

# Payback Obligation Use Case 3

Unproven Capacity Project



## DISCLAIMER



This document provides different fictive examples, so-called use cases, related to the Capacity Remuneration Mechanism being developed in Belgium. It has, as sole purpose, to explain the Functioning Rules and its annexes by means of examples.

Given that the CRM process consists of several steps, and for each of these steps, several layers of information and details are relevant, it is to be understood that this document focuses on most pertinent Payback Obligation aspects.

By no means, the use cases replace the rules in the relevant Laws, Royal Decrees, and regulatory approved documents.

The choices in the examples are only made for illustrative purposes and do not imply any judgement. All the figures and numbers used for these use cases are purely fictive. These numbers nor the use cases presented should be interpreted as representing a concrete case or a concrete situation of the Belgian capacity market or an implied proposal for any CRM parameter.

The use cases developed in this document are based on the chapter *Payback Obligation* of the Functioning Rules as known at the moment of writing and shared with market parties on 28/08/2020. It also obviously follows the context set by the Electricity Law.

## Use case structure



1. Capacity Provider and CMUs



2. Payback Obligation parameters

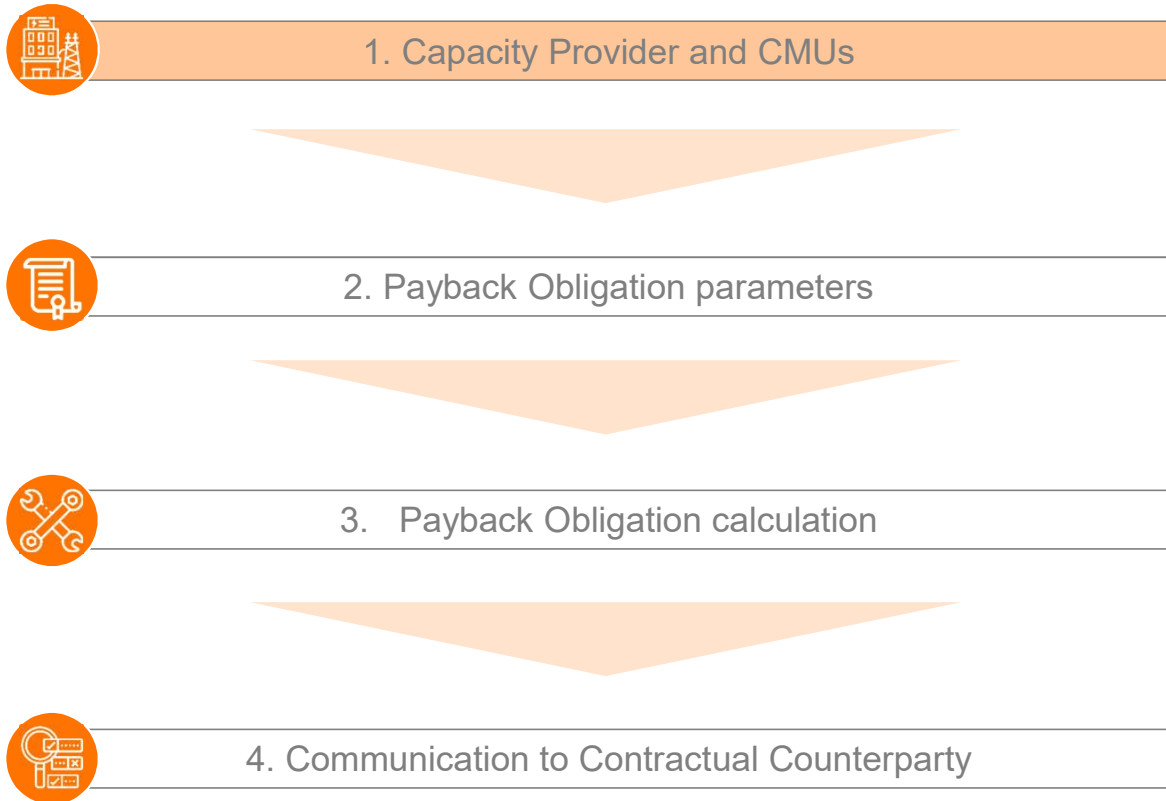


3. Payback Obligation calculation



4. Communication to Contractual Counterparty

## Use case structure







## 1. Capacity Provider and CMUs

- **RollingEnergy.SA/NV** was prequalified to offer **50 MW of Eligible Volume** in the 2021 Y-4 Auction
- The 50 MW was divided over 3 bids (and thus 3 CMUs) in the Capacity Auction
- It concerns a **Virtual CMU** that has successfully passed to existing in the pre-delivery period monitoring over
- After pre-delivery, the following Nominal Reference Power for Availability Monitoring were confirmed:

	CMU parameters		
	CMU 1	CMU 2	CMU 3
<i>Nominal Reference Power</i>	25,00 MW	4,5 MW	5,15 MW



