

WG Adequacy #18

14/04/2023

Agenda

- Welcome
- CRM proposal on the scenarios, input data and sensitivities
- LCT Status Update on Needs
- Cross-Border Status Update
- Regulatory Framework Evolutions
- AOB
- Next Meetings



CRM Calibration

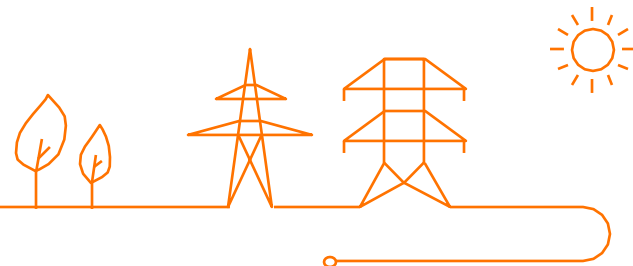
Proposal on the scenario, input data and sensitivities for
Y-1 auction Delivery Year 2025-26 &
Y-4 auction Delivery Year 2028-29

April 14 2023



Agenda

1. Planning
2. Update external studies
3. Public consultation – Royal Decree framework
4. Scenario & sensitivities – How are they constructed ?
5. Scenario dataset
6. Updates for neighboring countries
7. Sensitivities
8. Other parameters to be consulted





Planning

Indicative Planning for the scenario definition process



Following the public consultation, a second Working Group Adequacy will take place in order to present the public consultation report, including:

- the questions received from stakeholders;
- the answers from Elia; and
- Elia’s recommendations.



External studies

Load determination by Climact

- Request by stakeholders to provide more transparency on the tool and the parameters used to estimate the load
- More details in the slides covering the load

Quantitative DSR volume estimation by E-Cube

- High prices pose limitations to the established methodology
- Proposal to improve the methodology
- More detail in the slides covering the DSR

Strike Price calibration by E-Cube

- Yearly update ongoing
- No changes to methodology

Cost of capacity study

- RFP proposal was written by Elia and sent to the CREG for review
- Elia is currently refining the proposal based on comments from the CREG
- The goal is to involve market parties in the study, and to also publicly consult on it



**Public consultation – RD
framework**

Context : Royal Decree framework

Art. 5. § 1er. Le gestionnaire de réseau organise une ou plusieurs consultations publiques conformément à l'article 7undecies, § 3, alinéa 3, de la loi du 29 avril 1999 durant une période de minimum un mois. Le gestionnaire du réseau informe les acteurs de marché de la tenue de cette (ces) consultation(s).

§ 2. Au moins les sujets suivants sont soumis à une consultation publique :

1° la mise à jour des données et des hypothèses du scénario ou des scénarios, ainsi que des sensibilités, telles que visées à l'article 3, § 3 ;

2° la pertinence des sensibilités visées à l'article 3, §4, en ce compris les données et hypothèses à partir desquelles elles ont été établies ;

3° le type de capacité supplémentaire visé à l'article 6, § 1er ;

4° les sources publiques des scénarios pour les années postérieures à l'année de livraison à partir desquelles les données d'entrée sont utilisées pour le calcul des rentes inframarginales annuelles visées à l'article 10, §6 ;

5° la liste réduite des technologies existantes qui seront raisonnablement disponibles et qui sont éligibles pour la détermination du prix maximal intermédiaire visé à l'article 18, §1er.

Art. 5. § 1. De netbeheerder organiseert een of meerdere openbare raadpleging(en) met het oog op de opmaak van zijn verslag en zijn voorstel bedoeld in artikel 7undecies, § 3, derde lid van de wet van 29 april 1999, gedurende een periode van ten minste één maand. De netbeheerder informeert de marktdeelnemers over het houden van deze raadpleging(en).

§ 2. De volgende onderwerpen worden ten minste aan openbare raadpleging onderworpen:

1° de actualisatie van de gegevens en hypothesen van het scenario of de scenario's en de gevoeligheden zoals bedoeld in artikel 3, § 3;

2° de relevantie van de gevoeligheden bedoeld in artikel 3, § 4, inclusief de gegevens en hypothesen waaruit ze zijn opgebouwd;

3° het type bijkomende capaciteit bedoeld in artikel 6, § 1;

4° de publieke bronnen van de scenario's voor de jaren na het leveringsjaar waaruit de invoergegevens gebruikt worden voor de berekening van de jaarlijkse inframarginale inkomsten, bedoeld in artikel 10, § 6;

5° de beperkte lijst van bestaande technologieën die redelijkerwijs beschikbaar zullen zijn, en die in aanmerking komen voor de bepaling van de intermediaire maximumprijs, bedoeld in artikel 18, §1.

The first part of this presentation will introduce the **proposed data and assumptions associated with the scenario**, as mentioned in article 3, §2 of the RD.

The second part of this presentation will introduce the **proposed updates according to latest relevant information**, as mentioned in article 3, §3 of the RD.

The third part of this presentation will present the **proposed sensitivities, their source and the impact on the input data**, as mentioned in article 3, §4 of the RD.

The last part of this presentation is dedicated to three other parameter proposals that will be part of the public consultation :

