Payback Obligation
Use Case 1

Offtake: Industrial process on a site – Oven & Melting

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
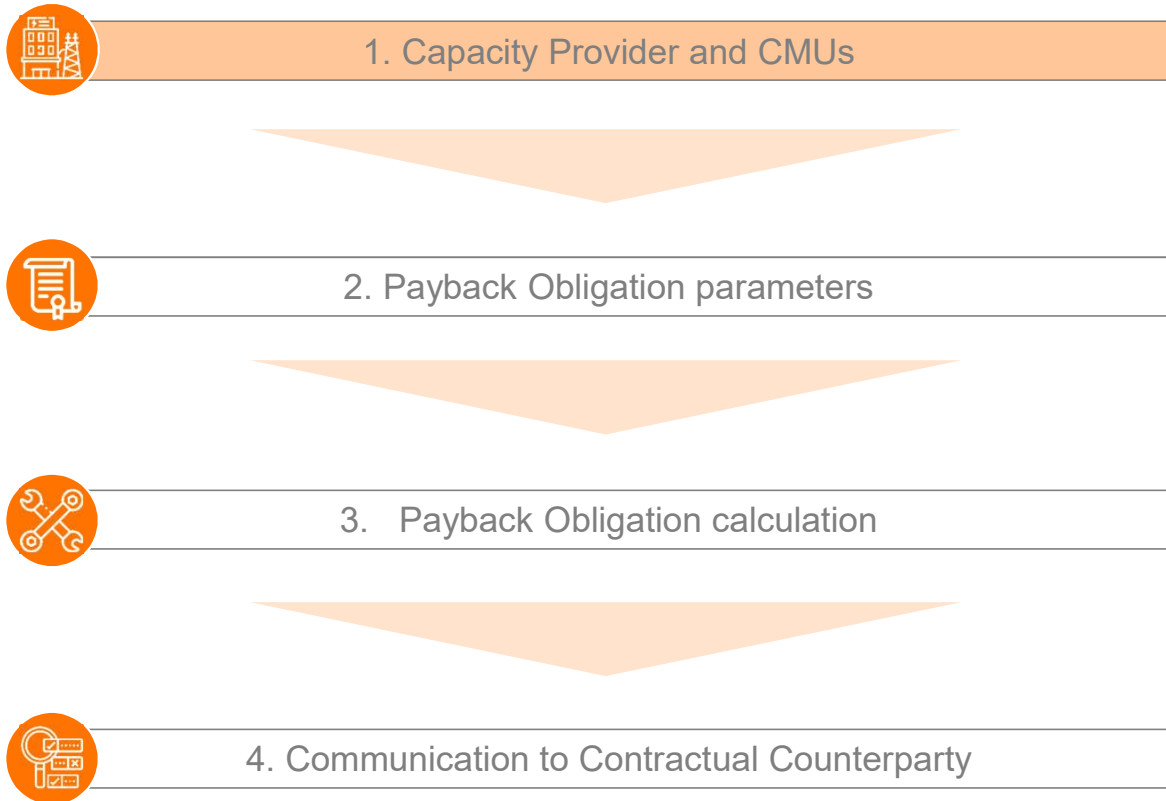
2. Payback Obligation parameters