# 1. Capacity Provider and CMUs – Contracted Capacity : Transaction overview

## Primary Market

- In the **Y-4 Auction** in October 2021, the Capacity Provider was awarded the following bids for VCMUs:

Auction results		
Selected bids		
	Selected Bid volumes	VCMU1: 20MW VCMU2: 10MW VCMU3: 20MW
	Related Price	VCMU1: 17€/kW/year VCMU2: 18€/kW/year VCMU3: 18,5€/kW/year
	Capacity contract duration	1 year



# 1. Capacity Provider and CMUs – Contracted Capacity : Transaction overview

## Secondary Transaction

- Through transaction on the **Secondary Market** in the pre-delivery period, the following Contracted Capacities and Capacity remunerations of the CMU have been secured:

CMU	Contracted Capacity	Capacity Remuneration	Derating Factor	Transaction Period
1	+ 20,0 MW	17 €/kW/y	0,8	01/11/2025 00:00 to 01/11/2026 00:00
2	+ 4,5 MW	18 €/kW/y	0,6	01/11/2025 00:00 to 01/11/2026 00:00
3	+ 5,15 MW	18 €/kW/y	0,8	01/11/2025 00:00 to 01/11/2026 00:00
1	- 2,88 MW	17 €/kW/y	0,8	01/11/2025 00:00 to 01/11/2026 00:00
2	- 0,27 MW	18 €/kW/y	0,6	01/11/2025 00:00 to 01/11/2026 00:00
TOTAL				
CMU 1	17,12 MW	17€/kW/y	0,8	01/11/2025 00:00 to 01/11/2026 00:00
CMU 2	4,23 MW	18€/kW/y	0,6	01/11/2025 00:00 to 01/11/2026 00:00
CMU 3	5,15 MW	18€/kW/y	0,8	01/11/2025 00:00 to 01/11/2026 00:00

## Use case structure



1. Capacity Provider and CMUs



2. Payback Obligation parameters



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## 2. Payback Obligation parameters

### For the Delivery Period:

- The AMT Price is set at **120 €/MWh** by Elia and published on its website by the May 15 prior the delivery period
- The Calibrated Strike Price of the 10MW Transaction of RollingEnergy is at **500 €/MWh**
- As it is the first year of Delivery Period and that the Contracted Capacity relies on a on-year contract, **no indexation is foreseen of the Calibrated Strike Price in the Delivery Period 2025**

### For the CMU on the Delivery Period:

- CMU 1 is energy constrained with a daily schedule obligation
- CMU 2 and 3 are non-energy constrained without daily schedule obligation
  - **If their DMP prices are above the Calibrated Strike Price of 500€/MWh for an hour of Payback Obligation, the maximum of both is the Strike Price in the calculation**
- The Reference Price of the CMU is the **Day-Ahead EPEX Market**



## 2. Payback Obligation parameters

### For the CMU on the Delivery Period:

- Once a year prior the Delivery Period, a Stop Loss Amount is calculated for each Transaction of the Primary Market or ex-ante Transaction of the Secondary Market having one or several Delivery Periods as Transaction Period.

$$\begin{aligned}
 & \text{StopLoss}(CMU_{id}, \text{Transaction}_{id}, \text{Delivery Period}) \\
 &= \sum_{t=1}^w \left( \text{Contracted Capacity}(CMU_{id}, \text{Transaction}_{id}, t) * \frac{\text{Capacity Remuneration}(CMU_{id}, \text{Transaction}_{id})}{w} \right)
 \end{aligned}$$

With  $w$  as the number of hours on the Delivery Period

- If applicable, the sum on all the Transaction Payback Obligations of the Delivery Period could not exceed the Transaction Stop Loss Amount.
- For CMU1, the Stop Loss Amount is applicable as Primary = 17,12MW \* 17 k€/MW/Delivery Period = 291,04k€ / Delivery Period 2025**
- For CMU2, the Stop Loss Amount is applicable as Primary = 4,52MW \* 18 k€/MW/Delivery Period = 81,36k€ / Delivery Period 2025**
- For CMU3, the Stop Loss Amount is applicable as Primary = 5,15MW \* 18 k€/MW/Delivery Period = 92,7k€ / Delivery Period 2025**

## Use case structure



1. Capacity Provider and CMUs



2. Payback Obligation parameters



3. Payback Obligation calculation



4. Communication to Contractual Counterparty



### 3. Payback Obligation calculation

On **10/01/2026**, the system was stressed due to **two peaks of consumption**, one in the morning and one in the evening. The Day-Ahead prices have risen to very high levels, demonstrating that the Belgian electricity market is facing an **adequacy-relevant moment**.

As the CRM implemented is a CRM with Reliability Option, the Payback Obligation applies to all CMUs and their Transactions. For a Energy Constrained CMU ex-ante Transaction, it applies at any moment of their Transaction Periods when the Reference Price exceeds the Strike Price which is an SLA Hour.

The Payback Obligation is calculated for each Transaction.