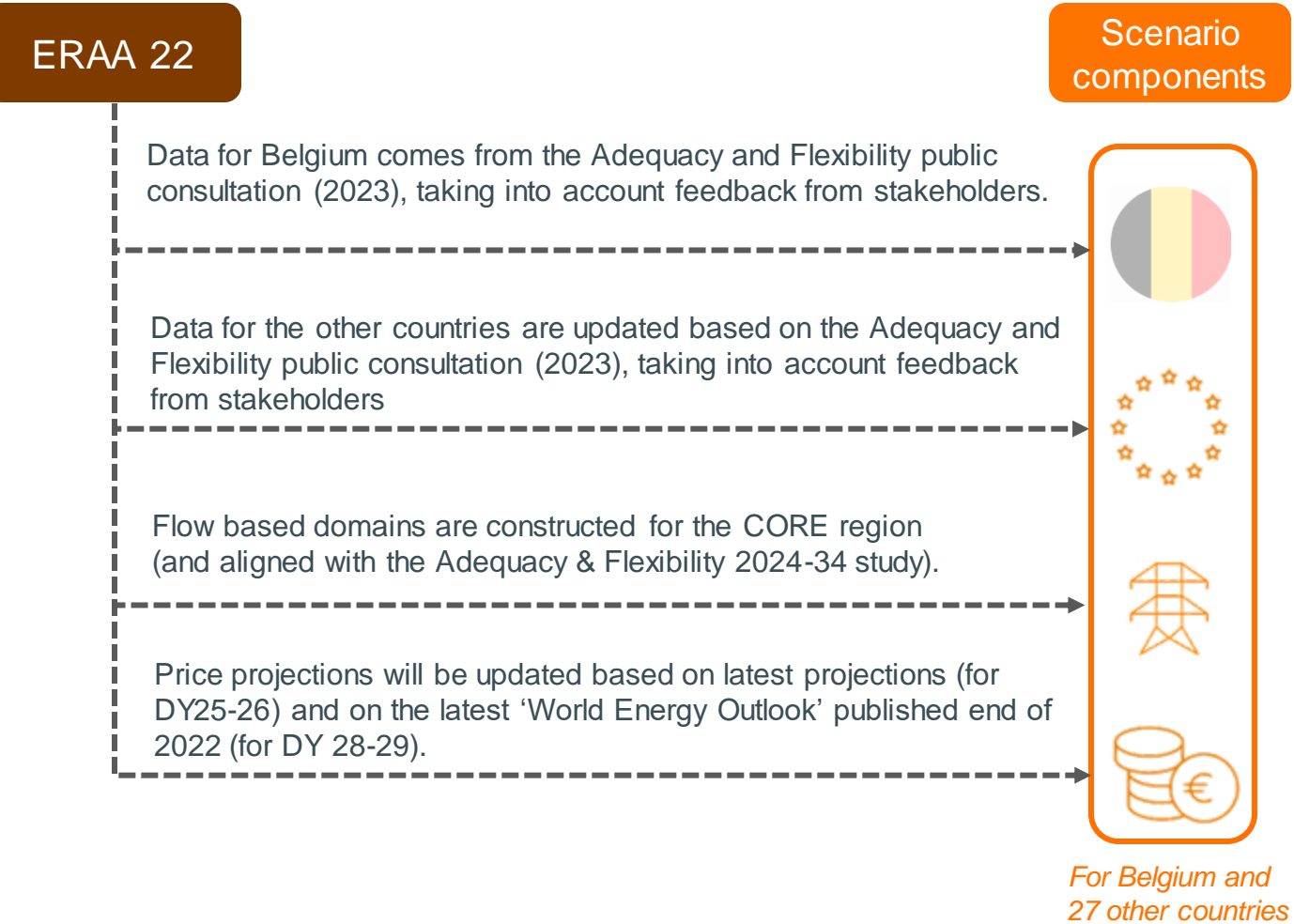
- **Preselected capacity types** (in order to make the reference scenario adequate)
- The **sources of the scenarios** for the determination of market revenues **after the delivery period**
- The **IPC parameters**



Scenario & Sensitivities – How are they constructed ?

The reference scenarios for DY 2025-26 and DY 2028-29 are constructed based the most recent ERAA complemented with additional events to be selected by Belgian authorities after public consultation

Art. 3. § 1er. Le gestionnaire de réseau effectue, en collaboration avec la Direction générale de l’Energie et en concertation avec la commission, une sélection d’un ou de plusieurs scénarios et sensibilités selon les étapes décrites à l’article 3, §§2 à 4 inclus.



§ 2. A partir de l’évaluation européenne, visée à l’article 23 du Règlement (UE) 2019/943, et / ou de l’évaluation nationale visée à l’article 24 du Règlement (UE) 2019/943, les plus récemment disponibles au moment de la sélection, un ou plusieurs scénarios et sensibilités sont sélectionnés. Cette sélection comprend au moins le scénario de référence central européen visé à l’article 23, 1er alinéa, 5, b) du Règlement (UE) 2019/943. Tant que lesdites évaluations ne sont pas encore disponibles, une sélection est effectuée à partir d’autres études disponibles.

§ 3. Les données et hypothèses à partir desquelles lesdits scénarios et sensibilités ont été établis, sont mises à jour sur la base des informations pertinentes les plus récentes.

The reference scenarios for DY 2025-26 and DY 2028-29 are constructed based the most recent ERAA complemented with additional events to be selected by Belgian authorities after public consultation

Following Article 3, §2-3

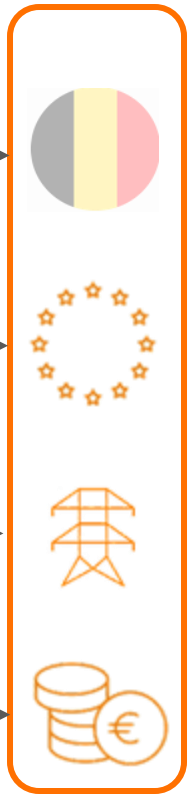
Following Article 3, §4

ERAA 22

Scenario components

Additional sensitivities to be included

- Data for Belgium comes from the Adequacy and Flexibility public consultation (2023), taking into account feedback from stakeholders.
- Data for the other countries are updated based on the Adequacy and Flexibility public consultation (2023), taking into account feedback from stakeholders
- Flow based domains are constructed for the CORE region (and aligned with the Adequacy & Flexibility 2024-34 study).
- Price projections will be updated based on latest projections (for DY25-26) and on the latest 'World Energy Outlook' published end of 2022 (for DY 28-29).



For Belgium and 27 other countries



- Sens. 1
- Sens. 2
- Sens. 3
- Sens. 4
- Sens. 5
- Sens. 6
-
-
-
-

List of sensitivities on all scenario components are possible

§ 4. En outre, d'autres sensibilités peuvent être définies, lesquelles peuvent avoir un impact sur la sécurité d'approvisionnement de la Belgique, notamment des évènements en dehors de la zone de réglage belge.

The reference scenarios for DY 2025-26 and DY 2027-28 are constructed based the most recent ERAA complemented with additional events to be selected by Belgian authorities after public consultation



Following Article 3, §2-3

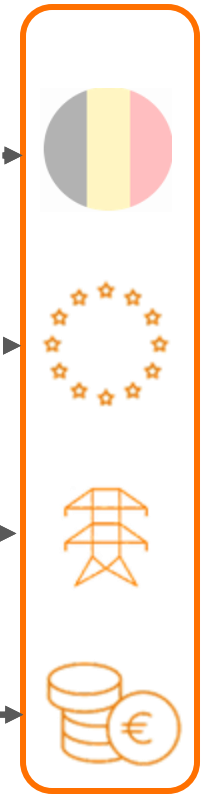
Following Article 3, §4

Following Article 3, §6-7

ERAA 22

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Scenario components



For Belgium and 27 other countries

Additional sensitivities to be included

- Sens. 1
- Sens. 2
- Sens. 3
- Sens. 4
- Sens. 5
- Sens. 6
-
-
-
-

List of sensitivities on all scenario components are possible

Sensitivity(ies) to be included in the reference scenario

EXAMPLE

- Sens. 2
- Sens. 4

The choice of the sensitivities to be included in the reference scenario is made following the process described in the RD and after public consultation.

§ 7. Compte tenu de la proposition de la commission, des recommandations du gestionnaire du réseau et de l'avis de la Direction générale de l'Energie, le Ministre décide, par arrêté délibéré en Conseil des ministres depuis la décision prise en 2021, au plus tard le 15 septembre de l'année précédant les enchères, de l'ensemble des données et des hypothèses qui doit être sélectionné comme scénario de référence. Le Ministre peut déroger à la proposition de la commission moyennant motivation adéquate.

What elements of the reference scenario will be submitted to public consultation ?

