capacity from the Contract for Transaction i

Weighted contract value

Example

- A CMU has 2 contracts that cover an MTU t for which a penalty is calculated
  - Transaction 1: 100 MW @ 30 000 €/MW/y
  - Transaction 2: 10 MW @ 10 000 €/MW/y

➢ Weighted contract value is calculated as

$$\frac{(100 * 30\,000) + (10 * 10\,000)}{(100 + 10)} = 28\,180$$

The Unavailability Penalty formula

3

$$\frac{1}{Q * UP}\left[\sum_{t \in T}(1+X) * weighted\ contract\ value_t * UMC_t + \sum_{t=1}^{T}(1+X) * weighted\ contract\ value_t * AMC_t\right]$$

1 2

1. UP is a fixed value, always equal to 15
2. Q is the amount of MTUs of the AMT Moment for which a penalty is calculated
3. T is the set of MTUs of the AMT Moment for which a penalty is calculated

Example – Unavailability Penalty $\frac{1}{Q * UP}[\sum_{t \in T}(1+X) * weighted\ contract\ value_t * UMC_t + \sum_{t=1}^{T}(1+X) * weighted\ contract\ value_t * AMC_t]$

Practical example 1

- Weighted contract value = 28 180 €/MW
- AMT Moment took place during winter
- AMT Moment spanning 2 MTUs with the following Missing Capacities:

	MTU 1	MTU 2
AMC	20	30
UMC	0	0

➢ Unavailability Penalty is calculated as

$$\frac{1}{2 * 15}[(1+0{,}9) * 28\,180 * 20 + (1+0{,}9) * 28\,180 * 30 + 0 + 0] = 74\,037\ €$$

Example – Unavailability Penalty

$$\frac{1}{Q * UP}[\sum_{t \in T}(1+X) * weighted\ contract\ value_t * UMC_t + \sum_{t=1}^{T}(1+X) * weighted\ contract\ value_t * AMC_t]$$

Practical example 2

- Weighted contract value = 28 180 €/MW
- AMT Moment took place during summer
- AMT Moment spanning 3 MTUs with the following Missing Capacities:

	MTU 1	MTU 2	MTU 3
AMC	20	0	0
UMC	0	0	50

➢ Unavailability Penalty is calculated as

$$\frac{1}{3 * 15}[(1+0) * 28\,180 * 20 + 0 + 0 + 0 + 0 + (1+0{,}5) * 28\,180 * 50]$$
$$= 46\,157\ €$$

Penalty Cap

- Yearly cap:
  - The total amount of applied Unavailability Penalties over one Delivery Year cannot exceed the total amount of Capacity remuneration received by the CMU over the entire Delivery Year
- Monthly cap:
  - The total amount of applied Unavailability Penalties over one month cannot exceed 20% of the total amount of Capacity Remuneration received by the CMU over the entire Delivery Year

- **This only applies to Transactions on the Primary Market**

Notification of the Unavailability Penalties

- The Capacity Provider receives a monthly activity report that includes information on the CMU's performance during AMT Moments and Availability Tests

1. AMT Moments and/or Availability Tests take place during a certain month M
2. The measuring data is validated, which can take until the end of month $M + 1$
3. The Activity report is sent at the 15th of month $M + 2$

Escalation procedure

- In case of repeated determinations of Missing Capacity, the CMU will incur a downwards revision of its Monthly Remuneration
- This happens when **Missing Capacity** has been determined **on three separate occasions** throughout the same Delivery Period
    - The Missing Capacity **must exceed 20%** of the Obligated Capacity
- Despite its lower remuneration, the CMU is still subject to the same Availability Obligation (i.e. Obligated Capacity does not change)
- The downwards revision is equal to the maximum ratio of the three concerned Missing Capacities and the Obligated Capacities
- The Capacity Provider can **reinstate** the original Monthly Remuneration by successfully providing its Obligated Capacity **on 3 consecutive occasions**

Example – Downwards revision

CCGT

- **Original Remuneration**: 30,000€/MW
- **Obligated Capacity**: 500MW
- **3 occasions with MC**:

	Occasion 1	Occasion 2	Occasion 3
MC	100	150	125

- **Downwards revision**:

$$MAX\left(\frac{100}{500};\frac{150}{500};\frac{125}{500}\right) = 0,3$$

- **Revised Remuneration**: (1 – 0,3) * 30,000 = 21,000

Purpose of Today's session

Right to remuneration

Financial Security Obligation

Availability Obligation

- Availability monitoring
- Availability Testing
- Unavailability Penalties

Payback Obligation

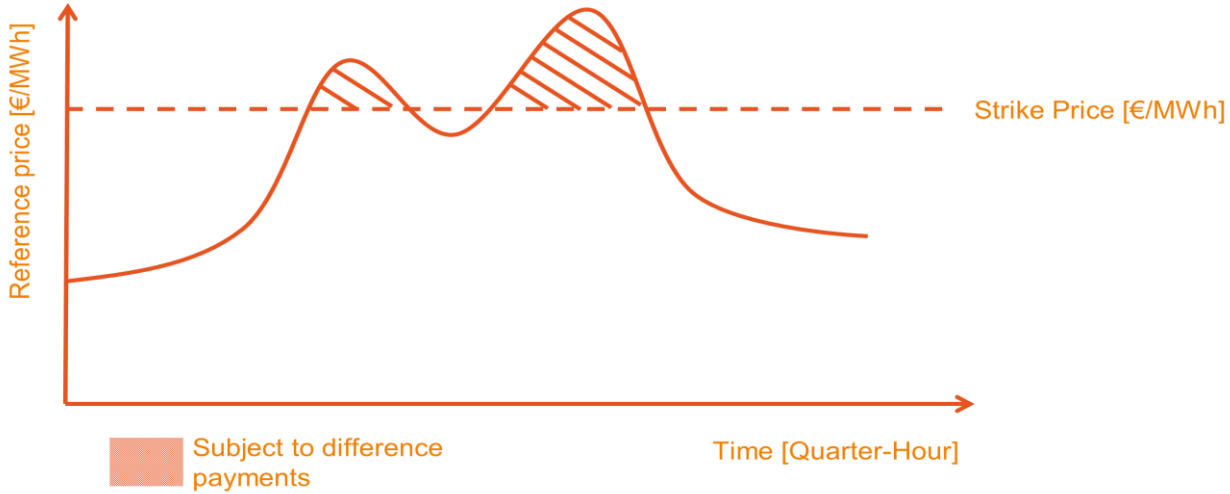
Secondary Market

Final notes

Payback Obligation : context & goal

Remunerations have to be paid back if energy reference prices exceed the strike price, to avoid double remunerations.

In a mechanism with a reliability option, the capacity provider receives a capacity remuneration but is obliged to payback money to society whenever the reference energy spot price (e.g. day-ahead price) exceeds a pre-defined strike price.



Such approach has two advantages for society:

- **Avoiding windfall profits**: as the capacity provider already receives a capacity remuneration on top of its 'normal' energy market revenues (which should cover all its fixed costs), extreme energy prices would provide him with an extra, double remuneration. This would constitute a windfall profit.
- **Strengthening incentive to deliver on SoS-obligations**: as capacity providers are obliged to payback when the energy price exceeds the strike price and those moments are strongly correlated with moment of (near-)scarcity, there is an extra incentive for capacity providers to be available for the system at such moments.

Reference price

- The Payback Obligation is composed of several parameters :
  - **The reference price** : "*the price reflecting the price that should be obtained by the Capacity Providers on the market*" - Day-ahead market.
    - It is applicable per CMU and must be observed on a NEMO active in Belgium (or NEMO active in an adjacent country for an Indirect Foreign Capacity) for each hour t of the Delivery Period.
    - The NEMO must be selected before the start of the Transaction Period (cf. chapter Pre-delivery Control).
    - It is expressed in €/MWh.
  - Some background on the choice of DA market for the reference price :
    - Reference price is meant to provide the most relevant energy market price signal (€/MWh) of the overall Belgian energy market revenue capturing **relevant moments for adequacy**, while sufficiently distinguishing with moments that are not relevant for adequacy.
    - It is also a **liquid** & **technology neutral** market.

Strike price & stop-loss

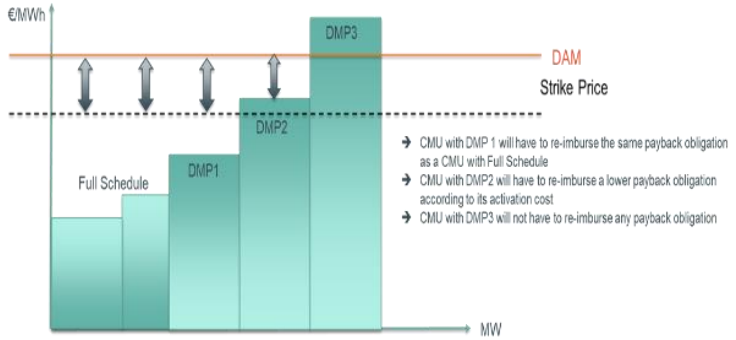
- **The strike price** : "*the price reflecting the price that should be obtained by the Capacity Providers on the market*".
  - It is expressed in €/MWh as well.
  - It is applicable to the entire CMU on a **transaction basis**.
  - The strike price applicable to a Transaction remains applicable & linked to this Transaction **in case of exchange on the Secondary Market**.
- The strike price is calibrated at a certain level for each CRM auction based on a methodology laid down in a Royal Decree.
  - A strike price is likely to be different for capacities contracted via the Y-4 & Y-1 auction related to the same Delivery Period.
- A dynamic monthly actualization of the strike price is foreseen during the Delivery Period to cope with price dynamics observed on the DA market.

- **The stop loss** : the limit foreseen capping the (potential) amount to be paid back by a Capacity Provider during a full Delivery Period.
  - It is fixed on a yearly basis just before the start of the Delivery Period.
  - It includes all primary transactions and secondary transaction lasting for **at least a full Delivery Period**.

Zoom on the strike price

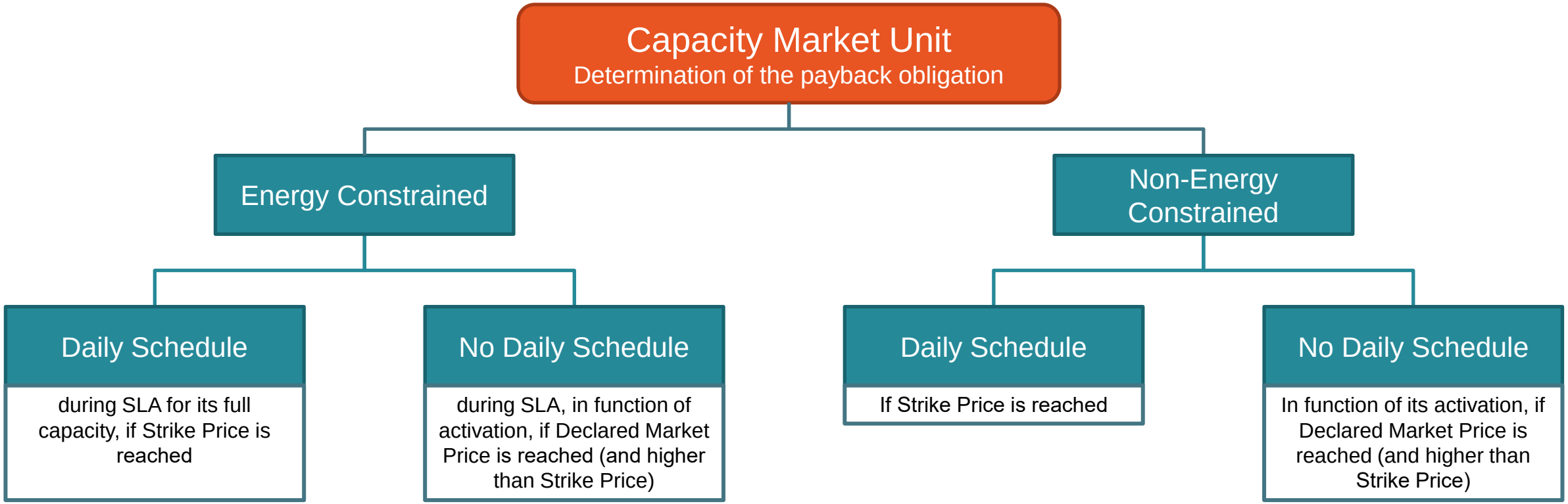
History & choices from the past

- The first CRM design proposals regarding the Payback Obligation aimed at keeping the CRM as a **technology neutral** mechanism with **limited overall costs** and **avoiding windfall profits.** After lengthy discussions, the idea of a **single** strike price was retained :
  - It ensured a certain level playing field between CRM participants.
  - It avoided the complexity of multiple strike prices.
- It was also decided not to consider a payback exemption linked to an individual market actor's choice/ behavior (e.g. hedging).
- However, the concept of a single strike price was complemented with its possible substitution by a **Declared Market Price (DMP) for units without a daily schedule:**
  - ➢ The underlying idea behind such DMP was to avoid that such units would not have to payback at the level of the calibrated strike price if it did not cover their high activation costs.