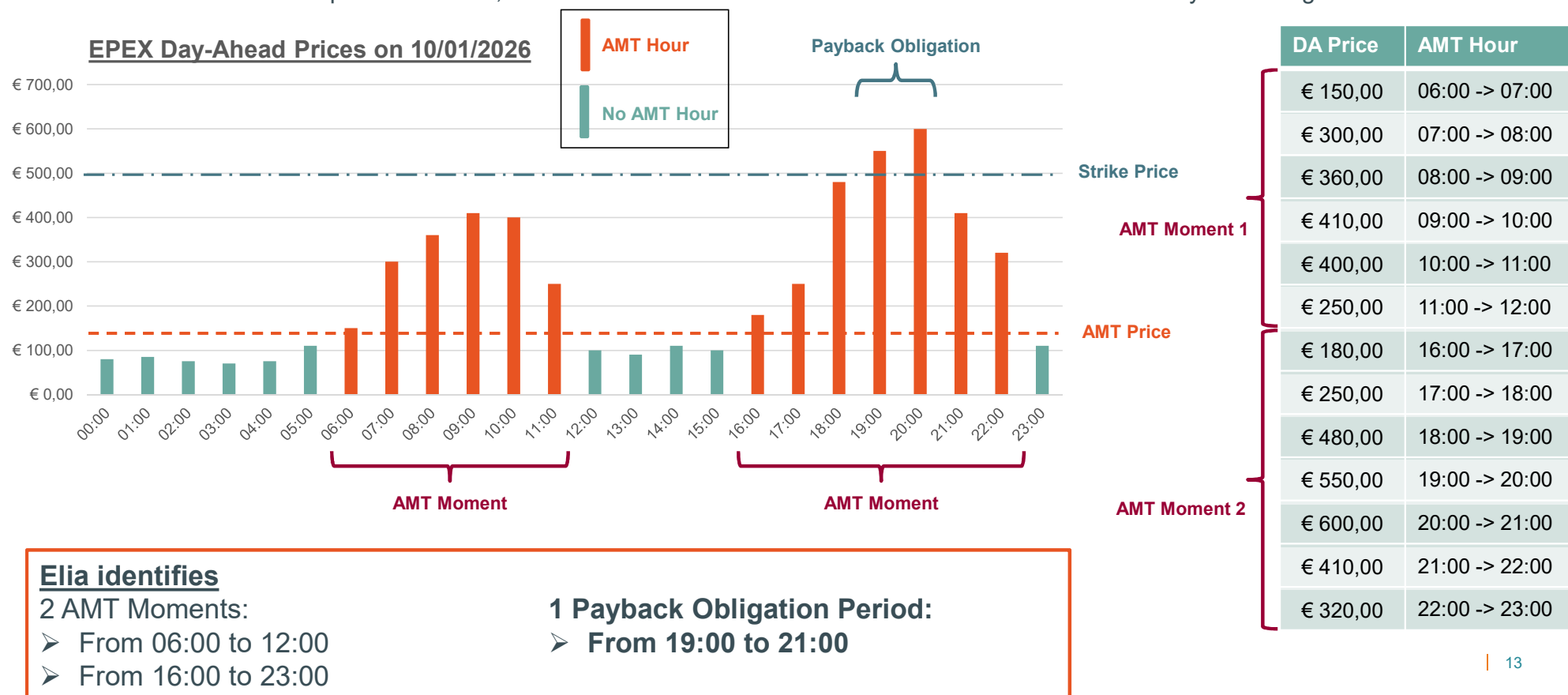
To perform the calculation of the Payback Obligation, ELIA will gather for all Transactions having a Transaction Period including the hours for which the Reference Price exceeds the Strike Price and a Payback Obligation applies, the following hourly elements:

- The Reference Price of the CMU on which the Transaction relies
- The Strike Price of the CMU's Transaction for that hour
- The Availability Ratio for the considered AMT Hours
- The Transaction's Contracted Capacity for that hour
- The Transaction associated Derating Factor if the CMU on which the Transaction relies is Energy Constrained



### 3. Payback Obligation – Reference Price are the Day-ahead Market revenues

- The CMU selected in its Prequalification File, EPEX as the NEMO for the Reference Price definition in the Payback Obligation





### 3. Payback Obligation – Availability Ratio

- An Availability Ratio applies in the Payback Obligation to take into account the duly communicated unavailability of the CMU.
- The Obligated Capacity and the Maximum Remaining Capacity DA are obtained in the Availability Obligations and Penalties Use Case 3 and according to the Functioning Rules.
- It equals  $Availability\ Ratio\ (CMU_{id,t}) = \frac{Min(Obligated\ Capacity\ (CMU_{id,t});\ Maximum\ Remaining\ Capacity\ DA\ (CMU_{id,t}))}{Obligated\ Capacity\ (CMU_{id,t})}$