Details for each scenario component will be provided in an Excel file complemented with an explanatory note



- Generation and storage capacities per type (including a list of all CIPU thermal units)
- Forced outage rates per technology
- Yearly total electricity final consumption
- Demand-side response volume (including end-user flexibility and additional industrial DSR linked to electrification)
- Balancing reserves volume
- A table will be presented based on ERAA 22 dataset and updated based on the Adequacy and Flexibility public consultation (2023). This table will include for both time horizons information on yearly demand [TWh] and capacities [GW] for onshore wind, offshore wind, solar, coal and nuclear for Germany, France, Netherlands, United Kingdom, Spain, Italy, Poland and Denmark.
- A reference to the ERAA 22 dataset will be given with the NTCs used (outside of the FB zone)
- In addition FB domains parameters and underlying assumptions will be provided
- Fuel and CO₂ prices
- Proposal of sensitivities

§5. Les scénarios et sensibilités sélectionnés, en ce compris les données et hypothèses à partir desquelles ils ont été établis, sont soumis à une consultation publique telle que visée à l'article 5.

Explanatory
note



Excel file with
all data



Other parameters will also be consulted upon:

- *technology list and costs by technology for the IPC, including efficiency and VOM ranges for the marginal cost calculation;*
- *scenario choice for delivery period after the delivery period;*
- *pre-selected capacity types (to be used to 'calibrate' the country's adequacy if needed), including CAPEX, FOM & economic lifetime.*



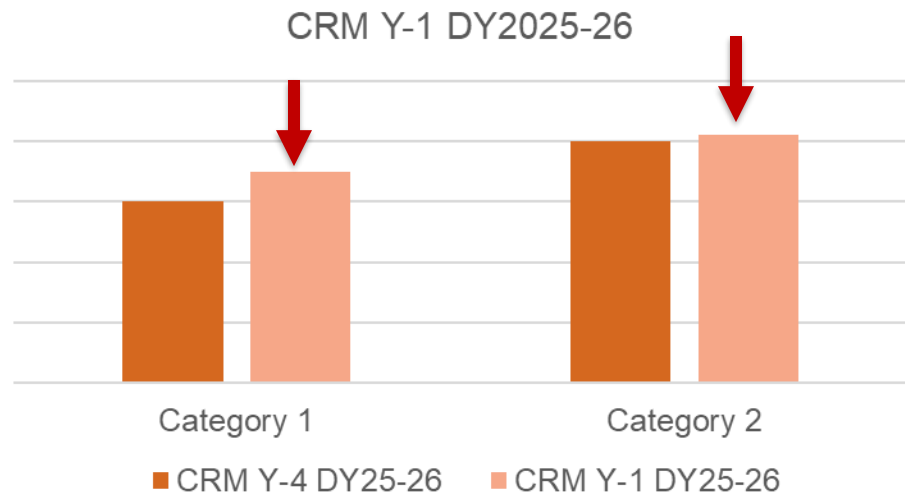
Scenario dataset

Information regarding following slides

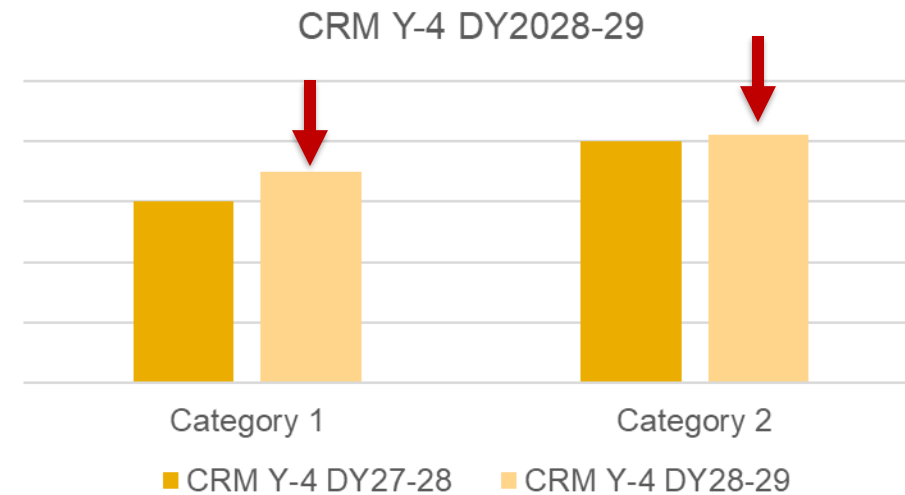
- Sensitivity proposals will be mentioned in the document this way:

Sensitivity XXX - xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

- Dataset will be presented and compared to the previous auctions this way:



Dataset for the proposed scenario of the Y-1 auction DY2025-26 will be compared with the scenario determined for the Y-4 auction DY2025-26, defined in Sep 20 by the Minister



Dataset for the proposed scenario of the Y-4 auction DY2028-29 will be compared with the scenario determined for the Y-4 auction DY2027-28, defined in Sep 22 by the Minister

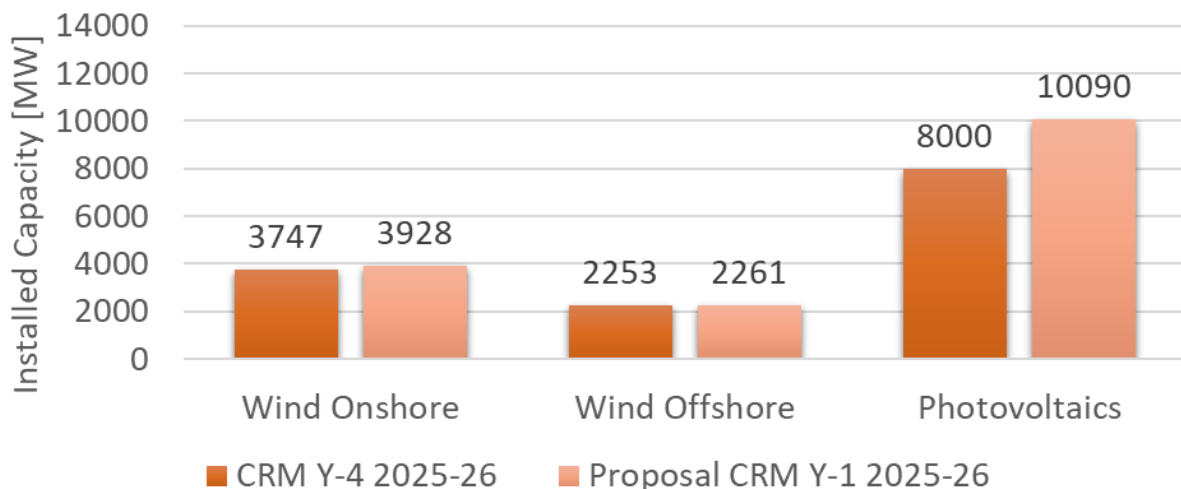
 Arrows indicate the value proposed for scenario to be used in the next calibration report