3. Payback Obligation calculation

4. Communication to Contractual Counterparty

Use case structure

1. Capacity Provider and CMUs

2. Payback Obligation parameters

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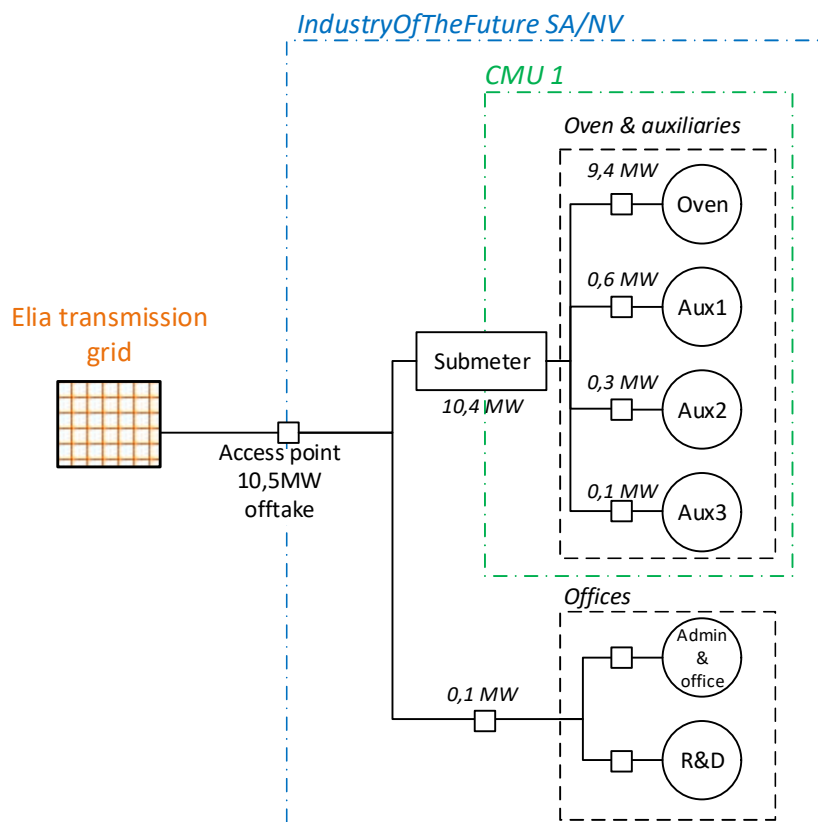4. Communication to Contractual Counterparty

1. Capacity Provider and CMU

- **IndustryOfTheFuture.SA/NA is owner of a site** on which a major oven & melting process are major consumers of electricity (located in Belgium and TSO connected)

- The CMU is purely electricity consumption oriented & TSO connected (no Individual MW Schedule Obligation)

- The CMU has a Nominal Reference Power of **10,4 MW**

- It is a 24h SLA hours asset, with a Derating Factor of **1**

- The Unsheddable Margin is equals to **0 MW**

- The CMU consists of one Delivery Point at the submeter (see next slide)

- **2 MW** of the Delivery Point is prequalified in the Manual Frequency Restoration Reserve (mFRR)

1. Detailed view: Capacity Provider and CMU

IndustryOfTheFuture SA/NV

CMU 1

Oven & auxiliaries

9,4 MW	Oven
0,6 MW	Aux1
0,3 MW	Aux2
0,1 MW	Aux3

Submeter 10,4 MW

Elia transmission grid

Access point 10,5MW offtake

Offices

0,1 MW

Admin & office

R&D

Name of the company	IndustryOfTheFuture.SA/NA	
Geographical site	• Owner: IndustryOfTheFuture.SA/NA • Location: Belgium • Connection: TSO grid	
Technology	• Electrical load: Oven & melting process (main part of the load), Offices • 24h SLA hours asset	
Prequalified CMU	Oven and auxiliaries	
CRM Capacity	• Type: Existing • Nominal reference power: 10,4 MW • Opt-out: 0,4 MW • Reference power: 10MW	• Derating factor: 1 • Eligible Volume: 10MW • Grid constraints : No grid contraints as existing load • Non-Energy Constrained CMU
Year	• 2021	
CRM auction parameters	• Participate to 2021 Y-4 auction or later • Contract duration: 1 year maximum, no investment file submitted to CREG	

1. Capacity Provider and CMU – Contracted Capacity : Transaction overview

Primary Transaction

- After its participation to a **Y-4 Auction** in October 2021, the following bid of the CMU has been selected:

Auction results	
Selected bids	
Selected Bid volumes	10 MW
Related Price	17€/kW/year
Capacity contract duration	1 year

- No bid was selected for the **Y-1 auction** as the Remaining Eligible Volume of the CMU is 0 MW

Secondary Transaction

- No transaction on the Secondary Market

The CMU has a Total Contracted Capacity of **10 MW**

Use case structure

1. Capacity Provider and CMUs

2. Payback Obligation parameters

3. Payback Obligation calculation

4. Communication to Contractual Counterparty

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 IndustryOfTheFuture 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:

- The CMU is considered as an **Energy Constrained CMU with a SLA of 24 hours**

- The CMU has a **Derating Factor of 1.**

- The CMU is considered as **without Daily Schedule** and it has a DMP price as a result of the Availability Obligation and Penalties

    - **If the DMP price is 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 entire or several entire Delivery Periods as Transaction Period.