DA Price	AMT Hour	SLA Hour	Obligated Capacity (MW)	Maximum Remaining Capacity DA (MW)	Availability Ratio
€ 180,00	16:00 -> 17:00	Yes	21,4	25,00	1
€ 250,00	17:00 -> 18:00	Yes	21,4	25,00	1
€ 480,00	18:00 -> 19:00	Yes	21,4	25,00	1
€ 550,00	19:00 -> 20:00	Yes	21,4	25,00	1
€ 600,00	20:00 -> 21:00	Yes	21,4	25,00	1
€ 410,00	21:00 -> 22:00	Yes	21,4	25,00	1
€ 320,00	22:00 -> 23:00	Yes	21,4	25,00	1

} Payback Obligation period



## CMU 2



### 3. Payback Obligation – Availability Ratio

- An Availability Ratio applies in the Payback Obligation to take into account the duly communicated unavailability of the CMU.

- The Obligated Capacity and the Maximum Remaining Capacity DA are obtained in the Availability Obligations and Penalties Use Case 3 and according to the Functioning Rules.

- It equals

$$\text{Availability Ratio } (CMU_{id}, t) =$$

$$\frac{\text{Min}(\text{Obligated Capacity } (CMU_{id}, t); \text{Maximum Remaining Capacity DA } (CMU_{id}, t))}{\text{Obligated Capacity } (CMU_{id}, t)}$$

AMT  
Moment  
1

AMT  
Moment  
2

DA Price	AMT Hour	SLA Hour	Obligated Capacity (MW)	Maximum Remaining Capacity DA (MW)	Availability Ratio
€ 150,00	06:00 -> 07:00	NA	4,23	2,3	0,544
€ 300,00	07:00 -> 08:00	NA	4,23	2,3	0,544
€ 360,00	08:00 -> 09:00	NA	4,23	2,3	0,544
€ 410,00	09:00 -> 10:00	NA	4,23	2,3	0,544
€ 400,00	10:00 -> 11:00	NA	4,23	2,3	0,544
€ 250,00	11:00 -> 12:00	NA	4,23	2,3	0,544
€ 180,00	16:00 -> 17:00	NA	4,23	2,3	0,544
€ 250,00	17:00 -> 18:00	NA	4,23	2,3	0,544
€ 480,00	18:00 -> 19:00	NA	4,23	2,3	0,544
€ 550,00	19:00 -> 20:00	NA	4,23	2,3	0,544
€ 600,00	20:00 -> 21:00	NA	4,23	2,3	0,544
€ 410,00	21:00 -> 22:00	NA	4,23	2,3	0,544
€ 320,00	22:00 -> 23:00	NA	4,23	2,3	0,544

Payback  
Obligation  
period

## CMU 3



### 3. Payback Obligation – Availability Ratio

- An Availability Ratio applies in the Payback Obligation to take into account the duly communicated unavailability of the CMU.
- The Obligated Capacity and the Maximum Remaining Capacity DA are obtained in the Availability Obligations and Penalties Use Case 3 and according to the Functioning Rules.

- It equals

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

$$\frac{Min(Obligated\ Capacity\ (CMU_{id}, t); \text{Maximum Remaining Capacity DA } (CMU_{id}, t))}{Obligated\ Capacity\ (CMU_{id}, t)}$$

AMT  
Moment  
1

AMT  
Moment  
2

DA Price	AMT Hour	SLA Hour	Obligated Capacity (MW)	Maximum Remaining Capacity DA (MW)	Availability Ratio
€ 150,00	06:00 -> 07:00	NA	5,15	5,15	1
€ 300,00	07:00 -> 08:00	NA	5,15	5,15	1
€ 360,00	08:00 -> 09:00	NA	5,15	5,15	1
€ 410,00	09:00 -> 10:00	NA	5,15	5,15	1
€ 400,00	10:00 -> 11:00	NA	5,15	5,15	1
€ 250,00	11:00 -> 12:00	NA	5,15	5,15	1
€ 180,00	16:00 -> 17:00	NA	5,15	5,15	1
€ 250,00	17:00 -> 18:00	NA	5,15	5,15	1
€ 480,00	18:00 -> 19:00	NA	5,15	5,15	1
€ 550,00	19:00 -> 20:00	NA	5,15	5,15	1
€ 600,00	20:00 -> 21:00	NA	5,15	5,15	1
€ 410,00	21:00 -> 22:00	NA	5,15	5,15	1
€ 320,00	22:00 -> 23:00	NA	5,15	5,15	1