Overview of renewable generation installed capacities



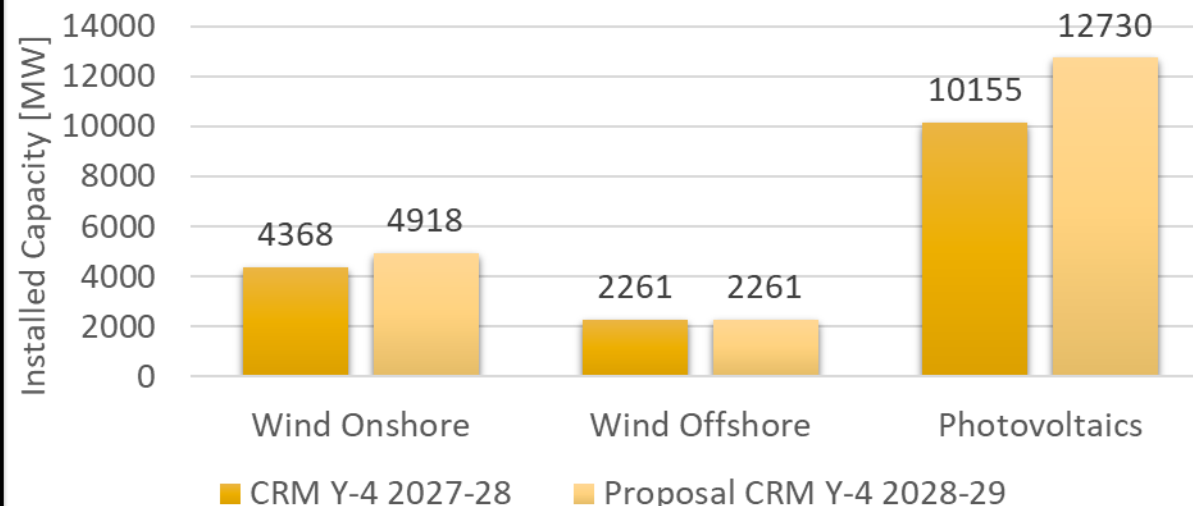
CRM Y-1 2025-26

Wind/Solar installed capacity



CRM Y-4 2028-29

Wind/Solar installed capacity



Category

Reason

Wind Onshore	Updated to consider latest ambitions (VEKA, SPW) and the feedback received during the AdeqFlex 23 public consultation
Wind Offshore	Aligned with the latest planning for MOG II (SPF economy)
Photovoltaics	Increased PV ambition based on the feedback received from the region and DSO during AdeqFlex 23 public consultation.

Category

Reason

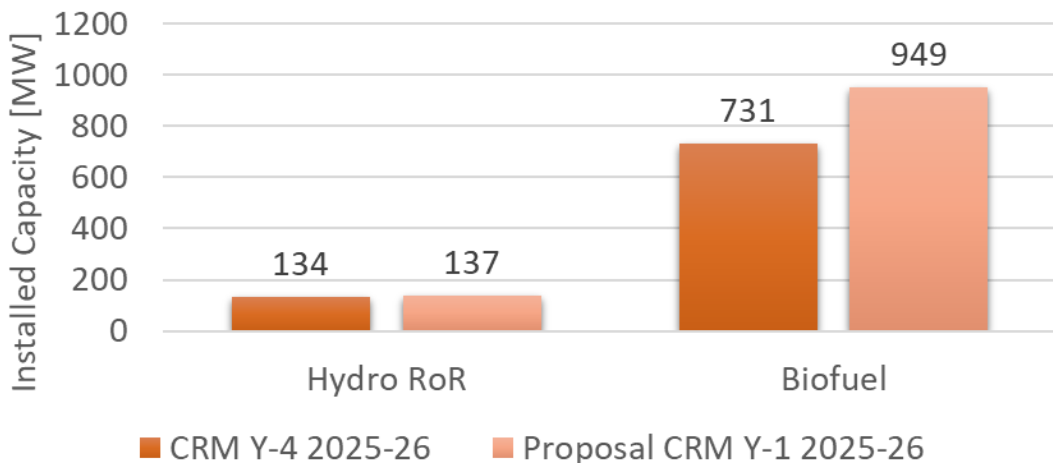
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Overview of other RES installed capacity