- An indexation mechanism looking at the evolution of DA prices between the auction and the second delivery period was foreseen for multi-year contracts only according to the Royal Decree Methodology.
  - Following a **repeated feedback** from market parties on the Payback Obligation and given the market conditions from 2022, Elia understood the need to reconsider some design aspects of the Payback Obligation (indexation & DSM exemption)

The application of the payback obligation differs per type of CMU



Important notes:

1. The strike price is determined during the calibration of the auctions, but is actualized based on the average monthly price of the DA market
2. For DSM, an exemption to the payback obligation is under discussion

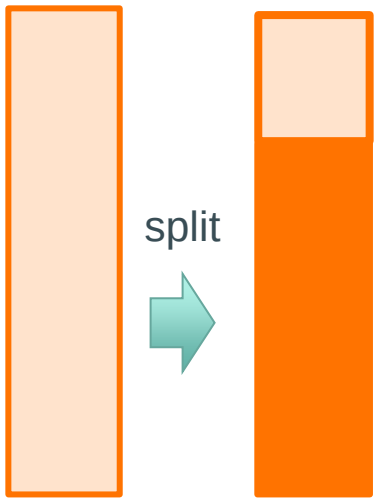
The previous mechanism has been adapted in order to become more dynamic

- Elia has worked out on an updated mechanism for the actualization of the strike price:
  - A **monthly ex-post actualization** of the strike price based on **monthly DA prices** (i.e. strike price of September is set by DA prices of September). This actualization would apply from the first delivery year.
  - This actualization mechanism applies to single & multi-years contracts.
  - It consists in adding a variable component following the DA evolution to a fixed component on which the strike price was initially calibrated.

At the time of the auction

$$Fixed\ component = calibrated\ strike\ price - average\ DA\ prices\ for\ the\ calibration\ period*$$

Strike price set as auction parameter (eg. 300€/MWh)



split

Av. DA market price observed for the same period as the one used for the calibration of the strike price (winter months, weekdays, peak hours)

Fixed component = calibrated strike price – Av. DA price of the period used for the calibration (winter months, weekdays, peak hours)

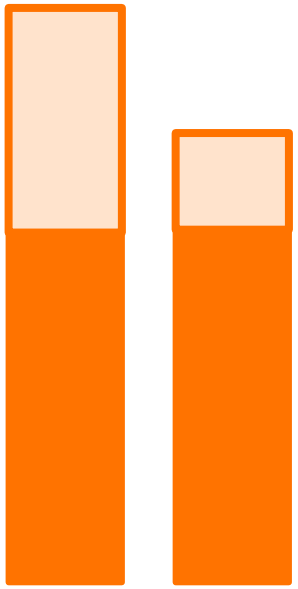
During delivery

$$Actualized\ Strike\ Price = (Fixed\ component + average\ DA\ price\ for\ month\ m)$$

Variable component : Av. DA price for each delivery month (all year)

+

Fixed component



Payback Obligation : parameters

Availability ratio

- The amount to be paid back depends on the expected (un)availability of the CMU in the market.
- This is taken into account in the calculation of the Payback Obligation by the **Availability Ratio.**
  - The Availability Ratio reflects the (un)availability of the CMU using the **Remaining Maximum Capacity**

- It varies in function of the type of the CMU and is associated to the concept of $\boldsymbol{P\ equivalent\ (CMU, t)}$.
  - $\boldsymbol{P\ equivalent\ (CMU, t)}$ is to be determined next to the concept of Obligated Capacity because theoretically a moment where **there is a Payback Obligation which is not an AMT Moment** can occur.
  - The concept of Obligated Capacity (linked to an AMT Moment & to a SLA MTU) would **not apply** in such moment and we would be unable to calculate the Availability Ratio applicable for the Payback Obligation.

    - For a non-energy constrained CMU : $P\ equivalent\ (CMU, t) = Total\ Contracted\ Capacity\ (CMU_{id}, t)$

    - For an energy constrained CMU :

$$P\ equivalent\ (CMU, t) = \frac{Total\ Contracted\ Capacity\ _{ex-ante}(CMU_{id}, t)}{Derating\ Factor\ (CMU, t)} + Total\ Contracted\ Capacity\ _{ex-post}(CMU_{id}, t)$$

Availability ratio – zoom on the way to determine the relevant capacity for an energy constrained CMU

- For an energy constrained CMU : When ?

$$P\ equivalent\ (CMU,t) = \frac{Total\ Contracted\ Capacity\ _{ex-ante}(CMU_{id},t)}{Derating\ Factor\ (CMU,t)} + Total\ Contracted\ Capacity\ _{ex-post}(CMU_{id},t)$$

- To assess availability, we must look whether the CMU has a Daily Schedule or not :
  - For a CMU with Daily Schedule : the MTUs for which the availability is looked at for Payback moments are either :
    - SLA MTU(s) or;
    - Non-SLA MTUs with the **highest Measured Power** forming with SLA MTU(s) a **continuous block** in a day depending whether the amount of MTU(s) of the CMU's SLA was reached.
  - For a CMU without Daily Schedule : the MTUs for which the availability is looked at for Payback are either :
    - SLA MTU(s) or;
    - Non-SLA MTU(s) with the **highest Active Volume** forming with SLA MTU(s) a **continuous block** in a day depending whether the amount of MTU(s) of the CMU's SLA was reached.

Availability ratio – zoom on the way to determine the relevant capacity

- For an energy constrained CMU : When ?

$$P\ equivalent\ (CMU,t) = \frac{Total\ Contracted\ Capacity\ _{ex-ante}(CMU_{id},t)}{Derating\ Factor\ (CMU,t)} + Total\ Contracted\ Capacity\ _{\boldsymbol{ex-post}}(CMU_{id},t)$$

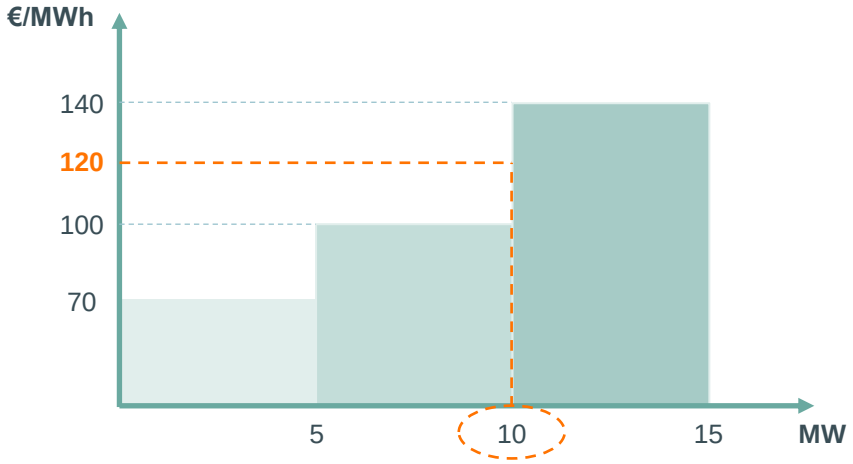
  - For a CMU with Daily Schedule : the MTUs for which the availability is looked at for Payback are either :
    - Non-SLA MTU(s) or;
    - Non-SLA MTU(s) with the **highest Measured Power** forming with SLA MTU(s) a **continuous block** in a day depending whether the amount of MTUs of the CMU's SLA was reached.

  - For a CMU without Daily Schedule : the MTUs for which the availability is looked at for Payback are either :
    - Non-SLA MTU(s) or;
    - Non-SLA MTU(s) with the **highest Active Volume** forming with SLA MTU(s) a **continuous block** in a day depending whether the amount of MTUs of the CMU's SLA was reached.

$$\boldsymbol{Availability\ ratio\ (CMU_{id},t) = \frac{Min\ (P\ equivalent\ (CMU_{id},t)\ ;\ Max.\ Remaining\ Capacity\ \ DA\ (CMU_{id},t))}{P\ equivalent\ (CMU_{id},t)}}$$

Activation ratio – a new component joined the Payback gang

- Partial Declared Prices can be used if a CMU is partially activated in response to market prices
- In case of a partial activation, a CMU only managed to capture windfall profits with a part of its capacity
- The Payback Obligation must be adapted accordingly



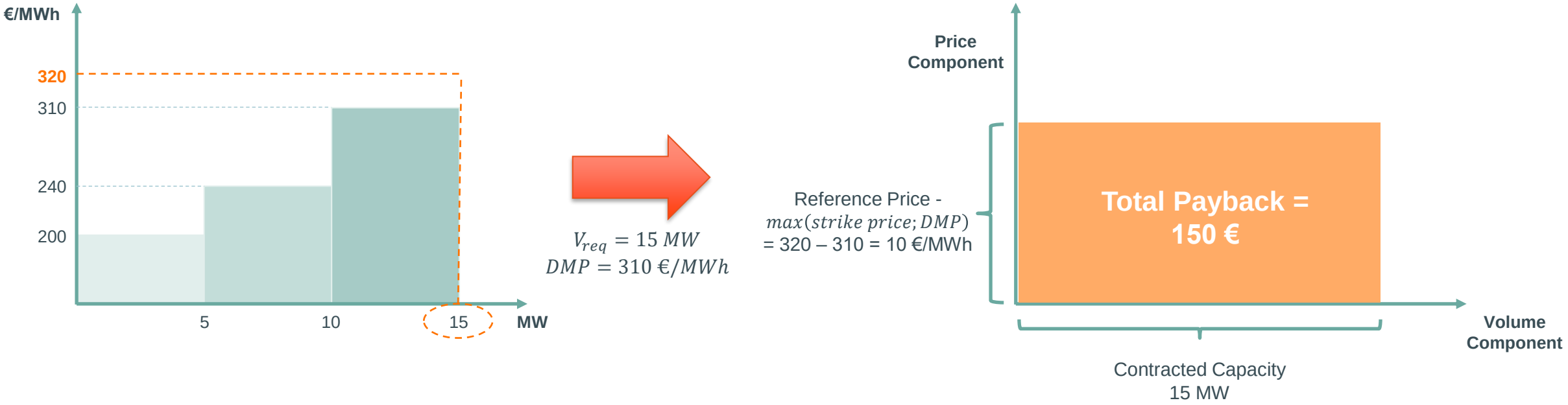
partial Declared Price	Associated Volume
70	5
100	**10**
140	15

The highest price that is surpassed sets the Associated Volume that is expected to be delivered, which is called the **Required Volume** V_{Req}

The price associated to this Required Volume is the **Declared Market Price** DMP

Case 1: full activation – fictive (simplified) example

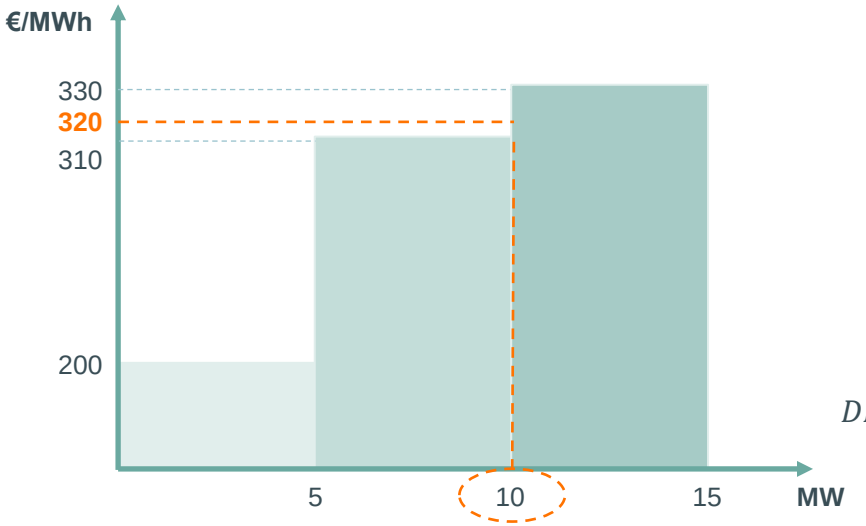
Consider a Non-daily Schedule CMU with a Contracted Capacity of 15 MW. The Strike Price equals 300 €/MWh. The CMU has submitted its (partial) Declared Prices during a Payback Event, resulting in the following result:



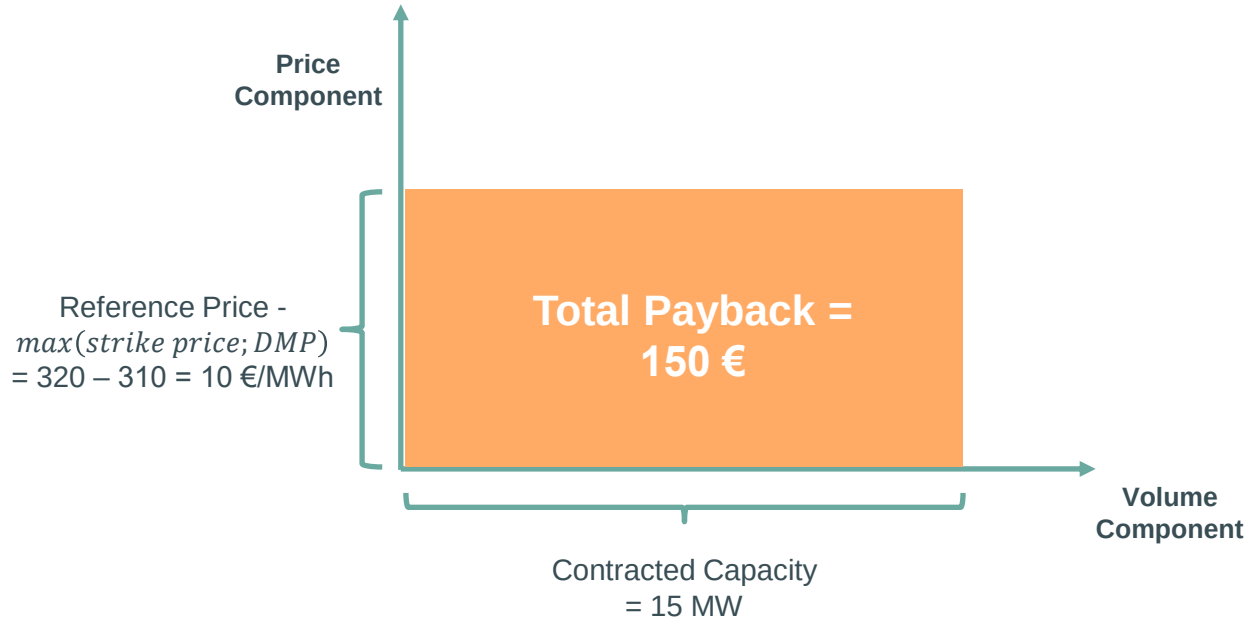
All prices are hypothetical

Case 2: partial activation – fictive (simplified) example

Consider a Non-daily Schedule CMU with a Contracted Capacity of 15 MW. The Strike Price equals 300 €/MWh. The CMU has submitted its (partial) Declared Prices during a Payback Event, resulting in the following result:



$V_{req} = 10\ MW$
$DMP = 310\ €/MWh$



The Payback remains at 150 €, even though we know that not all the contracted capacity actually captured these high revenues

All prices are hypothetical

Activation ratio – a new component joined the Payback gang

- The (partial) Activation of a Non-Daily Schedule CMU is now accounted for thanks to the Activation Ratio in the determination of the Payback Obligation.