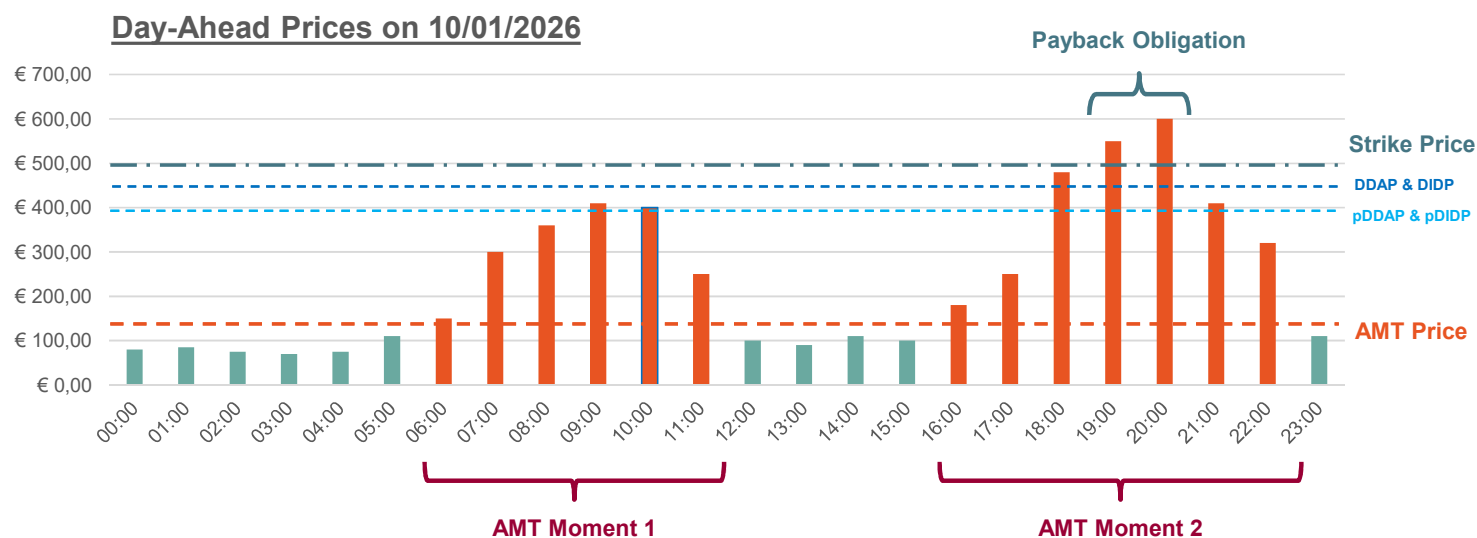
Payback  
Obligation  
period



### 3. Payback Obligation – Strike Price

#### DMP of the without Daily Schedule CMU

- As CMU1 of RollingEnergy.SA/NA is a with Daily Schedule CMU
- Strike Price ( $CMU_{id}, Transaction_{id}, t$ ) = Calibrated Strike Price ( $CMU_{id}, Transaction_{id}, t$ )
- The Strike Price is 500€/MWh** for the 17,12 MW CMU's Transaction on all Payback Obligation hours H19 and H20