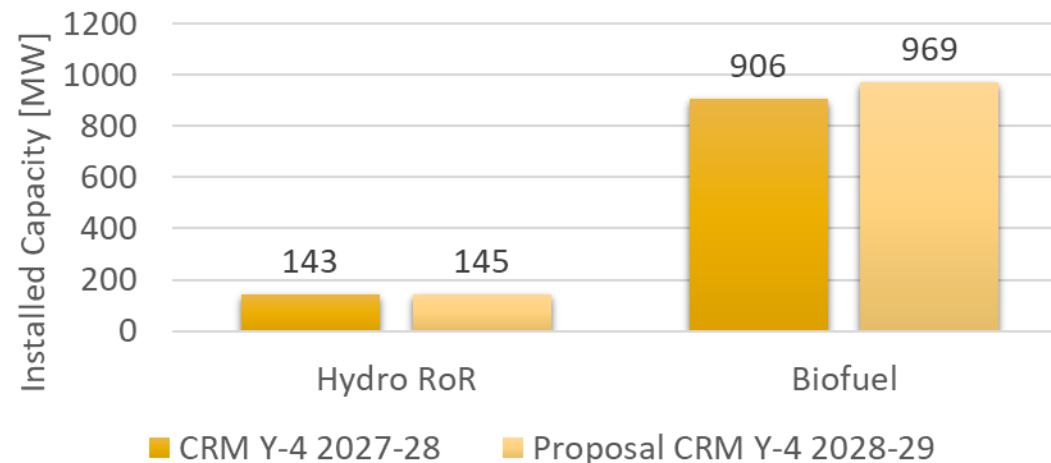
CRM Y-1 2025-26

Other RES installed capacity



CRM Y-4 2028-29

Other RES installed capacity

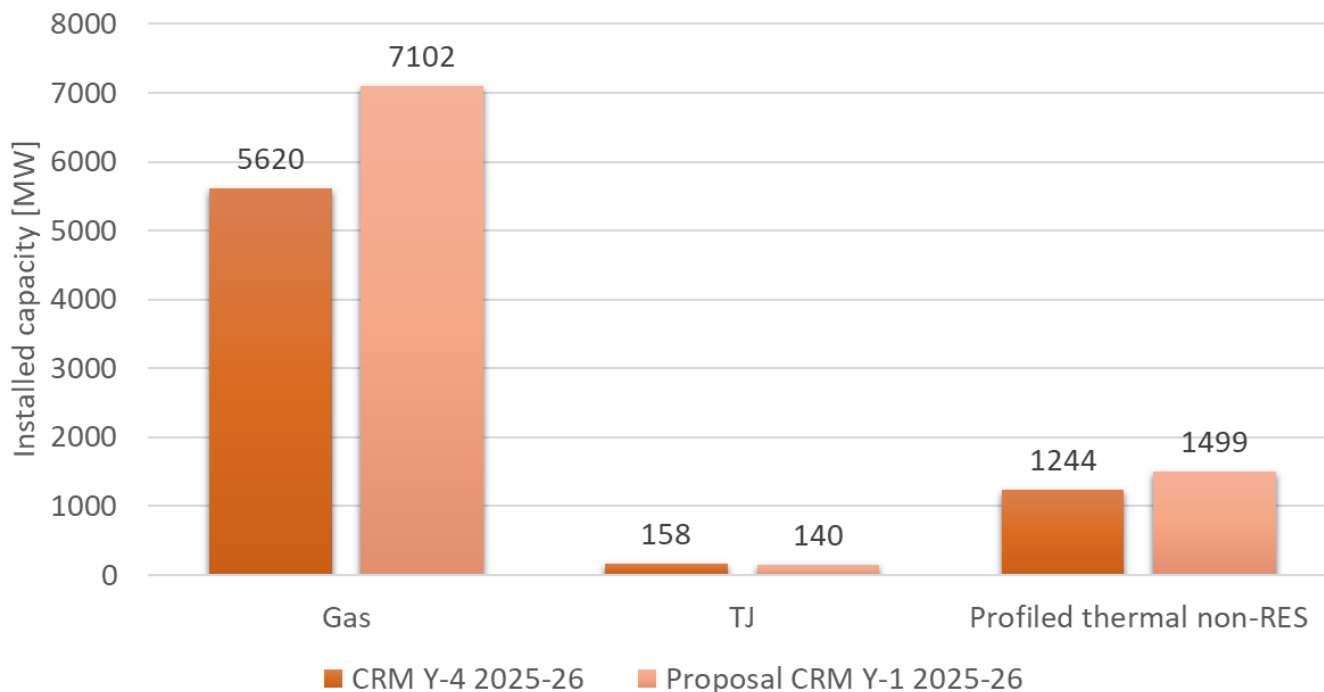


Category	Reason
Hydro – Run of River	151 MW by 2030 is taken into account in the NECP (2019), and a linear interpolation to this target is being considered.
Biofuel (Biomass and waste)	Increase based on upward trend observed on Elia’s internal database

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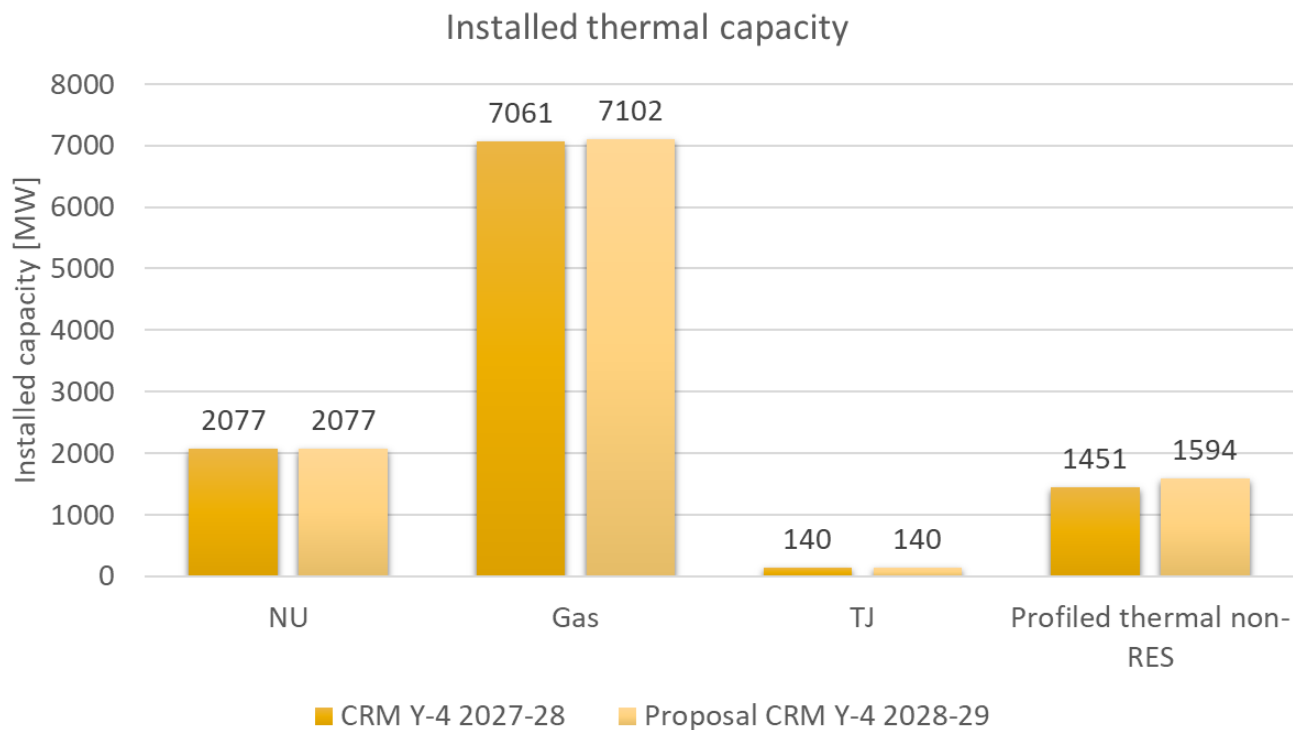
Installed thermal capacity



Category	Reason of the evolution
Gas*	Comissioning of the new CCGT Flémalle (+890MW), new CCGT Seraing (+885MW) and Borealis Kallo Gent ST commissioned (+32 MW).
	Update of the nominal power of Ringvaart STEG (+28 MW) and Marcinelle Energie TGV (+8MW), Izegem (-2 MW), Jemeppe-sur-Sambre GT1 (+5 MW) and Jemeppe-sur-Sambre GT2 (+5 MW).
	Repowering of Saint-Ghislain STEG (+36 MW) and Zanvliet Power (+33 MW).
	Removal of Seraing TV (-170 MW), Vilvoorde GT (-255 MW), and Ham Gent ST (-13 MW)
TJ	TURBOJET VOLTA (-18 MW) decomissioned
Profiled thermal capacity	Increase based on changes observed on Elia's internal database

*More details about the gas units are given in the assumption workbook.