- For a Daily Schedule CMU, the Activation Ratio is equal to 1 and does not differentiate for partial activation. This is explained by 2 main reasons:
  1. The strike price is initially calibrated by taking into account variable costs of daily schedule technologies meaning that such costs should be covered (cf. Royal Decree Methodology).
  2. The strike price applicable to Daily Schedule units will be actualized dynamically on a monthly basis to reflect the evolution of energy market prices and should cover to some extent price spikes.

- For a CMU without Daily Schedule, the Activation Ratio is determined by looking at the following:

$$\boldsymbol{Activation\ ratio\ (CMU_{id}, t) = \frac{Min\ (P\ equivalent\ (CMU_{id}, t);\ Required\ Volume\ (CMU_{id}, t))}{P\ equivalent\ (CMU_{id}, t)}}$$

Payback Obligation : modalities in function of the CMU's type

- The Payback Obligation is thus determined in function of the applicable price and of the type of CMU:
  - For a non-energy constrained CMU :

$$Payback\ Obligation\ (CMU_{id}, Transaction_{id}, t) = (Reference\ Price(CMU_{id}, t) - Strike\ Price(CMU_{id}, Transaction_{id}, t)) * Contracted\ Capacity\ (CMU_{id}, Transaction_{id}, t) * Min(Availability\ Ratio\ (CMU_{id}, t); Activation\ Ratio\ (CMU_{id}, t)$$

  - For an energy constrained CMU :

-> Ex –ante transaction :

$$Payback\ Obligation\ (CMU_{id}, Transaction_{id}, t) = \left(Reference\ Price(CMU_{id}, t) - Strike\ Price(CMU_{id}, Transaction_{id}, t)\right) * \frac{Contracted\ Capacity\ (CMU_{id}, Transaction_{id}, t)}{Derating\ Factor\ (Transaction_{id})} * \frac{\boldsymbol{Nominal\ Reference\ Power\ (CMU_{id}, Transaction_{id}, t) - \sum_{i=1n}\ Nominal\ Reference\ Power\ DSM\ DP_i(CMU_{id}, Transaction_{id}, t)}}{\boldsymbol{Nominal\ Reference\ Power\ (CMU_{id}, Transaction_{id}, t)}} * Min(Availability\ Ratio\ (CMU_{id}, t); Availability\ Ratio\ (CMU_{id}, t)$$

- As raised before, an **exemption of Payback Obligation is under discussion for DSM** : in practice, it would mean that **all pure offtake Delivery Points** would be exempted from such obligation/calculation.
  - Remaining technologies from an aggregated CMU would still have to payback

Payback Obligation : modalities in function of the CMU's type

- The Payback Obligation is thus determined in function of the applicable price and of the type of CMU:

  - For an energy constrained CMU:

  -> Ex – post transaction :

$$Payback\ Obligation\ (CMU_{id}, Transaction_{id}, t) = \left(Reference\ Price(CMU_{id}, t)\ - Strike\ Price(CMU_{id}, Transaction_{id}, t)\right) *$$
$$Contracted\ Capacity\ (CMU_{id}\ , Transaction_{id}\ , t) *$$
$$* \frac{\boldsymbol{Nominal\ Reference\ Power\ (CMU_{id}, Transaction_{id}, t) - \sum_{i=1n}\ Nominal\ Reference\ Power\ DSM\ DP_i (CMU_{id}, Transaction_{id}, t)}}{\boldsymbol{Nominal\ Reference\ Power\ (CMU_{id}, Transaction_{id}, t)}} *$$
$$Min(Availability\ Ratio\ (CMU_{id}, t); Availability\ Ratio\ (CMU_{id}, t)$$

- The same principle of exemption for Demand Side applies ex-post as well.

Payback Obligation : stop-loss amount, cumulative & effective Payback Obligation

Calculation & process

- The Stop loss amount is calculated, just before the start of a Delivery Period, per Delivery Period for each CMU's Transaction on :
  - The Primary Market
  - The Secondary Market for ex-ante Transactions covering at least the full Delivery Period concerned.

- It is calculated as follows and can be considered as a snapshot taken before the Delivery Period :

$$StopLoss\ Amount\ (CMU_{id}, Transaction_{id}, Delivery\ Period\ ) = \sum_{t=1}^{w}(Contracted\ Capacity\ \ (CMU_{id}, Transaction_{id}, t) * (\frac{Capacity\ Remuneration\ (CMU_{id}, Transaction_{id}, t)}{w})$$

- The Effective Payback Obligation applicable for a month M during the Delivery Period is calculated as follows :

$$Effective\ Payback\ Obligation\ (CMU_{id}, Transaction_{id}, M) = (\sum_{t=1}^{m} Payback\ Obligation\ (\ CMU_{id}, Transaction_{id}, t)$$

Payback Obligation : stop-loss amount, cumulative & effective Payback Obligation

Calculation & process

- During the Delivery Period, Elia calculates the cumulative Payback Obligation of all previous months including the latest month M linked to the Transaction(s) considered :

$$\text{Cumulative } \textit{Payback Obligation } (\text{CMU}_{\text{id}}, \text{Transaction}_{\text{id}}, \text{M}) = (\sum_{\text{t=1}}^{\text{p}} \textit{Payback Obligation } (\text{CMU}_{\text{id}}, \text{Transaction}_{\text{id}}, t)$$

- Elia checks whether adding the Effective Payback Obligation to the Cumulative Payback Obligation calculated so far leads to a higher value than the Stop Loss Amount :

$$\textit{Effective Payback Obligation } (\text{CMU}_{\text{id}}, \text{Transaction}_{\text{id}}, \text{M}) = \text{Max } (0; \text{Stop Loss Amount } (\text{CMU}_{\text{id}}, \text{Transaction}_{\text{id}}, \text{Delivery Period}) - \sum_{\text{t=1}}^{\text{n}} \textit{Payback Obligation } (\text{CMU}_{\text{id}}, \text{Transaction}_{\text{id}}, t))$$

OCGT

OCGT 100MW

- **Not Energy Constrained**
- **Daily Schedule** (>25 MW)

- **Contracted Capacity:** 93MW
- **Secondary Market Remaining Eligible Volume** (SMREV): 7MW
- **Derating Factor** : 93%

- **Obligated Capacity during AMT-MTUs or tests:** 93 MW as OCGT is Non-Energy Constrained

- **Reference Price (NEMO) :** EPEX Spot
- **Stop loss amount :** 18k€ * 93 MW = 1,67 M€/year

- **CMU with Daily Schedule :** $Strike\ price\ (CMU_{id}, Transaction_{id}, t) = Actualized\ strike\ price\ (CMU_{id}, Transaction_{id}, t)$

- **Non-energy constrained CMU :**
  $\boldsymbol{P}_{\boldsymbol{equivalent}}(\boldsymbol{CMU}, \boldsymbol{t})$ used to calculate the availability ratio =
  $Total\ Contracted\ Capacity\ (CMU_{id}, t)$ = 93MW

- The capacity was contracted for 1 year through the Y-4 auction for the Delivery Period starting in November 2025 with an **initial strike price calibrated at a value of 300 €/MWh**.

  - The calculation of the fixed component gives the following :
    $calibrated\ strike\ price\ (CMU_{id}, Transaction_{id}, t)$ - *Average DAM (winter months weekdays peak hours as for calibration)*

    $-> 300\ €/MWh - 45\ €/MWh = 245\ €/MWh$

  - Average DA prices of the month November must be added as variable component to calculate the indexed calibrated strike price applicable in December :

    $-> Average\ DAM_{November} = 250\ €/MWh$

Indexed calibrated strike price in November : 495 €/MWh

OCGT

OCGT 100MW

- **Not Energy Constrained**
- **Daily Schedule** (>25 MW)
- **Contracted Capacity:** 93MW
- **Secondary Market Remaining Eligible Volume** (SMREV): 7MW
- **Derating Factor:** 93 %
- **Obligated Capacity during AMT-MTUs or tests:** 93 MW as OCGT is Not Energy Constrained
- **Reference Price (NEMO) :** EPEX Spot
- **Stop loss amount :** 18k€ * 93 MW = 1,67 M€/year

Date	MTUs	Actualized Strike Price	AMT Price	DAM-Price (EPEX Spot)
10/11/25	**08:00**	495 €/MWh	triggered	**600 €/MWh**
10/11/25	**08:15**	495 €/MWh	triggered	**550 €/MWh**
10/11/25	**08:30**	495 €/MWh	triggered	**500 €/MWh**
10/11/25	08:45	495 €/MWh	triggered	490 €/MWh
10/11/25	09:00	495 €/MWh	triggered	450 €/MWh
10/11/25	09:15	495 €/MWh	triggered	440 €/MWh
10/11/25	09:30	495 €/MWh	triggered	440 €/MWh
10/11/25	09:45	495 €/MWh	triggered	410 €/MWh
10/11/25	10:00	495 €/MWh	triggered	460 €/MWh
10/11/25	**10:15**	495 €/MWh	triggered	**500 €/MWh**
10/11/25	**10:30**	495 €/MWh	triggered	**550 €/MWh**
10/11/25	**10:45**	495 €/MWh	triggered	**620 €/MWh**

OCGT

OCGT 100MW

- **Not Energy Constrained**
- **Daily Schedule** (>25 MW)
- **Contracted Capacity:** 93MW
- **Secondary Market Remaining Eligible Volume** (SMREV) : 7MW
- **Derating Factor** : 93%
- **Obligated Capacity during AMT-MTUs or tests:** 93 MW as OCGT is Not Energy Constrained
- **Reference Price (NEMO) :** EPEX Spot
- **Stop loss amount :** 18k€ * 93 MW = 1,67 M€/year

- The CMU decided not to buy any capacity on the **Secondary Market** with his SMREV.
- The CMU did communicate an unavailability during the targeted day of 10 MW hence his Availability ratio is calculated accordingly :

$$Availability\ ratio\ (CMU_{id}, t) = \frac{Min\ (\boldsymbol{P\ equivalent}\ (\boldsymbol{CMU_{id}}, \boldsymbol{t})\ ;\ Max.\ Remaining\ Capacity\ \ DA\ (CMU_{id}, t))}{\boldsymbol{P\ equivalent}\ (\boldsymbol{CMU_{id}}, \boldsymbol{t})}$$

MTUs	Min (P equivalent; Max Remaining Capacity)	Availability Ratio
08:00	(93 MW; 83 MW)	89%
08:15	(93 MW; 83 MW)	89%
08:30	(93 MW; 83 MW)	89%
10:00	(93 MW; 83 MW)	89%
10:15	(93 MW; 83 MW)	89%
10:30	(93 MW; 83 MW)	89%

- Activation Ratio = 1 since it is a non-Daily Schedule CMU

OCGT

OCGT 100MW

- **Not Energy Constrained**
- **Daily Schedule** (>25 MW)
- **Contracted Capacity:** 93MW
- **Secondary Market Remaining Eligible Volume** (SMREV) : 7MW
- **Derating Factor** : 93%
- **Obligated Capacity during AMT-hours or tests:** 93 MW as OCGT is Not Energy Constrained
- **Reference Price (NEMO) :** EPEX Spot
- **Stop loss amount :** 18k€ * 93 MW = 1,67 M€/year

- **Payback Obligation determination :**

$$Payback\ Obligation\ (CMU_{id}, Transaction_{id}, t) = (Reference\ Price(CMU_{id}, t) - Strike\ Price(CMU_{id}, Transaction_{id}, t)) * Contracted\ Capacity\ (CMU_{id}, Transaction_{id}, t) * Min(Availability\ Ratio\ (CMU_{id}, t); Activation\ Ratio\ (CMU_{id}, t)$$