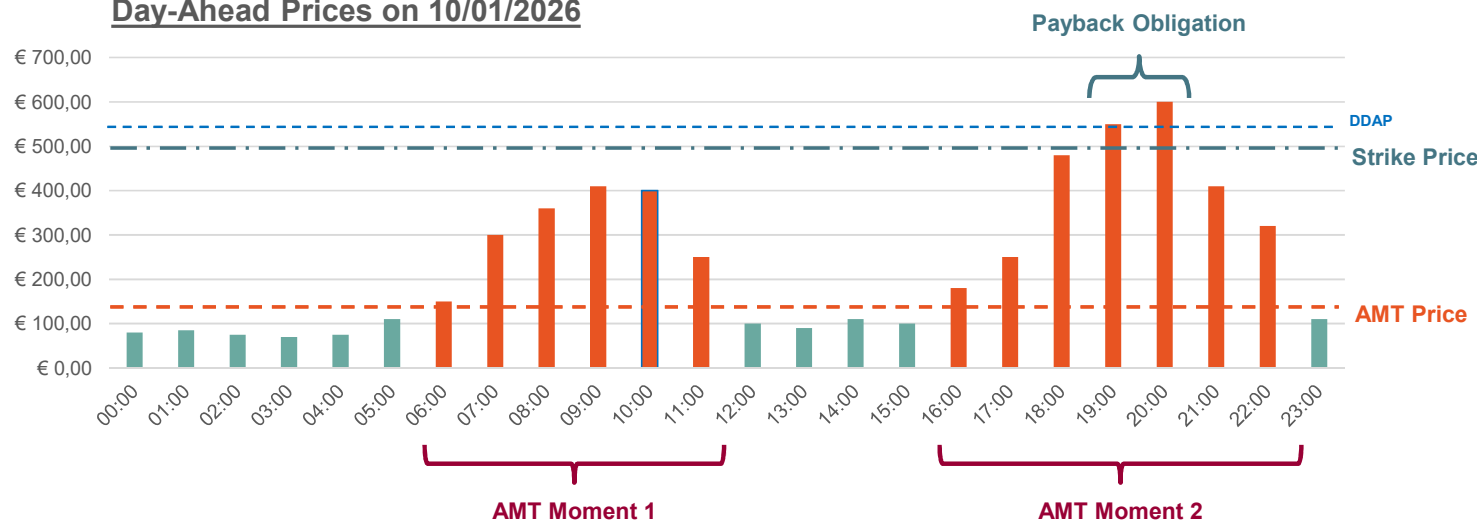


### 3. Payback Obligation – Strike Price

#### DMP of the without Daily Schedule CMU

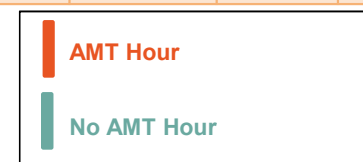
- As CMU2 of RollingEnergy.SA/NA is a without Daily Schedule CMU, a check occurs on its DMP value in comparison with the Calibrated Strike Price (500€/MWh) of the Transaction
- $Strike\ Price(CMU_{id}, Transaction_{id}, t) = \max(DMP(CMU_{id}, t); Calibrated\ Strike\ Price(CMU_{id}, Transaction_{id}, t))$
- According to UC3 of Availability Obligation & Penalties, the DMP is 520€/MWh and above 500€/MWh Calibrated Strike Price, **the Strike Price is 520€/MWh** for the 4,23 MW CMU's Transaction on all Payback Obligation hours H19 and H20

#### Day-Ahead Prices on 10/01/2026



#### (Partial) Declared Prices

Associated Volume (MW)	Day-Ahead Market (€/MWh)	Intraday Market (€/MWh)	Balancing Market (€/MWh)
NRP = 4,5	520	N/A	N/A



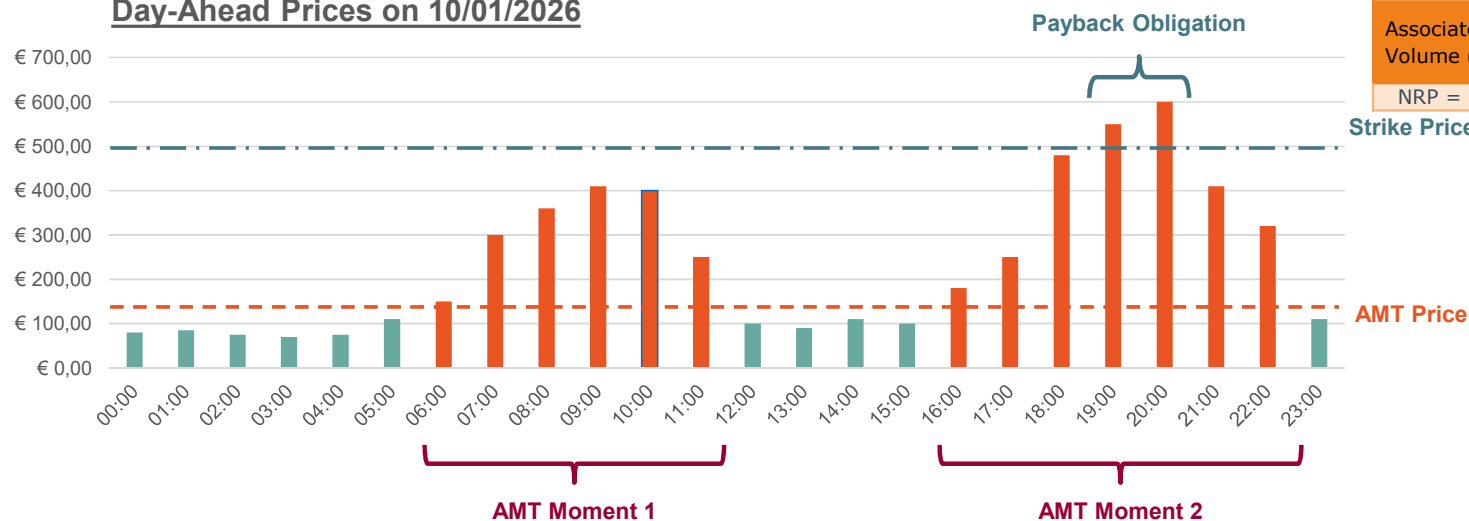


### 3. Payback Obligation – Strike Price

#### DMP of the without Daily Schedule CMU

- As CMU3 of RollingEnergy.SA/NA is a without Daily Schedule CMU, a check occurs on its DMP value in comparison with the Calibrated Strike Price (500€/MWh) of the Transaction
- $Strike\ Price\ (CMU_{id},\ Transaction_{id},\ t) = \max(DMP(CMU_{id}, t); Calibrated\ Strike\ Price\ (CMU_{id},\ Transaction_{id},\ t))$
- According to UC3 of Availability Obligation & Penalties, the DMP is 1000€/MWh and above 500€/MWh Calibrated Strike Price, **the Strike Price is 1000€/MWh** for the 5,15 MW CMU's Transaction on all Payback Obligation hours H19 and H20