In addition to these installed capacities, **Doel 2 is taken into account until 01/12/2025.**



Category	Reason of the evolution
CCGT	Repowering of Zandvliet Power (+33 MW) and Saint-Ghislain (+8 MW)
Profiled thermal capacity	Increase based on the changes observed on Elia's internal database

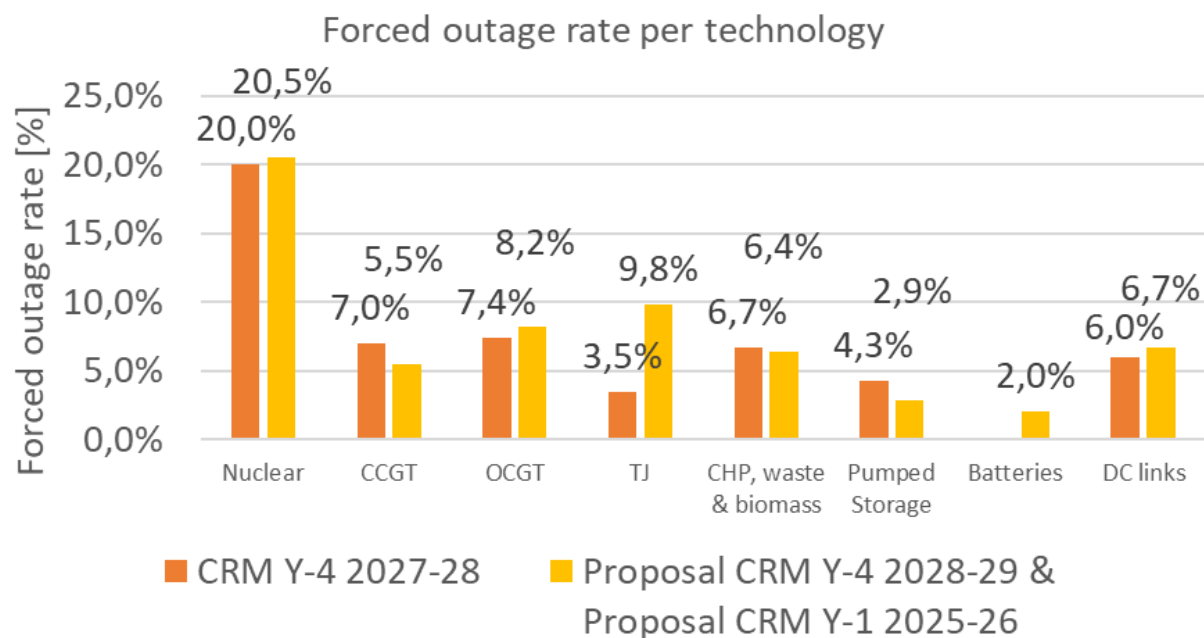
A sensitivity is proposed on possible closure of TJ in Belgium due to the introduction of a CO2 emissions cap in the CRM for DY 2028-29



Forced-outage rates

Assumptions

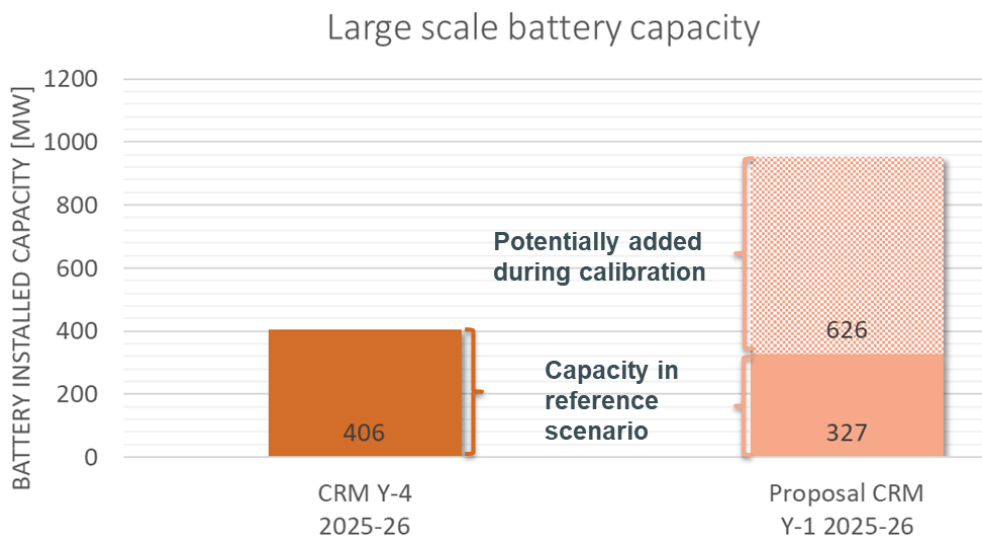
- For the previous CRM calibration reports (including CRM Y-4s DY 2025-26 and DY 2027-28), the forced outage rates were calculated on a 10-y historic set of data, only looking at Belgium.
- For the proposal CRM Y-1 DY 2025-26 and CRM Y-4 DY 2028-29, the forced outages rates are calculated using the study performed by N-Side in the framework of AdeqFlex 2023.
- The forced outage rates for PSP and batteries were updated based on comments received during the public consultation of AdeqFlex 2023.



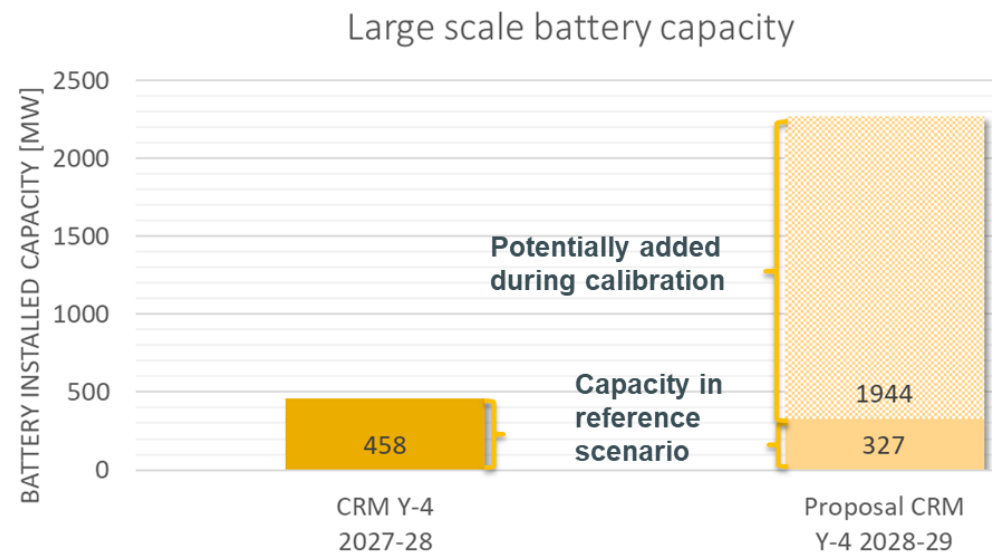
Large-scale battery capacities



CRM Y-1 2025-26



CRM Y-4 2028-29



Key points:

- In previous scenario proposals the proposed battery capacities were a best estimate for future installed capacity
- In the new scenario proposal only existing capacities + already contracted capacities
- The potential additional capacity will be integrated (if needed) during the calibration with preselected capacity types.
- Large-scale batteries are modelled “in-the-market”