MTUs	DAM-Price (EPEX Spot)	Actualized Strike Price	Min (Availability Ratio; Activation Ratio)	Contracted Capacity	Payback Amount
08:00	600 €/MWh	495 €/MWh	89%	93 MW	((600-495)*93*89%)/4 = 8690,85€/4= 2172,71€
08:15	550 €/MWh	495 €/MWh	89%	93 MW	((550-495)*93*89%)/4 = 4552,35€/4= 1138,08€
08:30	500 €/MWh	495 €/MWh	89%	93 MW	((500-495)*93*89%)/4 = 369,35€/4= 92,33€
10:00	500 €/MWh	495 €/MWh	89%	93 MW	((500-495)*93*89%)/4 = 369,35€/4= 92,33€
10:15	550 €/MWh	495 €/MWh	89%	93 MW	((550-495)*93*89%)/4 = 4552,35€/4= 1138,08€
10:30	620 €/MWh	495 €/MWh	89%	93 MW	((620-495)*93*89%)/4 = 10760€/4= 2690,02€

Total amount to be paid back during that day = 7323,55€

OCGT

OCGT 100MW

- **Not Energy Constrained**
- **Daily Schedule** (>25 MW)
- **Contracted Capacity:** 93MW
- **Secondary Market Remaining Eligible Volume** (SMREV) : 7MW
- **Derating Factor** : 93%
- **Obligated Capacity during AMT-MTUs or tests:** 93 MW as OCGT is Not Energy Constrained
- **Reference Price (NEMO) :** EPEX Spot
- **Stop loss amount :** 18k€ * 93 MW = 1,67 M€/year

- Actualized strike price of November calculated against December 15th ‘25 at the latest.
- Stop loss check :
  - Prior to sending the delivery report in (15th day of January ‘26), Elia checks whether the stop-loss amount was already reached during that Delivery Period.
  - The Payback Obligation linked to the Month November does not reach the stop-loss amount of that transaction
    - Assuming there were no other Payback moments in November

$$Effective\ Payback\ Obligation\ (CMU_{id}, Transaction_{id}, November) = (\sum_{t=1}^{m} Payback\ Obligation(\ CMU_{id}, Transaction_{id}, t)$$

The capacity provider has to reimburse the full payback amount calculated for the month of November ’25 : **7323,55€**

Payback Obligation Example Cases

Aggregated CMU

Aggregated CMU 20MW

- **Energy Constrained** (SLA 3h)
  - Derating Factor: 47%
- **No Daily Schedule** (<25 MW)
- **Contracted Capacity:** 9,4MW
- **Obligated Capacity during AMT-MTUs or tests:**
  20 MW during SLA MTUs.
  0 MW outside of SLA MTUs.
- **Reference Price (NEMO) :** Nord Pool Spot
- **Stop loss amount :** 20 k€* 9,4 MW= 188k€/year

Technologies	Nominal Reference Power of each Delivery Point	Ratio Nominal Reference Power of CMU that is not DSM
CHP	10 MW	20 MW – 5 MW / 20 MW = 75%
DSM	5 MW	
BESS	5 MW	

- **<u>CMU without Daily Schedule</u> :** $Strike\ price\ (CMU_{id}, Transaction_{id}, t) = Max\ (DMP;\ Actualized\ strike\ price\ (CMU_{id}, Transaction_{id}, t)$
- Need (potentially) to payback during an amount of hours up to its SLA.
- The capacity was contracted in Y-4 auction for the Delivery Period starting in November 2027 with an **initial strike price calibrated at a value of 417€/MWh**.
  - The calculation of the fixed component gives the following : $calibrated\ strike\ price\ (CMU_{id}, Transaction_{id}, t)$ - *Average DAM (winter months weekdays peak hours calibration)*

    $-> 417\ €/MWh - 114\ €/MWh = 303\ €/MWh$

  - Average DA prices of the month April 2028 must be added as variable component to calculate the actualized strike price applicable in April :

    $-> Average\ DAM_{April} = 140\ €/MWh$

Actualized strike price in April : 443 €/MWh

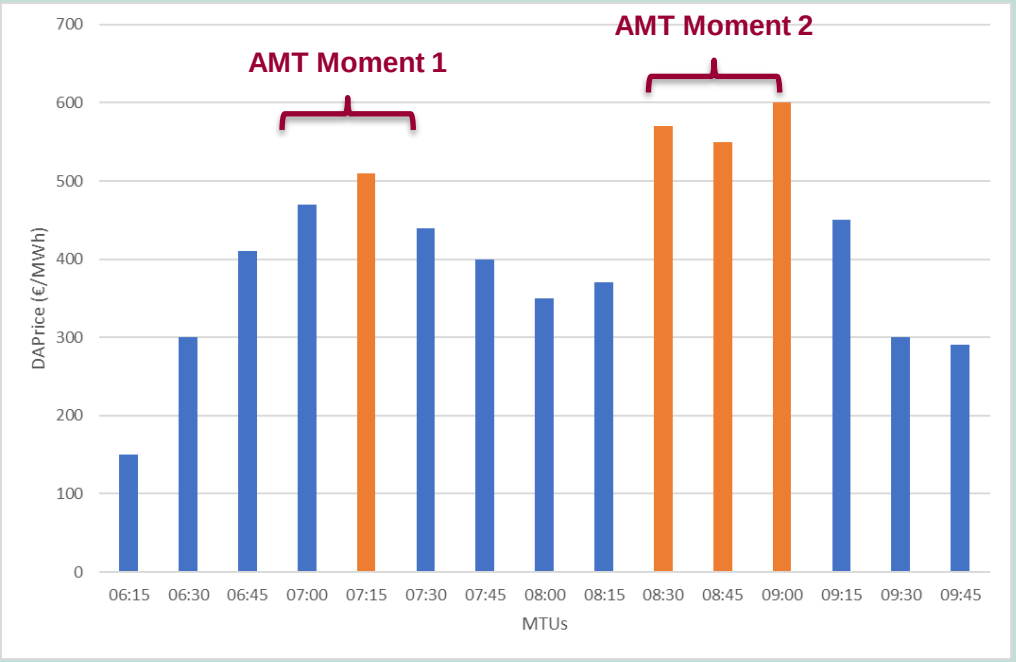
Example: determination of SLA Hours & availability ratio

CMU without Daily Schedule

Energy Constrained / No Daily Schedule

Aggregated CMU

- **NRP**: 20MW / **Contracted Capacity** : 9,4 MW
- **SLA**: 3 hours
- **Derating Factor** : 47%



Date	MTU	AMT Price	DAM Price (Nord Pool Spot - €/MWh)	Actualized Strike Price (€/MWh)
01/04/28	06:15	Triggered	150	443
01/04/28	06:30	Triggered	300	443
01/04/28	06:45	Triggered	410	443
01/04/28	**07:00**	Triggered	**470**	**443**
01/04/28	**07:15**	Triggered	**510**	**443**
01/04/28	07:30	Triggered	440	443
01/04/28	07:45	Triggered	400	443
01/04/28	08:00	Triggered	350	443
01/04/28	08:15	Triggered	370	443
01/04/28	**08:30**	Triggered	**510**	**443**
01/04/28	**08:45**	Triggered	**550**	**443**
01/04/28	**09:00**	Triggered	**600**	**443**
01/04/28	**09:15**	Triggered	**450**	**443**
01/04/28	09:30	Triggered	300	443
01/04/28	09:45	Triggered	290	443

partial Declared Day-Ahead Price* (€/MWh)	Associated Volume (MW)
500	10
550	15
600	20

*Simplified example: a Capacity Provider can provide different Declared Prices per MTU

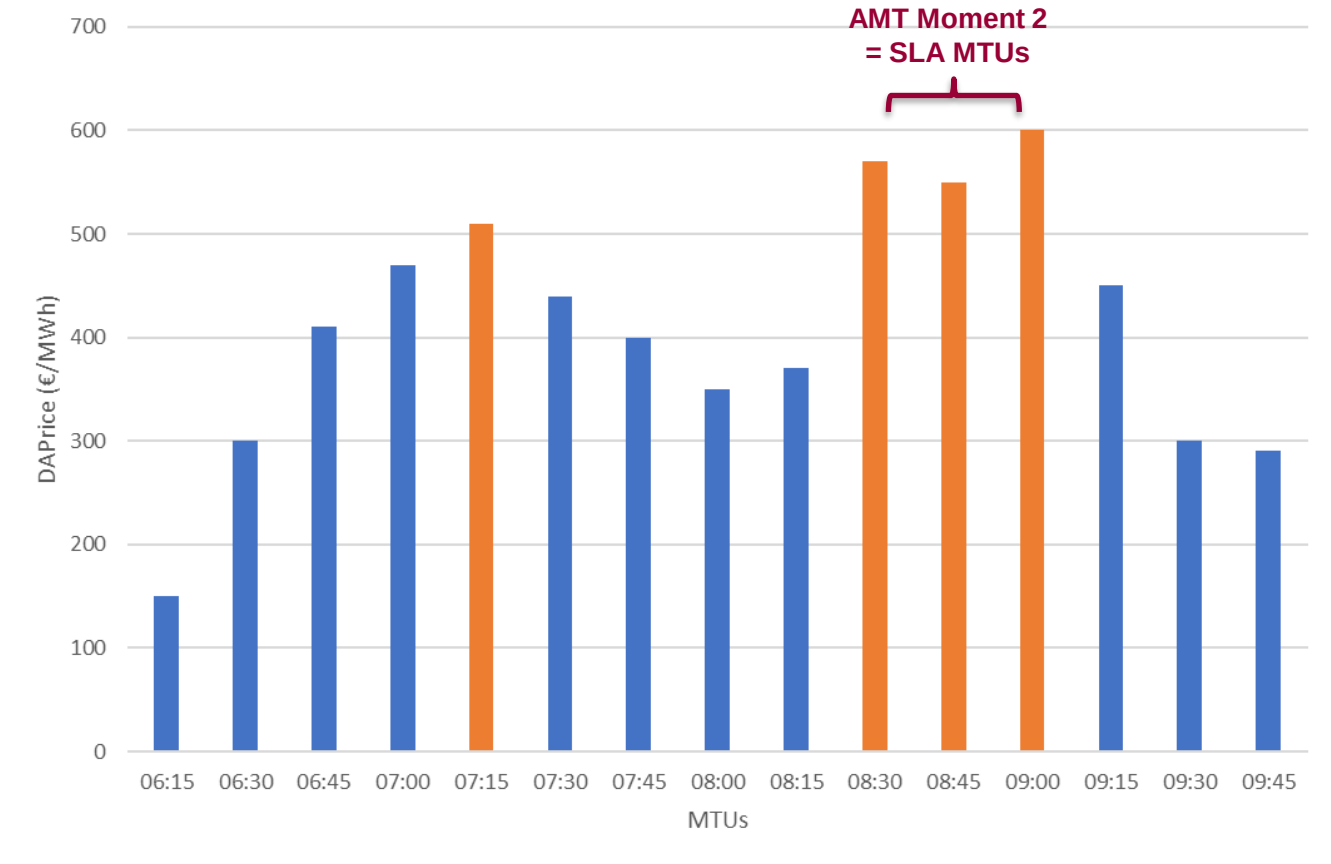
Example: determination of SLA MTUs & availability ratio

CMU without Daily Schedule

Energy Constrained / No Daily Schedule

Aggregated CMU

- **NRP**: 20MW / **Contracted Capacity** : 9,4 MW
- **SLA**: 3 hours
- **Derating Factor** : 47%



- Determination of P equivalent for an energy constrained CMU :

$$P\ equivalent\ (CMU,t) = \frac{Total\ Contracted\ Capacity\ _{ex-ante}(CMU_{id},t)}{Derating\ Factor\ (CMU,t)} + Total\ Contracted\ Capacity\ _{ex-post}(CMU_{id},t)$$

- No Secondary Market transaction registered
- P equivalent during determined SLA MTUs = 9,4 MW / 0,47 = 20 MW

Hour	SLA MTU	DAM Price (Nord Pool Spot	Active Volume	Weighted Active Volume
07:15	NO	**510**	10	10
08:30	YES	**510**	10	**15 (highest Active Volume)**
08:45	YES	**550**	15	
09:00	YES	**600**	20	

Aggregated CMU

Aggregated CMU 20MW

- **Energy Constrained** (SLA 3h)
  - Derating Factor: 47%
- **No Daily Schedule** (<25 MW)
- **Contracted Capacity:** 9,4MW
- **Obligated Capacity during AMT-MTUs or tests:**
  20 MW during SLA MTUs.
  0 MW outside of SLA MTUs.
- **Reference Price (NEMO) :** Nord Pool Spot
- **Stop loss amount :** 20 k€* 9,4 MW= 188k€/year

- CMU did not communicate in due time an unavailability during the targeted day. His Availability ratio is calculated accordingly for all MTUs:

$$Availability\ ratio\ (CMU_{id},t) = \frac{Min\ (P\ equivalent\ (CMU_{id},t)\ ;\ Max.\ Remaining\ Capacity\ \ DA\ (CMU_{id},t))}{P\ equivalent\ (CMU_{id},t)}$$

MTUs	P equivalent	Availability Ratio
08:30	20 MW	100%
08:45	20 MW	100%
09:00	20 MW	100%

- His Activation ratio is calculated accordingly for all MTUs:

$$Activation\ ratio\ (CMU_{id},t) = \frac{Min\ (P\ equivalent\ (CMU_{id},t);\ Required\ Volume\ (CMU_{id},t))}{P\ equivalent\ (CMU_{id},t)}$$

MTUs	P equivalent	Required Volume	Activation Ratio
08:30	20 MW	10 MW	50%
08:45	20 MW	15 MW	75%
09:00	20 MW	20 MW	100%