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

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 IndustryOfTheFuture Primary Market Transaction of 10MW, the Stop Loss Amount is applicable as Primary Market Transaction:**

  = 10MW * 17 k€/MW/Delivery Period = **170k€ / Delivery Period 2025**

Use case structure

1. Capacity Provider and CMUs

2. Payback Obligation parameters

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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.

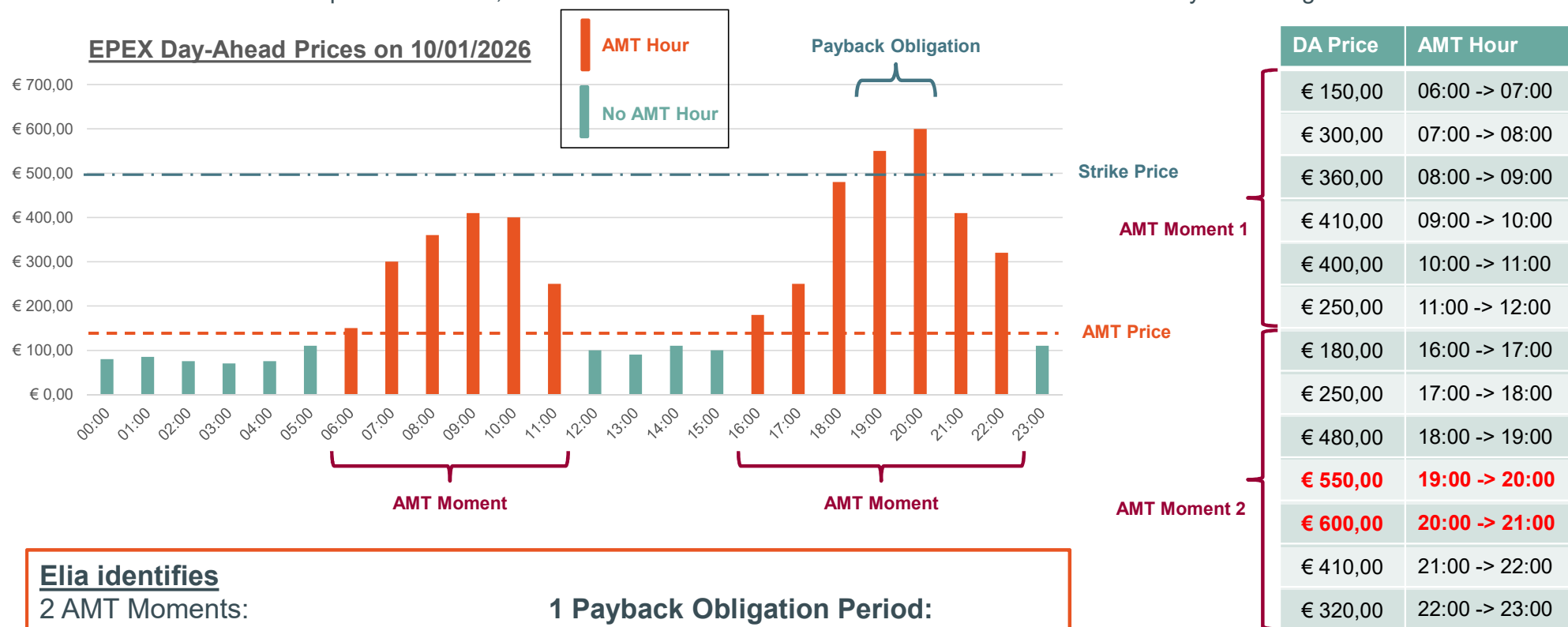The Payback Obligation is calculated for each Transaction.
To perform the calculation of the Payback Obligation, ELIA will gather for all Transactions having a Transaction Period including the hours for which the Reference Price exceeds the Strike Price and a Payback Obligation applies, the following 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

EPEX Day-Ahead Prices on 10/01/2026

Legend:
- AMT Hour (orange)
- No AMT Hour (teal)