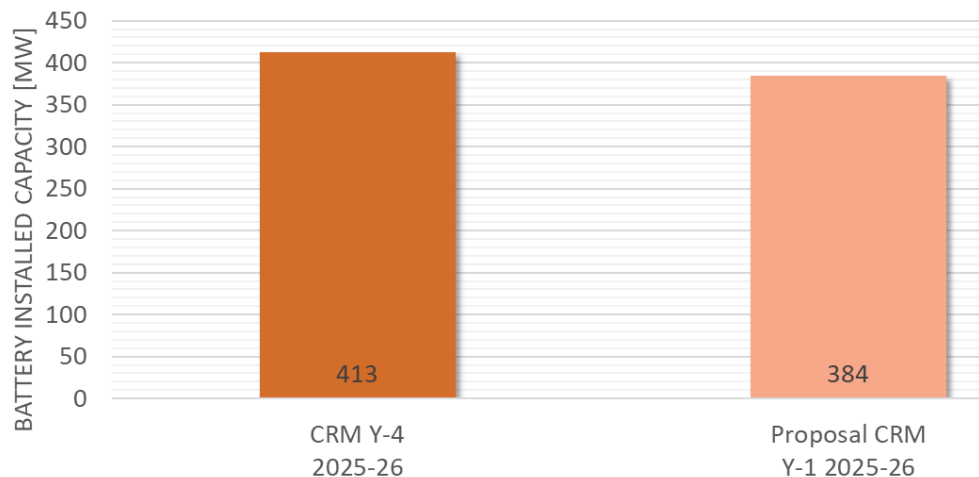
A sensitivity with a higher existing capacity for large-scale batteries is proposed



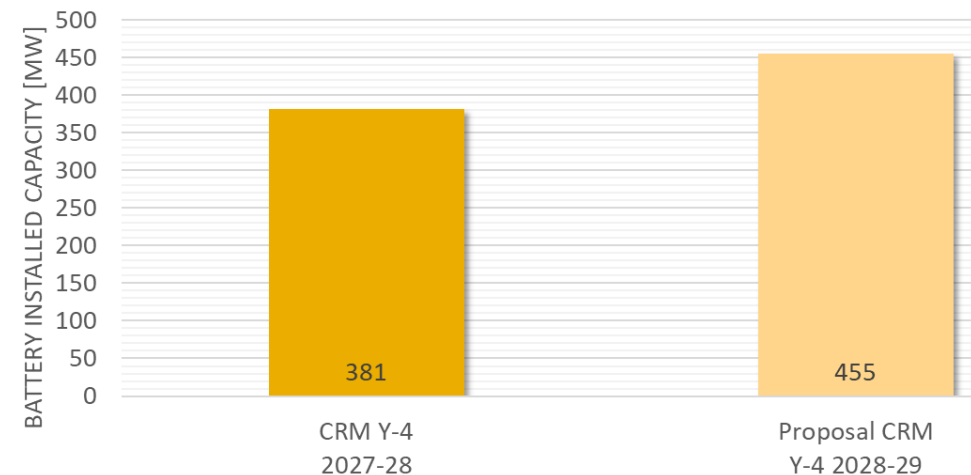
CRM Y-1 2025-26

CRM Y-4 2028-29

Small scale storage installed capacity



Small scale storage installed capacity



Key points:

- EVs (V2G included) are integrated in the demand and are going to be discussed in the “demand” section.
- Small-scale batteries are modelled both “in-the-market” and “out-of-market”.



CRM Y-1 2025-26

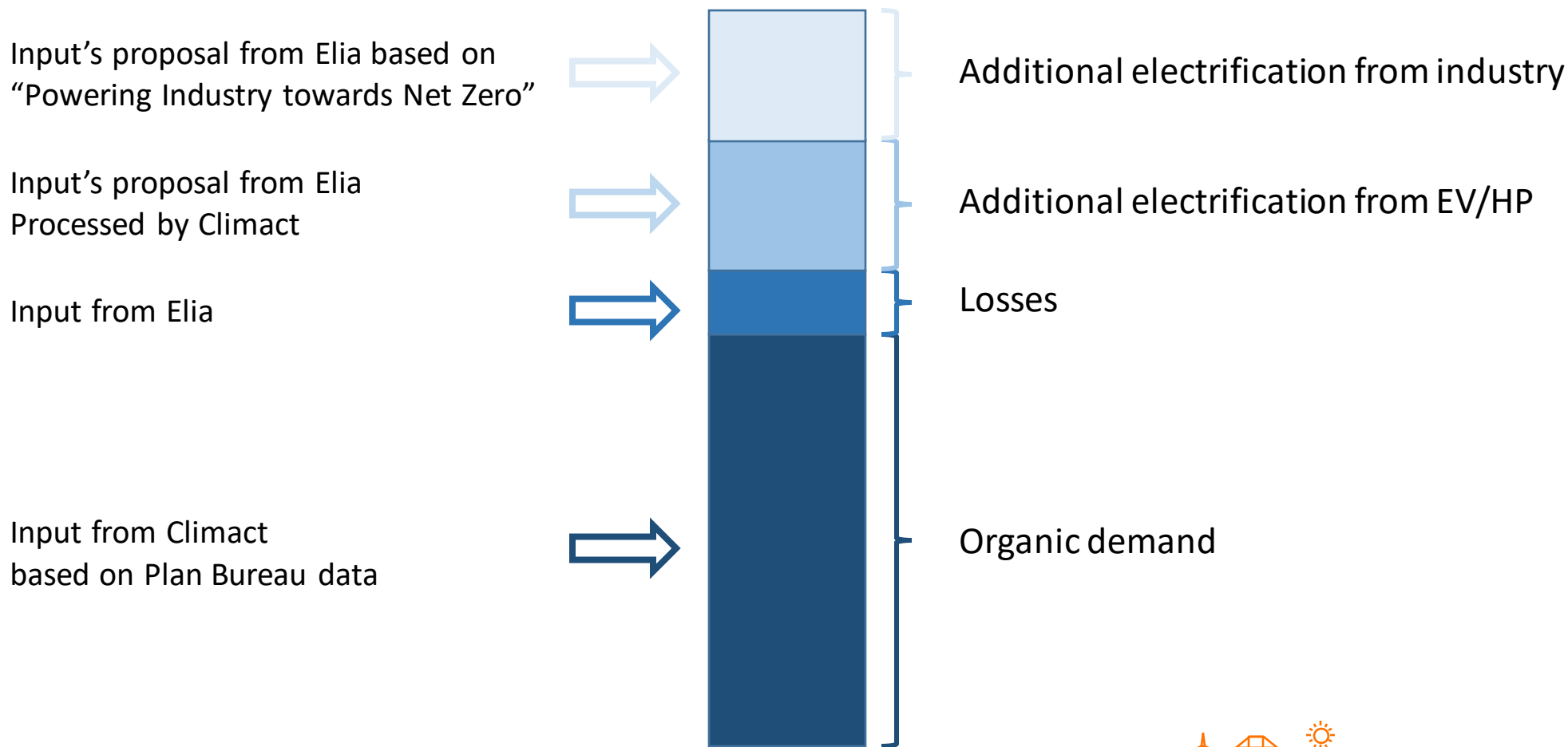
CRM Y-4 2028-29

BE Pumped-Storage facilities	CRM Y-4 2025-26	Proposal CRM Y-1 2025-26
Storage reservoir [MWh]	6200	6300
Storage reservoir derating (black-start services) [MWh]	500	500
Available storage for economical dispatch [MWh]	5700	5800
Total capacity [MW]	1395	1305
Coo 1-6 [MW]	1251	1161
Platte Taille 1-4 [MW]	144	144