Aggregated CMU

Energy Constrained / No Daily Schedule

Aggregated CMU 20MW

- **Energy Constrained** (SLA 3h)
  - Derating Factor: 47%
- **No Daily Schedule** (<25 MW)
- **Reference Price (NEMO) :** Nord Pool Spot
- **Contracted Capacity:** 9,4MW

- **Payback Obligation determination :**

$$Payback\ Obligation\ (CMU_{id}, Transaction_{id}, t) = \big(Reference\ Price(CMU_{id}, t) - Strike\ Price(CMU_{id}, Transaction_{id}, t)\big) *$$

$$\frac{Contracted\ Capacity\ (CMU_{id}, Transaction_{id}, t)}{Derating\ Factor\ (Transaction_{id})}$$

$$* \frac{\mathbf{Nominal\ Reference\ Power\ (CMU_{id}, Transaction_{id}, t) - \sum_{i=1n}\ Nominal\ Reference\ Power\ DSM\ DP_i(CMU_{id}, Transaction_{id}, t)}}{\mathbf{Nominal\ Reference\ Power\ (CMU_{id}, Transaction_{id}, t)}} *$$

$$Min(Availability\ Ratio\ (CMU_{id}, t); Availability\ Ratio\ (CMU_{id}, t)$$

MTUs	DAM-Price (Nord Pool Spot)	Actualized Strike Price	Max (DMP; Actualized Strike Price)	Contracted Capacity / Derating Factor	Ratio NRP of the CMU without NRP DSM	Min (Availability Ratio; Activation Ratio)	Payback Amount
08:30	510	443	500 (DMP)	9,4 MW/0,47 = 20 MW	75%	(100%; 50%)	((510-500)*20*75%*50%)/4 =75€/4 =18,75€
08:45	550	443	550 (DMP)	9,4 MW/0,47 = 20 MW	75%	(100%; 75%)	((550-500)*20*75%*75%)/4 =562,5/4= 140,62€
09:00	600	443	600 (DMP)	9,4 MW/0,47 = 20 MW	75%	(100%; 100%)	((600-500)*20*75%*100%)/4 =1500 €/4= 375€

Total amount to be paid back during that day = 534,37€

Aggregated CMU

Aggregated CMU 20MW

- **Energy Constrained** (SLA 3h)
  - Derating Factor: 47%
- **No Daily Schedule** (<25 MW)
- **Contracted Capacity:** 9,4MW
- **Obligated Capacity during AMT-MTUs or tests:**
  20 MW during SLA MTUs.
  0 MW outside of SLA MTUs.
- **Reference Price (NEMO) :** Nord Pool Spot
- **Stop loss amount :** 20 k€* 9,4 MW= 188k€/year

- Actualized strike price of April calculated against May 15th ‘28 at the latest.
- Stop loss check :
  - Prior to sending the delivery report in (15th day of June ‘28), Elia checks whether the stop-loss amount was already reached during that Delivery Period.
  - The Payback Obligation linked to the Month April does not reach the stop-loss amount of that transaction
    - Assuming there were no other Payback moments in April

$$Effective\ Payback\ Obligation\ (CMU_{id}, Transaction_{id}, November) = (\sum_{t=1}^{m} Payback\ Obligation(\ CMU_{id}, Transaction_{id}, t)$$

The capacity provider has to reimburse the full payback amount calculated for the month of April ’28 : **534,37€**

Purpose of Today’s session

Right to remuneration

Financial Security Obligation

Availability Obligation

- Availability monitoring
- Availability Testing
- Unavailability Penalties

Payback Obligation

Secondary Market

Final notes

Refresher on **concept and goal** of Secondary Market

Design modalities of Secondary Market

Secondary Market **Process**
illustrated with **examples**

CMUs can trade “contracted capacities” on the Secondary Market. This allows CMUs to sell their excess capacity or to cover their capacity shortages, thus covering their risks.

The **purpose** of a Secondary Market is:

- To allow Capacity Providers to be able to **transfer** their CMU Contracted Capacities and related rights (capacity remuneration) & obligations (availability & payback obligation to another CMU in order to allow them to **manage their risks** better;
- To contribute to **enhance competition** in the Primary Market (Auction) of all participating technologies ensuring SoS within the CRM;
- To **decrease the risk** of the Auction bidders, and therefore **decrease the overall CRM cost.**

The Secondary Market is **not an exchange platform**:

- Elia is not running an exchange. The CRM IT interface only acts as a platform where market parties have to notify Elia from the transactions they want to make with other parties
- Market parties **find each other and negotiate themselves**. Elia only assists in this process by recurrently **publishing a list** of all prequalified CMUs participating in the CRM.
- The market is **free to develop** an exchange platform or other tools to facilitate Secondary Market trading.

Summary of Design modalities

Secondary Market Transactions Features in a nutshell

Features of a Transaction:

1 – Seller of an Obligation

2 – Buyer of an Obligation

3 – CMUs

Who?

4 – Transaction Period (from an hour to Delivery Years)

How long?

5 – At what time?

When ?

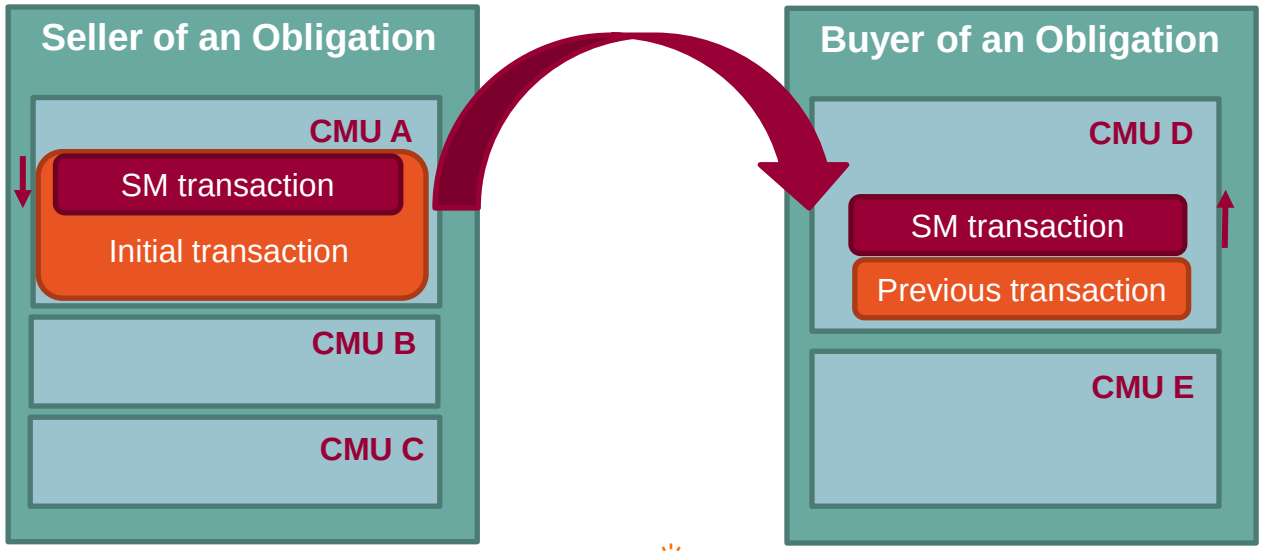
6 – Secondary Market Capacity

How much?

Illustration:

Full transfer of rights & obligations from CMU A to CMU D:
- Rights : Capacity Remuneration
- Obligations: Availability Obligation & Payback Obligation

For a **certain volume** (cf. Secondary Market Capacity and for a **defined period in time** (cf. the Transaction Period).



Design modalities: WHO?

Sellers and buyers of capacity obligations need to meet certain requirements in order to be allowed to trade.

Seller of an obligation

- **Capacity Provider** needs to have a capacity contract for at least one of its CMUs to sell (part of) a transaction.
- The seller's CMU needs to have **positive contracted capacity** during the entire Transaction Period.

Buyer of an obligation

- **Successfully prequalified CRM Candidate** for each Delivery Period during the Transaction Period or **a Capacity Provider** (if the buyer already holds a capacity contract).
- **Buyer cannot be restricted by penalties** (following from historical underperformance in the availability monitoring & testing**).**
- Buyer's CMU Secondary Market **Remaining Eligible Volume > Secondary Market Capacity**.
- Buyer's CMU is an **existing CMU** that is **successfully prequalified for each delivery period** of the transaction period.
- Buyer needs to **submit a financial security** during pre-delivery.

CMUs

- Transaction is always between **two different CMUs** (even though the seller and buyer can be the same capacity provider).

Secondary Market trades can be made during the pre-delivery period and the delivery period and before or after the start of the transaction period

Pre-delivery Period

EX-ANTE

- During the **pre-delivery period,** market parties can trade contracted capacities and notify them to Elia via the CRM IT Interface.
- The seller of obligation **reduces its future availability obligations**, which can mitigate its risks during the pre-delivery controls.
- **Opening of secondary market on 05/06/2023.**

During Delivery Period

EX-ANTE

- During the delivery period, market parties can trade contracted capacities and notify them to Elia via the CRM IT Interface.
- The seller of obligations **reduces its future availability obligations**, which can mitigate its risks, e.g. in relation to its planned outages.

EX-POST

- Elia can accept notifications of transferred contracted capacities for up to **12 days in the past***

  * Transaction date up to 12 days after the start of the transaction period, so including the acceptance of the transaction by the counterparty and including Elia's own processing period of 1 Working Day.
- The seller of obligation can avoid unavailability penalties ex-post in case of underperformance.
- The buyer of obligation can valorize its excess capacity.

Transaction Periods can range from 1 hour to multiple years.

- The **Transaction Period** has start date/start time and end date/end time and defines the period for which the rights and obligations are transferred from the buyer to the seller.

- As a general rule, the **granularity** or the Transaction Period is either :
  - **One calendar day** or a **set of consecutive calendar days** during the same Delivery Period or multiple Delivery Period(s); **OR**

  ➔ *Transaction covering multiple Delivery Periods is only possible for a multi-year transaction of the seller.*

  - **One full hour** or a **set of consecutive full hours** within a single calendar day.

- **Specific limitations on the Transaction Period** apply in function of the different type of transactions, such as
  - Ex-ante transaction with an energy-constrained CMU as buyer ➔ one or multiple *full* calendar days.
  - Ex-post transaction covers an hour or a set of hours **considered as AMT Hours.**
  - Ex-post transaction with an energy-constrained CMU as seller for an ex-ante transaction ➔ entire set of SLA Hours of the seller's CMU for the calendar day.

Limitations relative to the seller of the obligation's CMU

- The seller of a transaction can only sell contracted capacities per transaction.
- In case it wants to sell capacities from multiple transactions in its contract, it has to notify multiple transactions to Elia (see further).
- For each transaction, the seller cannot sell a higher volume than the (derated) minimum contracted capacity over the transaction period.

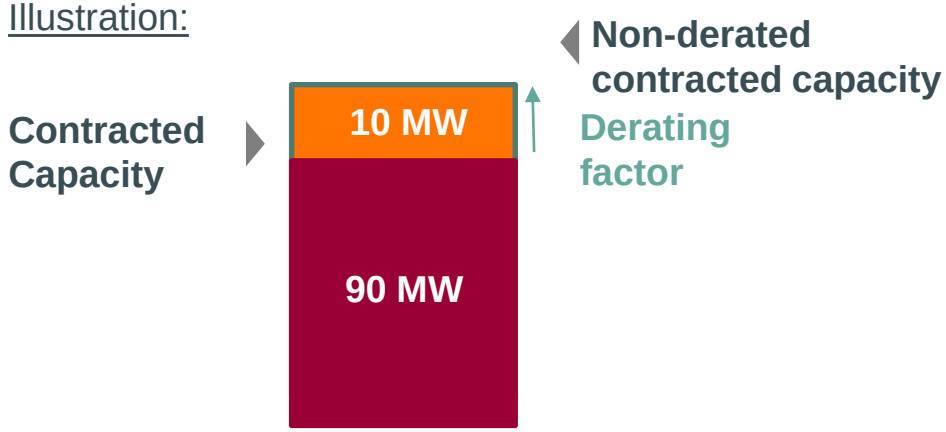
A/ For a transaction that cumulatively meets following criteria:

- Seller is an energy-constrained CMUs;
- That sells (part of) the contracted capacity in ex-post;
- For a transaction that has the status ex-ante.