Payback Obligation

DA Price	AMT Hour
€ 150,00	06:00 -> 07:00
€ 300,00	07:00 -> 08:00
€ 360,00	08:00 -> 09:00
€ 410,00	09:00 -> 10:00
€ 400,00	10:00 -> 11:00
€ 250,00	11:00 -> 12:00
€ 180,00	16:00 -> 17:00
€ 250,00	17:00 -> 18:00
€ 480,00	18:00 -> 19:00
€ 550,00	**19:00 -> 20:00**
€ 600,00	**20:00 -> 21:00**
€ 410,00	21:00 -> 22:00
€ 320,00	22:00 -> 23:00

AMT Moment 1

AMT Moment 2

Strike Price

AMT Price

AMT Moment

AMT Moment

Elia identifies

2 AMT Moments:
- From 06:00 to 12:00
- From 16:00 to 23:00

1 Payback Obligation Period:
- **From 19:00 to 21:00**

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 Remaining Maximum Capacity DA are obtained in the Availability Obligations and Penalties Use Case 1 and according to the Functioning Rules.

- It equals $Availability\ Ratio\ (CMU_{id}, t) = \frac{Min(Obligated\ Capacity\ (CMU_{id}, t); Remaining\ Maximum\ Capacity\ DA\ (CMU_{id}, t))}{Obligated\ Capacity\ (CMU_{id}, t)}$

DA Price	AMT Hour	SLA Hour	Obligated Capacity (MW)	Remaining Maximum Capacity DA (MW)	Availability Ratio
€ 480,00	18:00 -> 19:00	Yes	10	10,4	1
€ 550,00	19:00 -> 20:00	Yes	10	10,4	1
€ 600,00	20:00 -> 21:00	Yes	10	10,4	1
€ 410,00	21:00 -> 22:00	Yes	10	10,4	1

Payback Obligation Period

3. Payback Obligation – Strike Price

DMP of the without Daily Schedule CMU

- As IndustryOfTheFuture.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 UC1 of Availability Obligation & Penalties, as none of the DMP constituting elements are above 500€/MWh Calibrated Strike Price, **the Strike Price is 500€/MWh** for the 10 MW CMU's Transaction on all Payback Obligation hours H19 and H20

Day-Ahead + Intraday reference prices on 10/01/2026

(Partial) Declared Prices

Ass Vol	(p)DDAP	(p)DIDP
10,4	450	450
9,4	400	400

- AMT Hour
- No AMT Hour
- Potential SLA Hours
- Intraday Reference

3. Payback Obligation formula

Contracted Capacity	Ex-Ante	Ex-Post
Primary Transaction (MW)	10	N/A
Secondary Transaction (MW)	0	0
Derating Factor	1	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:

$$Payback\ Obligation\ (CMU_{id}, \quad Transaction_{id}, t)$$
$$= Max(0\ ; Reference\ Price\ (CMU_{id}, t) - Strike\ Price(CMU_{id}, \quad Transaction_{id}, t)) * \frac{Contracted\ Capacity\ (CMU_{id}, Transaction_{id}, t)}{Derating\ Factor\ (CMU_{id}, Transaction_{id}, t)} * Availability\ Ratio\ (CMU_{id}, t)$$

It gives for hour 19:00: $Max(0\ ; 550 - 500)) * \frac{10}{1} * 1 = 500€$

It gives for hour 20:00: $Max(0\ ; 600 - 500)) * \frac{10}{1} * 1 = 1000€$

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

$$Payback\ Obligation\ (CMU_{id}, \quad Transaction_{id}, t)$$
$$= Max(0\ ; Reference\ Price\ (CMU_{id}, t) - Strike\ Price(CMU_{id}, \quad Transaction_{id}, t)) * Contracted\ Capacity\ (CMU_{id}, \quad Transaction_{id}, t) * Availability\ Ratio\ (CMU_{id}, t)$$

No Transaction on the CMU

Use case structure

1. Capacity Provider and CMUs

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4. Report to the Contractual Counterparty

Prior the creation of the report (at latest the 15th 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 Transaction of 10 MW of IndustryOfTheFuture, the Stop Loss Amount is 170k€ / 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:

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

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 15th 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