#### Day-Ahead Prices on 10/01/2026

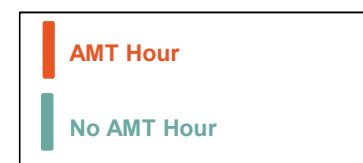


#### (Partial) Declared Prices

Associated Volume (MW)	Day-Ahead Market (€/MWh)	Intraday Market (€/MWh)	Balancing Market (€/MWh)
NRP = 5,15	1.000	N/A	N/A

Strike Price

AMT Price



## CMU 1



### 3. Payback Obligation formula

Contracted Capacity	Ex-Ante	Ex-Post
Primary Transaction (MW)	17,12	N/A
Secondary Transaction (MW)	0	0
Derating Factor	0,8	N/A



#### For each ex-ante Transaction of the Energy Constrained CMU:

The formula of the Payback Obligation is applied on each of the two hours for which the Reference Price exceed the Strike Price:

$$\text{Payback Obligation (CMU}_{id}, \text{ Transaction}_{id}, t) = \text{Max}(0 ; \text{Reference Price (CMU}_{id}, t) - \text{Strike Price (CMU}_{id}, \text{ Transaction}_{id}, t)) * \frac{\text{Contracted Capacity (CMU}_{id}, \text{ Transaction}_{id}, t)}{\text{Derating Factor (CMU}_{id}, \text{ Transaction}_{id}, t)} * \text{Availability Ratio (CMU}_{id}, t)$$

It gives for hour 19:00:  $\text{Max}(0 ; 550 - 500) * \frac{17,12}{0,8} * 1 = 1070,00\text{€}$

It gives for hour 20:00:  $\text{Max}(0 ; 600 - 500) * \frac{17,12}{0,8} * 1 = 2140,00\text{€}$

#### For each ex-post Transaction of the Energy Constrained CMU:

$$\text{Payback Obligation (CMU}_{id}, \text{ Transaction}_{id}, t) = \text{Max}(0 ; \text{Reference Price (CMU}_{id}, t) - \text{Strike Price (CMU}_{id}, \text{ Transaction}_{id}, t)) * \text{Contracted Capacity (CMU}_{id}, \text{ Transaction}_{id}, t) * \text{Availability Ratio (CMU}_{id}, t)$$

No Transaction on the CMU



## CMU 2



### 3. Payback Obligation formula

Contracted Capacity	Ex-Ante	Ex-Post
Primary Transaction (MW)	4,23	N/A
Secondary Transaction (MW)	0	0
Derating Factor	0,6	N/A



#### For each ex-ante Transaction of the non-Energy Constrained CMU:

The formula of the Payback Obligation is applied on each of the two hours for which the Reference Price exceed the Strike Price:

$$\text{Payback Obligation (CMU}_{id}, \text{ Transaction}_{id}, t) = \text{Max}(0 ; \text{Reference Price (CMU}_{id}, t) - \text{Strike Price (CMU}_{id}, \text{ Transaction}_{id}, t)) * \text{Contracted Capacity (CMU}_{id}, \text{ Transaction}_{id}, t) * \text{Availability Ratio (CMU}_{id}, t)$$

It gives for hour 19:00:  $\text{Max}(0 ; 550 - 520) * 4,23 * 0,544 = 69,03\text{€}$

It gives for hour 20:00:  $\text{Max}(0 ; 600 - 520) * 4,23 * 0,544 = 184,06\text{€}$

#### For each ex-post Transaction of the Energy Constrained CMU:

$$\text{Payback Obligation (CMU}_{id}, \text{ Transaction}_{id}, t) = \text{Max}(0 ; \text{Reference Price (CMU}_{id}, t) - \text{Strike Price (CMU}_{id}, \text{ Transaction}_{id}, t)) * \text{Contracted Capacity (CMU}_{id}, \text{ Transaction}_{id}, t) * \text{Availability Ratio (CMU}_{id}, t)$$

No Transaction on the CMU

## CMU 3



### 3. Payback Obligation formula

Contracted Capacity	Ex-Ante	Ex-Post
Primary Transaction (MW)	5,15	N/A
Secondary Transaction (MW)	0	0
Derating Factor	0,8	N/A



#### For each ex-ante Transaction of the non-Energy Constrained CMU:

The formula of the Payback Obligation is applied on each hour for which the Reference Price exceed the Strike Price:

$$\text{Payback Obligation (CMU}_{id}, \text{ Transaction}_{id}, t) = \text{Max}(0 ; \text{Reference Price (CMU}_{id}, t) - \text{Strike Price (CMU}_{id}, \text{ Transaction}_{id}, t)) * \text{Contracted Capacity (CMU}_{id}, \text{ Transaction}_{id}, t) * \text{Availability Ratio (CMU}_{id}, t)$$