Secondary Market Capacity $\leq$

$$\frac{\boldsymbol{Contracted\ Capacity}_{\boldsymbol{min}}(\boldsymbol{CMU}, \boldsymbol{Transaction\ ID}, \boldsymbol{TP}, \boldsymbol{tnotif})}{\boldsymbol{Derating\ Factor}\ (\boldsymbol{Transaction\ ID})}$$

Illustration:



B/ For all other transactions:

Secondary Market Capacity $\leq$

$$Contracted\ Capacity_{min}(CMU, Transaction\ ID, TP, t_{notif})$$

Limitations relative to the buyer of the obligation's CMU : general principles

$$Secondary\ Market\ Capacity \leq Secondary\ Market\ Remaining\ Eligible\ Volume\ (SMREV)(CMU, TP, t_{notif}).$$

General principles for the SMREV calculation for a Buyer of an Obligation

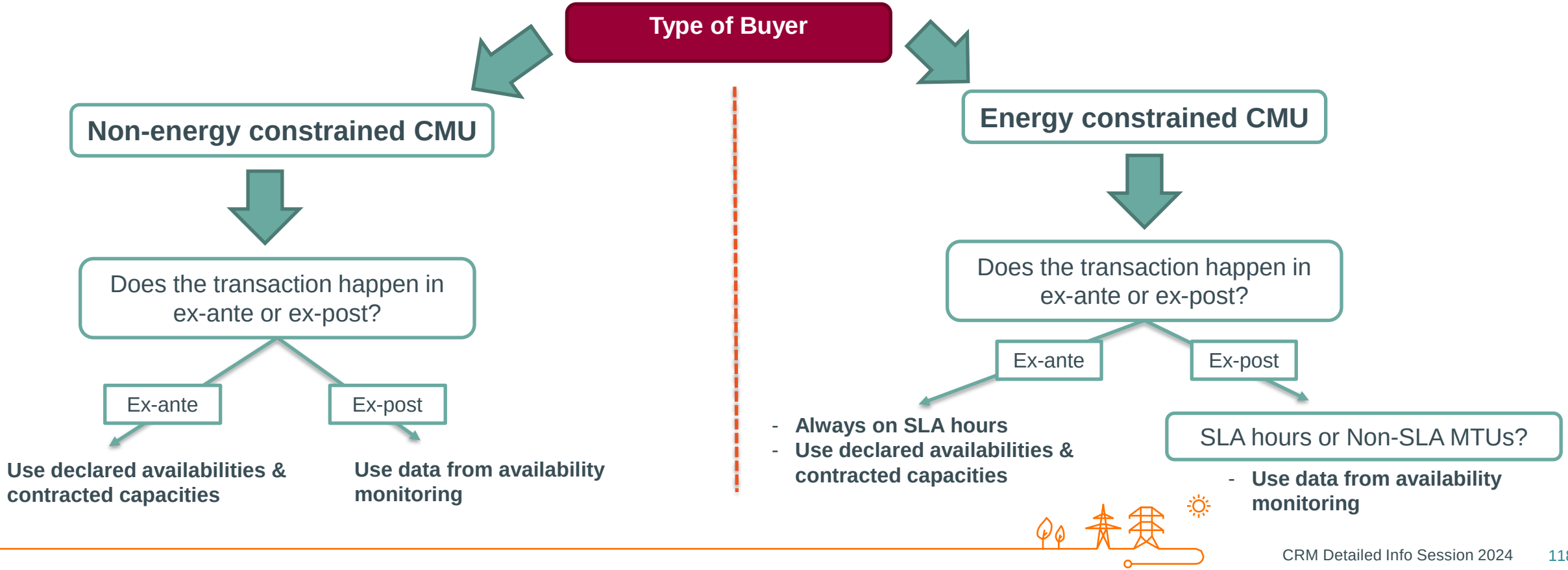
- The exact calculation of the SMREV differs in function of
  - **The CMU type** :
    - **Energy constrained CMU**: The non-derated contracted capacities are deducted from the SMREV during their SLA Hours (in line with their availability obligation).
    - **Non-energy constrained CMU**: The contracted capacities are deducted from the SMREV (in line with their availability obligation). The derated part of their nominal capacities can be offered in the secondary market.
  - **Timing of the transaction :**
    - Ex ante : SMREV is based on declared availabilities and contracted capacities.
    - Ex post :
      - For energy-constrained CMUs distinction is made between SLA Hours & Non-SLA Hours ;
      - Data from availability monitoring is used to calculate the SMREV.

- **The derated Opt-out "IN" volumes** are already considered as **contributing to Security of Supply** (via correction of the demand curve during the auction process) and **cannot be offered** on the secondary market ➔ excluded from the SMREV

Limitations relative to the buyer of the obligation's CMU

General rule:

- $\boldsymbol{Secondary\ Market\ Capacity} \leq \boldsymbol{Secondary\ Market\ Remaining\ Eligible\ Volume}\ (\boldsymbol{SMREV})(\boldsymbol{CMU}, \boldsymbol{TP}, \boldsymbol{t_{notif}})$.
- The exact calculation of the SMREV differs in function of the CMU type (energy constrained versus non-energy constrained and the timing of the transaction (ex-ante or ex-post).

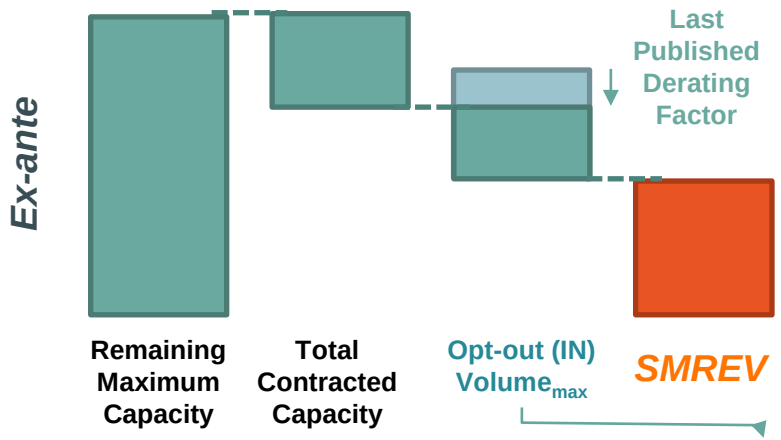


Limitations relative to the buyer of the obligation's CMU (non-energy constrained CMU)

Timing of the transaction

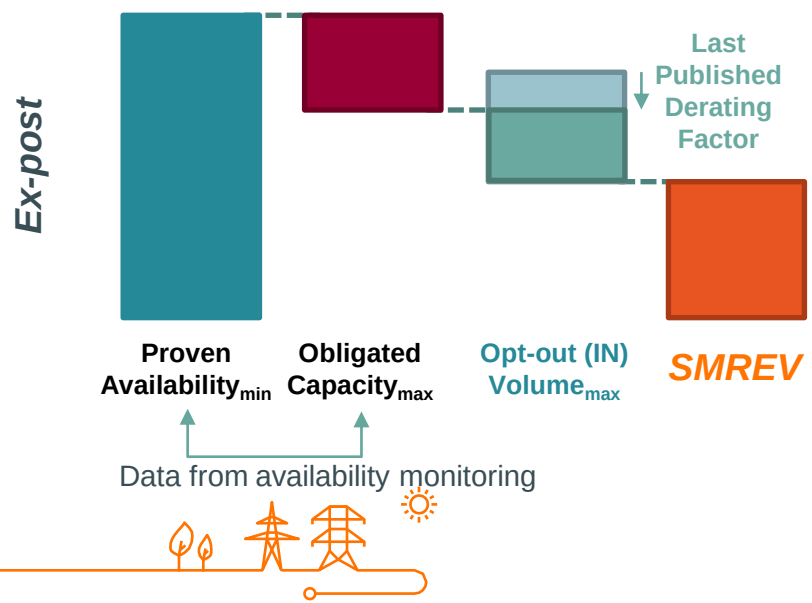
Ex-ante: based on declared/contracted volumes

$$SMREV(CMU, TP, t_{notif})$$
$$= Max\ (0;\ Remaining\ Maximum\ Capacity_{min}(CMU, TP, t_{notif})$$
$$- Total\ Contracted\ Capacity_{max}(CMU, TP, t_{notif})$$
$$- [Optout\ Volume_{max}(CMU, TP, t_{notif})$$
$$\times Last\ Published\ Derating\ Factor(CMU, TP, t_{notif})])$$



Ex-post: input from availability monitoring

$$SMREV(CMU, TP, t_{notif})$$
$$= Max\ (0;\ \mathbf{Proven\ Availability_{min}}(CMU, TP, t_{notif})$$
$$- \mathbf{Obligated\ Capacity}_{max}(CMU, TP, t_{notif})$$
$$- [Optout\ Volume_{max}(CMU, TP, t_{notif})$$
$$\times Last\ Published\ Derating\ Factor(CMU, TP, t_{notif}]$$

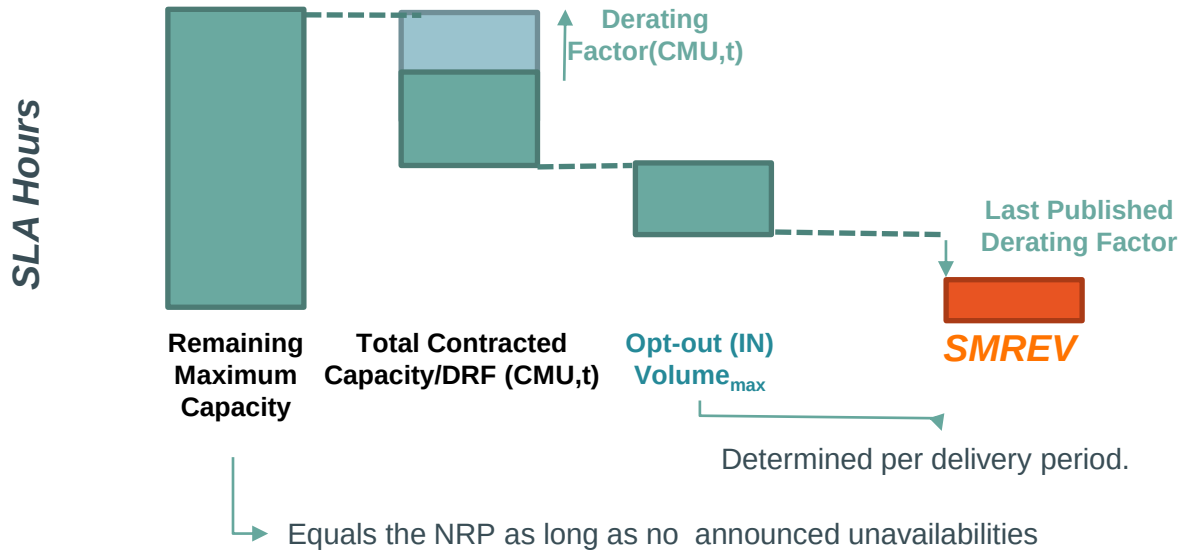


Limitations relative to the buyer of the obligation's CMU (energy constrained CMU)

Timing of the transaction : ex ante

Always during SLA Hours (as SLA Hours are not identified yet ex-ante)

$$SMREV(CMU, TP, t_{notif}) = Max\ (0;\ [Remaining\ Maximum\ Capacity_{min}(CMU, TP, t_{notif}) - \frac{Total\ Contracted\ Capacity_{max}(CMU,TP,t_{notif})}{Derating\ Factor\ (CMU,t)} - OptoutVolume_{max}(CMU, TP, t_{notif}] \times Last\ published\ derating\ factor(CMU, TP, t_{notif})$$

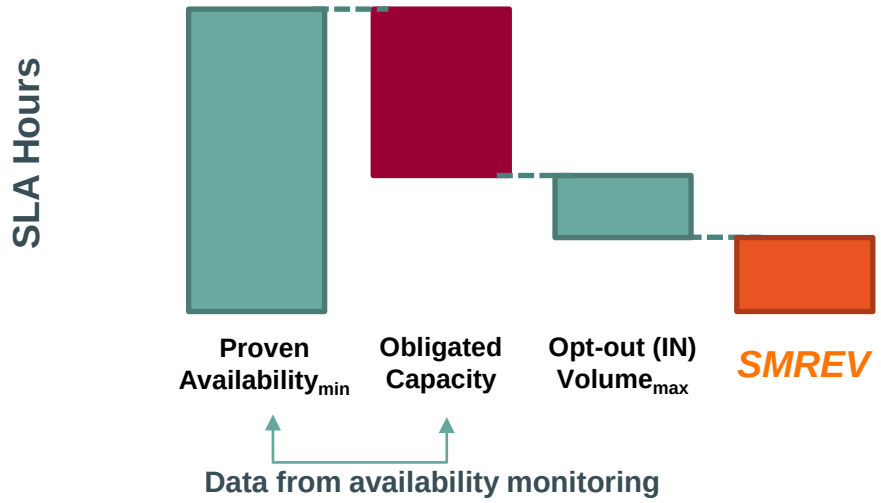


Limitations relative to the buyer of the obligation's CMU (energy constrained CMU)

Timing of the transaction : ex post

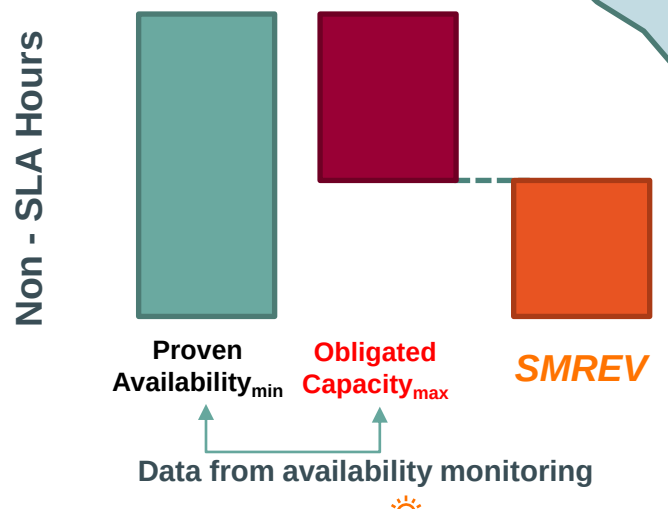
SLA Hours

$$SMREV(CMU, TP, t_{notif}) = Max\ (0;\ Proven\ Availability_{min}(CMU, TP, t_{notif}) - Obligated\ Capacity_{max}(CMU, TP, t_{notif}) - OptoutVolume_{max}(CMU, TP, t_{notif})$$



Non- SLA Hours

$$SMREV(CMU, TP, t_{notif}) = Max\ (0;\ Proven\ Availability_{min}(CMU, TP, t_{notif}) - Obligated\ Capacity_{max}(CMU, TP, t_{notif})$$



Outside SLA Hours, no contribution of OPT-out "IN" volumes to SoS yet.

Secondary Market Transaction process

Market Parties

"Deal creation"

Transaction submission

(max 3 working days)

- Clients reached a mutual agreement with each other (bilateral or via an exchange).
- First party (or exchange) submits a transaction notification.
- Second party confirms within **max. 3 working days** (if no exchange)

Elia

"Deal validation"

Transaction Acknowledgement

(max 1 working day)

- No checks done yet
- Defines the Transaction Date.

Transaction Validation

(max 2 working days)

- Elia checks compliance of the transaction notification with the FR.
- Main checks relate to Financial Security & SM Capacity.

Elia ⇔ Market Parties

"Contract signature"

Contract Creation & Review

(max 2 working days)

- Elia generates updated contracts for buyer/seller and uploads to DocuSign.

Signature Market Parties

(max 3 working days)

- Market parties sign contracts **within 3 working days.**

Contract Signature Elia

(max 5 working days)

- After both the seller and buyer sign the updated contract, Elia signs as well.

After 2 Parties reach a mutual agreement it is notified to Elia via a transaction notification.

1. **Buyer and Seller reach a mutual agreement** on a transaction on the Secondary Market.
   - Mutual agreement can be made bilaterally; OR
   - Via an exchange if made available by the market (as far as Elia know, there is currently no CRM exchange).

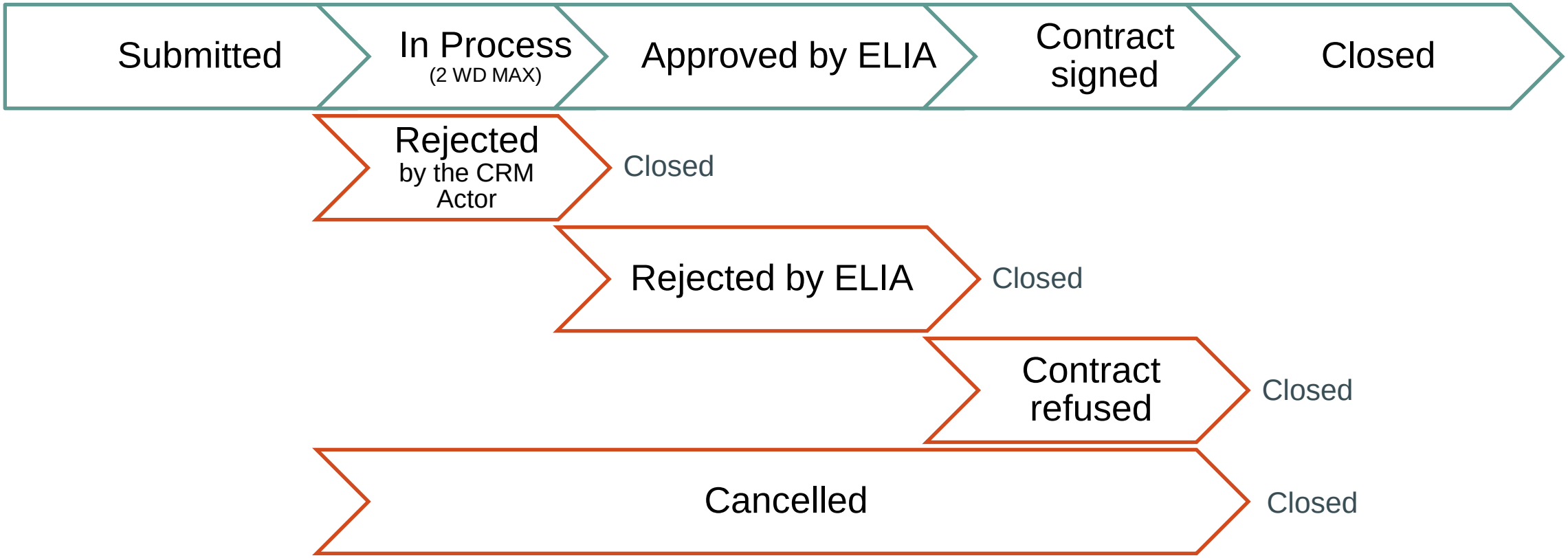
2. First, **party A (or the exchange) notifies Elia** of the transaction **via a transaction notification on the CRM IT Interface.** Such transaction notification includes the following information :

Transaction notification

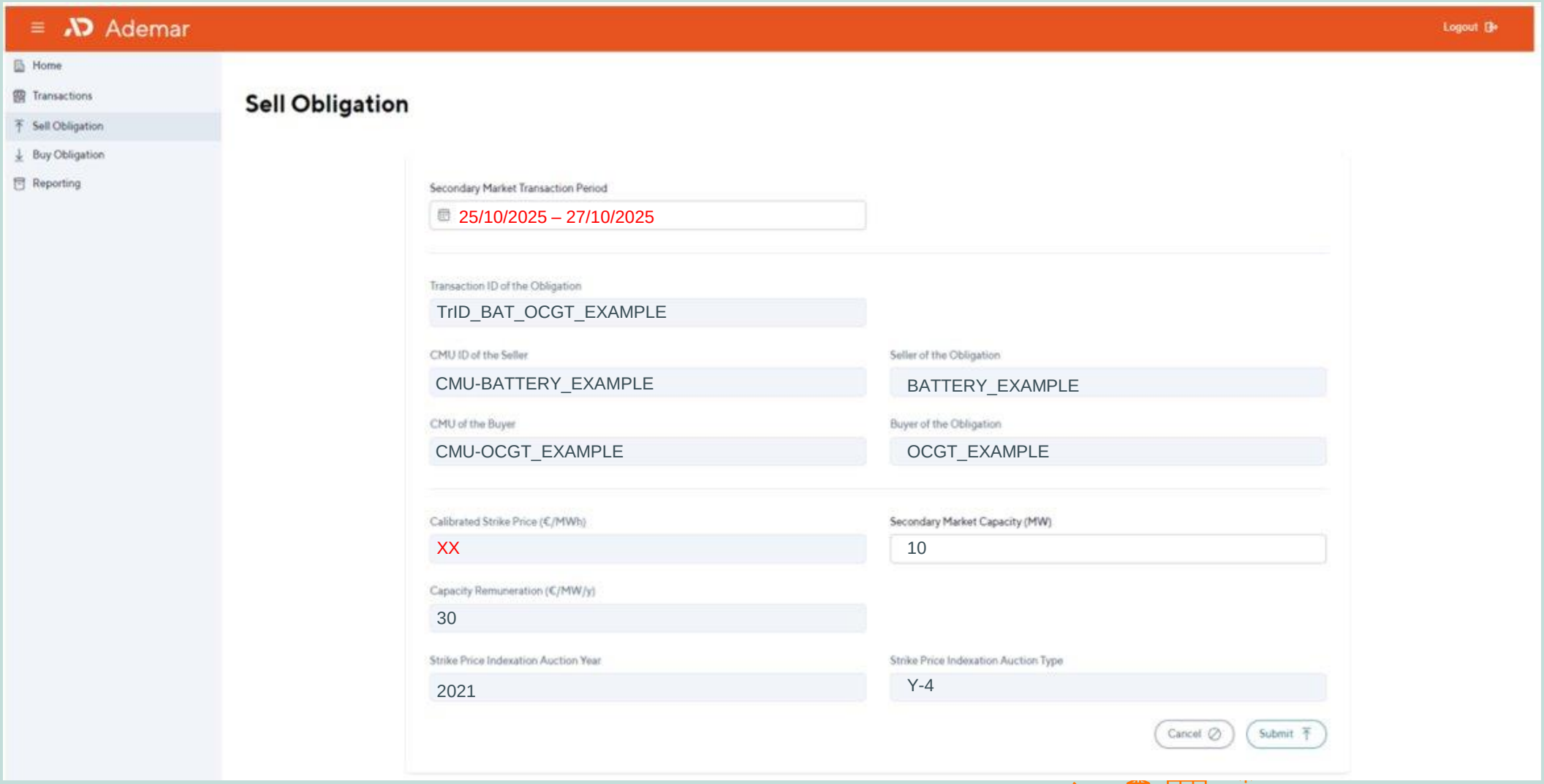
- Transaction ID
- Seller/Buyer ID
- CMU ID for both seller/buyer
- Transaction ID of the seller
- Secondary Market Capacity
- Transaction period
- Capacity Remuneration
- Calibrated Strike Price + Indexation Auction year and type

After transaction notification, there are 9 possible transaction statuses

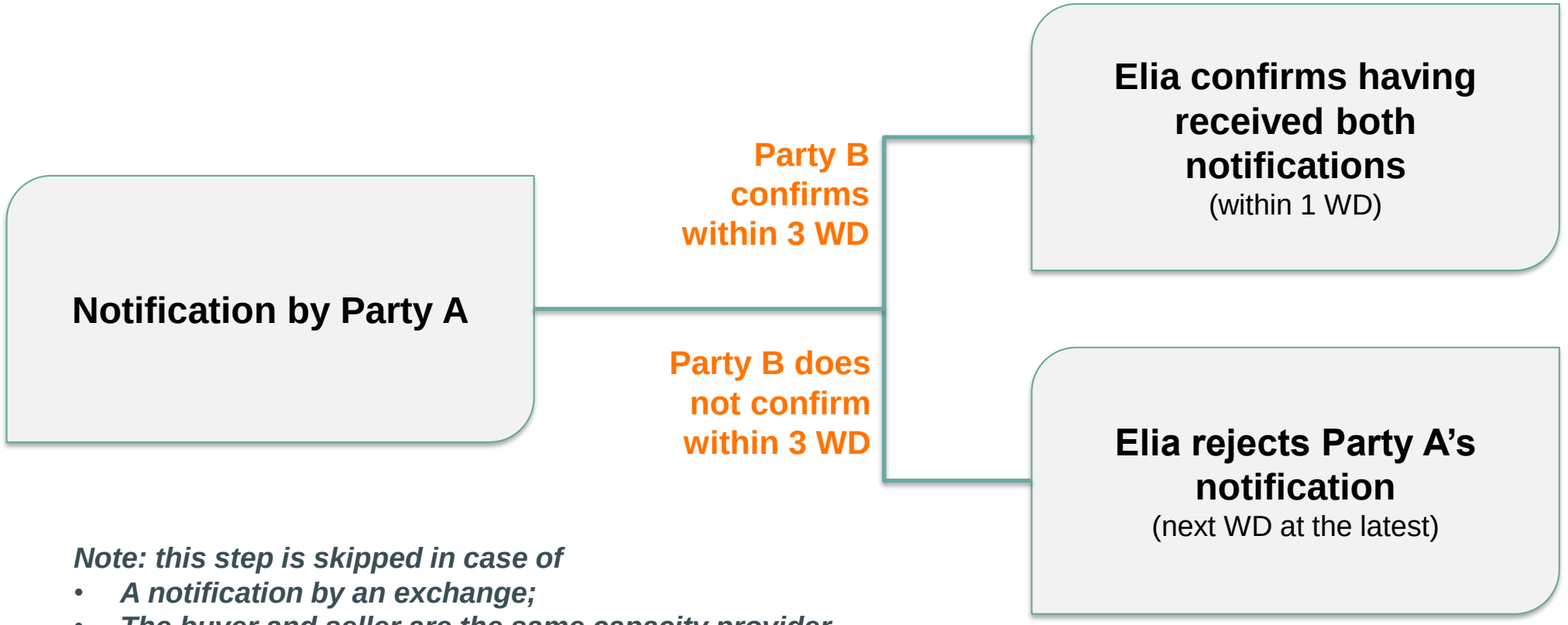
During the “In Process”-phase, Elia checks if the transaction complies with the requirements set in the Functioning Rules.



Notification Example



Party B has 3 Working Days to confirm the transaction via the CRM IT platform (not applicable in case of a notification via an exchange)



Note: this step is skipped in case of

- ***A notification by an exchange;***
- ***The buyer and seller are the same capacity provider.***

The deal validation phase occurs in two steps

Step 1 : Transaction acknowledgement by Elia (within 1 WD)

- No checks performed at this stage;
- The date defines the Transaction Date.
- Within 1 Working Day after last party confirmed the transaction notification or after exchange's submission of the notification.

Step 2 : Transaction Validation by Elia (within 2 WD)

- Elia approves or rejects the transaction by verifying the data in the transaction notification.
- Elia will check if **the transaction notification complies with the Functioning Rules.**
- Elia will **check the secondary market capacity** and the **financial security obligation** (only during pre-delivery period) - see next slides.
- Only if all conditions (**see slide 83**) are met, the transaction is approved. If not, transaction is rejected.
  - In case of rejection, transaction can be resubmitted with updated data and new transaction ID.

- After Elia has approved a transaction, CREG can still ask Elia to cancel a transaction in case of market abuse until up to 10 WD after the transaction approval.