It gives for hour 19:00:  $\text{Max}(0 ; 550 - 1000)) * 5,15 * 1 = 0\text{€}$

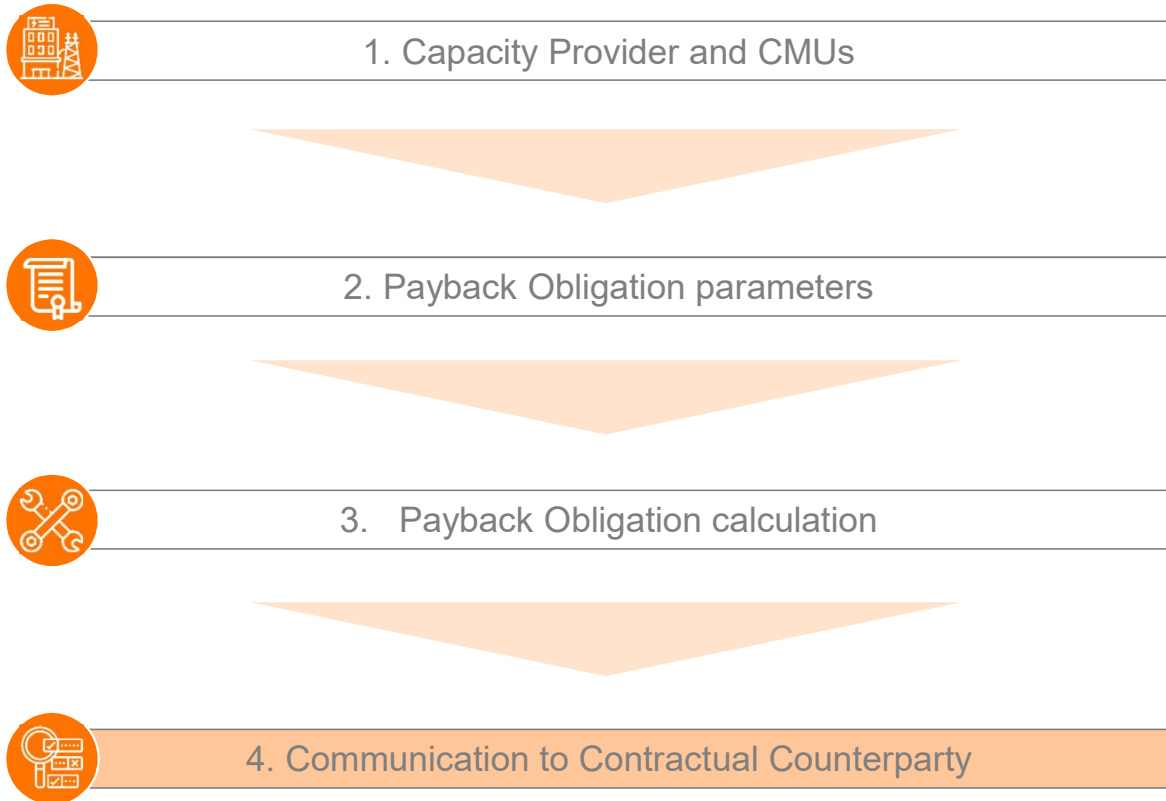
It gives for hour 20:00:  $\text{Max}(0 ; 600 - 1000)) * 5,15 * 1 = 0\text{€}$

#### For each ex-post Transaction of the Energy Constrained CMU:

$$\text{Payback Obligation (CMU}_{id}, \text{ Transaction}_{id}, t) = \text{Max}(0 ; \text{Reference Price (CMU}_{id}, t) - \text{Strike Price (CMU}_{id}, \text{ Transaction}_{id}, t)) * \text{Contracted Capacity (CMU}_{id}, \text{ Transaction}_{id}, t) * \text{Availability Ratio (CMU}_{id}, t)$$

No Transaction on the CMU

## Use case structure





## 4. Report to the Contractual Counterparty

Prior the creation of the report (at latest the 15<sup>th</sup> of the month M+2 for the related month M of the Delivery Period), ELIA checks the Transaction cumulated Payback Obligations already paid for the Transactions on which a Stop Loss principles applies:

**For the 3 Transactions of RollingEnergy, the Stop Loss Amounts are respectively 291,04k€ ; 81,36k€ ; 92,7k€ / DP 2025.**

The Payback Obligation on the Delivery Period up to the month M (January 2026) included doesn't reach the Stop Loss amount of the Transaction, so that:

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

Where m are the hours of the month M.

→ The Capacity Provider has to re-imburse the complete Payback Obligations of the month M (Effective).



## 4. Report to the Contractual Counterparty

At latest the 15<sup>th</sup> of the month M+2 for the related month M of the Delivery Period, a report is sent to the Contractual Counterparty and includes:

The Capacity Provider Id

The CMU identification Id

The Transaction identification Id

The Total Payback Obligation of the month M

The Effective Payback Obligation value of the month M (after Stop Loss principle on the Delivery Period if applicable)

**And for all hours of the month for which the Reference Price exceeds the Strike Price and a Payback Obligation applies:**

- The Availability Ratio
- The Obligated Capacity
- The Reference Price
- The Strike Price value
- The Payback Obligation value

It gives for the month M of January 2026:

CMU1 : 3 210,00€

CMU2 : 253,09€

CMU3 : 0€