Transaction validation examples

Seller Battery to Buyer OCGT

Parameter	Value	Check
Transaction ID	TrID_BAT_OCGT_EXAMPLE	
Seller ID	BATTERY_EXAMPLE	
Buyer ID	OCGT_EXAMPLE	
Seller CMU ID	CMU_BATTERY_EXAMPLE	
Buyer CMU ID	CMU_OCGT_EXAMPLE	
Transaction ID of the seller	Dries, do you know the format?	
Secondary Market Capacity	7 MW	1
Transaction Period	25/10/2025 - 27/10/2026	2
Capacity Remuneration	30k €/MW/year	
Calibrated Strike Price	300 EUR/MWh	
Auction Year	2021	
Auction Type	Y-4	

Elia's volume check :

1. Volume limitations for the buyer.
2. Volume limitations for the seller.

➔ See next slide

Elia's check on Transaction Period & Financial Security

1. Elia acknowledges receipt of transaction on 30/06/2023

➔ Transaction during pre-delivery period.

➔ Elia will check the financial security obligation

1. Elia will check the Transaction Period limitations.

Transaction validation examples : volume check

Transaction: Ex-ante during the Pre-delivery Period

Seller: Battery (energy constrained)

- **Contracted Capacity:** 11,7 MW
- **Derating Factor:** 39%

$$Secondary\ Market\ Capacity \leq Contracted\ Capacity$$

$$Secondary\ Market\ Capacity \leq 11,7\ MW$$

Buyer: OCGT (non-energy constrained)

- **Min remaining maximum capacity** for 25/10/'25 – 27/10/'25 = 100 MW
- **Opt-out "IN" Volume** for delivery period '25- '26 = 0 MW
- **Max. Total Contracted Capacity** for 25/10/'25 – 27/10/'25 = 93 MW
- **Last published Derating Factor:** 93%
- **SMREV** = $100\ MW - 93\ MW - 0MW * 93\% = 7\ MW$

$$Secondary\ Market\ Capacity \leq 7\ MW$$

$$SMREV(CMU, TP, t_{notif}) = Max\ (0;\ Remaining\ Maximum\ Capacity_{min}(CMU, TP, t_{notif}) - Total\ Contracted\ Capacity_{max}(CMU, TP, t_{notif}) - [Optout\ Volume_{max}(CMU, TP, t_{notif}) * Last\ Published\ Derating\ Factor(CMU, TP, t_{notif})])$$

Transaction validation examples : financial security check

Transaction: Ex-ante during the Pre-delivery Period

Seller: Battery (additional CMU)

- **Max Total Contracted Capacity** (before SM transaction) **:** 11,7 MW
- **Max Total Contracted Capacity** (after SM transaction) :
  - 4,7 MW during 25/10/'25 – 27/10/'25
  - 11,7 MW during remaining part of the Delivery Period '25 – '26.

Max. total contracted capacity remains unchanged, so no impact on financial security obligation.

Buyer: OCGT (existing CMU)

- **Max Total Contracted Capacity** (before SM transaction) **:** 93 MW
- **Max Total Contracted Capacity** (after SM transaction) :
  - 100 MW during 25/10/'25 – 27/10/'25
  - 93 MW during remaining part of the Delivery Period '25 – '26.
- **Required level of financial security**: 10,000 €/MW.

CMU needs to submit additional financial security of 70,000 EUR.

After Elia has validated the transaction, the necessary changes are made in the contracts for the buyer and the seller

Elia

Contract Creation

- Max. 2 WDs after transaction approval
- Seller's contract:
  - Elia **decreases contracted capacity in Annex A** for the involved transaction.
- Buyer's contract:
  - If buyer already signed a contract for the CMU, a new Annex A is added with the **contracted capacity.**
  - If buyer has not signed any contract yet for the CMU, most recent version of the capacity contract is signed + annex A **with the contracted capacity.**

Market Parties

Party A and B sign within 3 WD

Party A and/or B do not sign within 3 WD

Elia

Transaction validation date

Contract signature Elia

- Max. 5 WDs after last signature of buyer or seller.
- Elia only signs the contract after Party A and Party B signed.

Elia rejects the transaction.

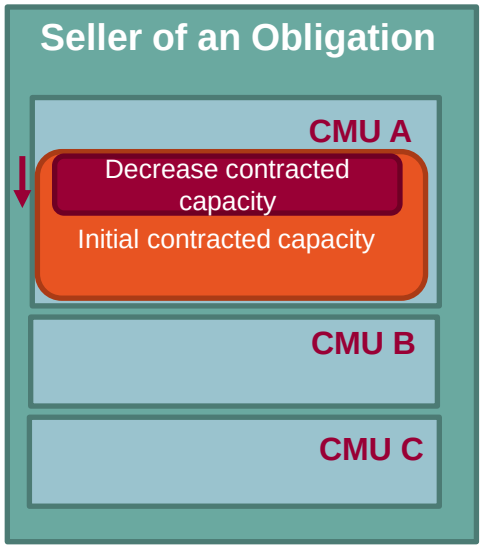
Contractual impact of approved transaction

Seller of an obligation

The Seller **revokes all rights** and is **absolved from the obligations** associated to the capacity transferred.

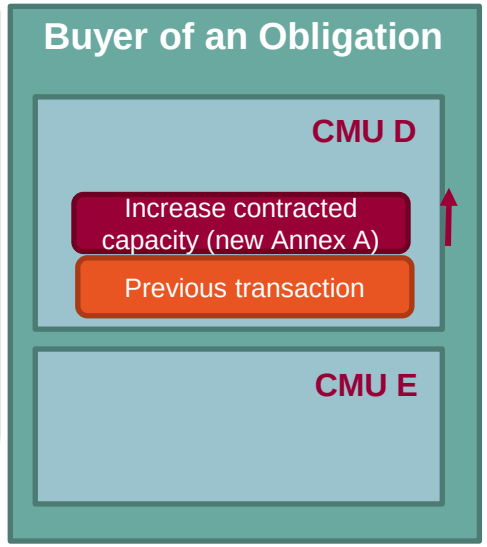
Buyer of an obligation

The buyer **takes over all Obligations and all Rights** associated to the capacity transferred.

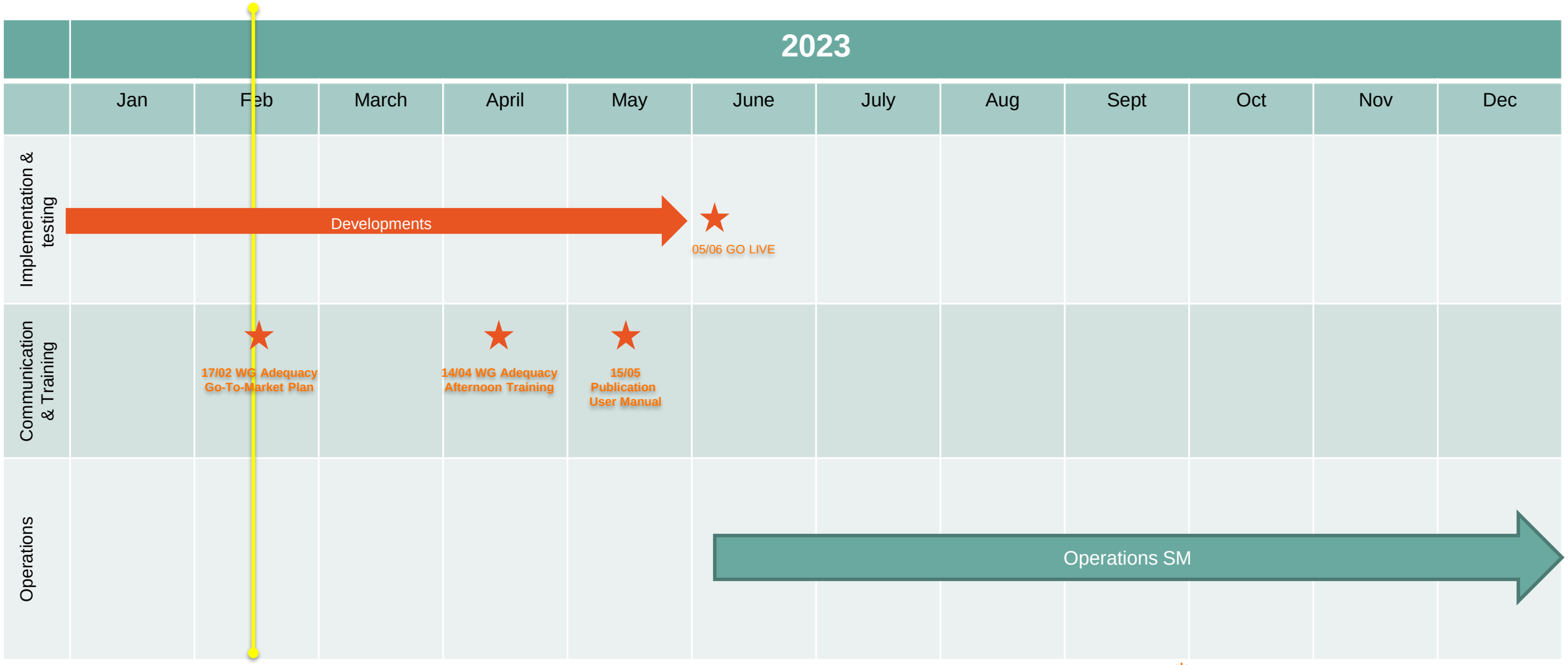


The total contracted capacity decreases for the seller of an obligation and increases for the buyer of an obligation during the transaction period, affecting mainly:

- **Obligations**
  - **Availability obligation**
  - **Payback obligation**
  - **(Financial Security Obligation, if applicable)**
- **Rights**
  - **Capacity Remuneration**



Go-to-Market planning – Secondary market



Purpose of Today's session

Right to remuneration

Financial Security Obligation

Availability Obligation

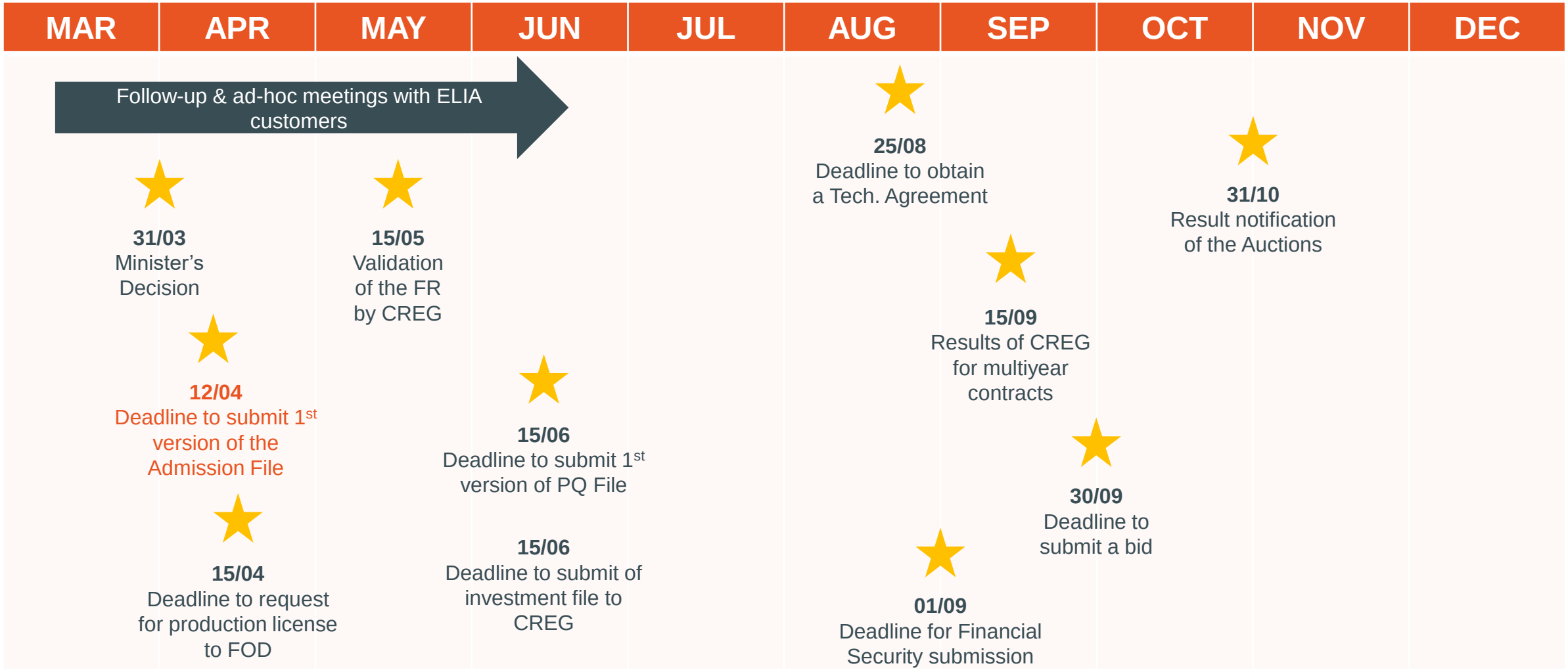
- Availability monitoring
- Availability Testing

Payback Obligation

Secondary Market

Final notes

CRM auction - key dates in 2024



Your participation in the Y-1 / Y-4 Auction

Now to Q2 2024
'Preparation'

Flex revenue estimation with Elia on demand / in the 'Road Shows'

By 15 june 2024
'Submission'

Prequalification File to Elia

Multi year contract possible via CREG

Sept 2024
'Bidding'

Elia feedback on MW

Your offers for the Auction by 30/09

as of Oct 2024

Results
&
Contracts

Your Elia KAM guides you through your flexibility valorization supported by:

- CRM dedicated support (customer.crm@elia.be)
- Balancing products dedicated support (contracting_AS@elia.be)

You can also find here the list of "Balancing Services Providers"

Thank you