BE Pumped-Storage facilities	CRM Y-4 2027-28	Proposal CRM Y-4 2028-29
Storage reservoir [MWh]	6300	6300
Storage reservoir derating (black-start services) [MWh]	500	500
Available storage for economical dispatch [MWh]	5800	5800
Total capacity [MW]	1305	1305
Coo 1-6 [MW]	1161	1161
Platte Taille 1-4 [MW]	144	144

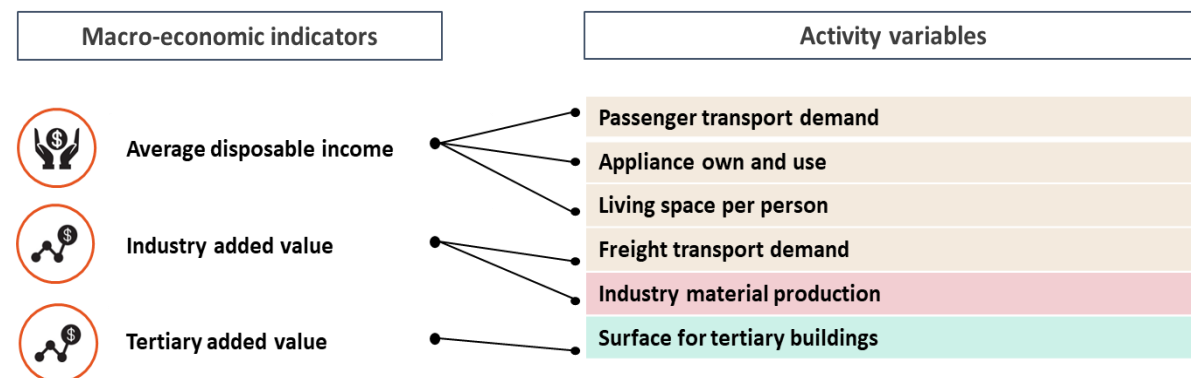
- The extension of the reservoir of Coo is taken into account (+7,5%)
- The total capacity of Coo was corrected based on feedback from stakeholders in previous consultations

Demand assumptions – Overview of demand components



Demand assumptions - Overview of the Climact model and parameters are now included in the public consultation

Parameter type	Explanation
Macro-economic indicators	<ul style="list-style-type: none"> Input from Planning Bureau Drive activity variables To be updated based on new estimates from the Planning Bureau
Activity variables - computed	<ul style="list-style-type: none"> Activity variables linked to electricity consumption Derived by the model from the macro-economic variables Will be included in the public consultation
Activity variables - direct input	<ul style="list-style-type: none"> TWh resulting from EV and HP numbers in next slide



The macro-economic parameters will be updated based on the upcoming economic outlook from the Planning Bureau (June 2023) and combined with the remaining parameters to update the CRM load



Demand assumptions – electric vehicles, heat pumps and additional electrification



CRM Y-1 2025-26

CRM Y-4 2028-29

Input for activity variables Climact and integrated on top of the organic demand

	CRM Y-4 2025-26	Proposal CRM Y-1 2025-26
Passengers Cars BEV [thousands]		400
Passengers Cars PHEV [thousands]		430
LDV freight BEV [thousands]	N/A	28
LDV freight PHEV [thousands]		10
HDV freight BEV [thousands]		0
Busses BEV [thousands]		2
Residential HP [thousands]	N/A	815
Tertiary HP [thousands]		70
Additional electrification from industry [TWh]	Not considered	2,3
Additional electrification from to data centers [TWh]		0,8

Added on top of the load from Climact

	CRM Y-4 2027-28	Proposal CRM Y-4 2028-29
Passengers Cars BEV [thousands]		1.170
Passengers Cars PHEV [thousands]		400
LDV freight BEV [thousands]	850*	90
LDV freight PHEV [thousands]		24
HDV freight BEV [thousands]		1
Busses BEV [thousands]		4
Residential HP [thousands]	250**	1.061
Tertiary HP [thousands]		114
Additional electrification from industry [TWh]	Not considered	9,2
Additional electrification from to data centers [TWh]		2,0

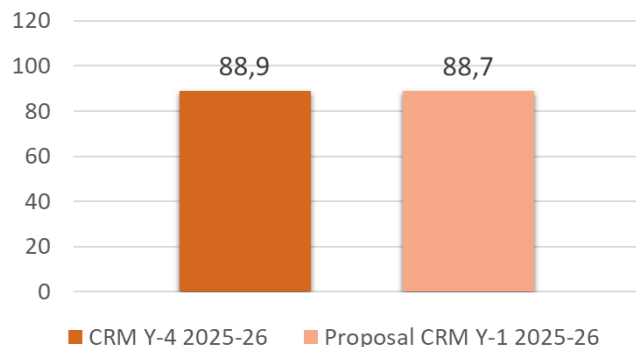
* number of equivalent EVs
 ** number of equivalent HPs

The end-user flexibility methodology is in line with the methodology defined in the public consultation of AdeqFlex 23.



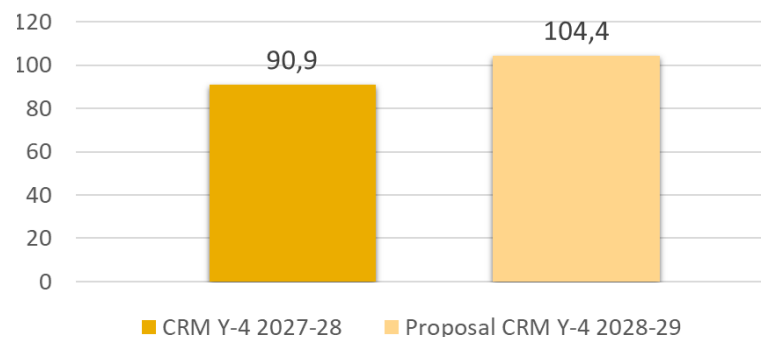
CRM Y-1 2025-26

Normalized total load in TWh



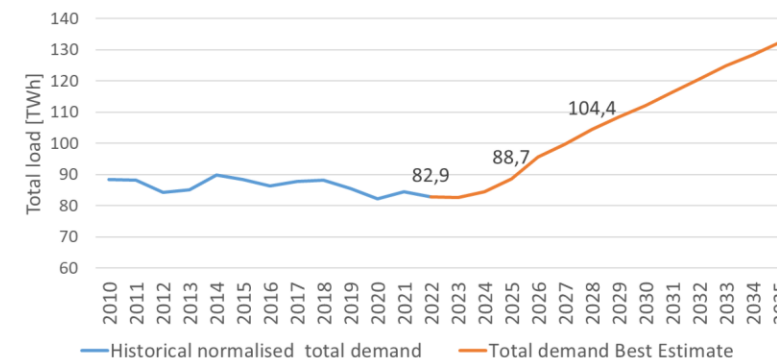
CRM Y-4 2028-29

Normalized total load in TWh



Best estimate

Best estimate of the load evolution

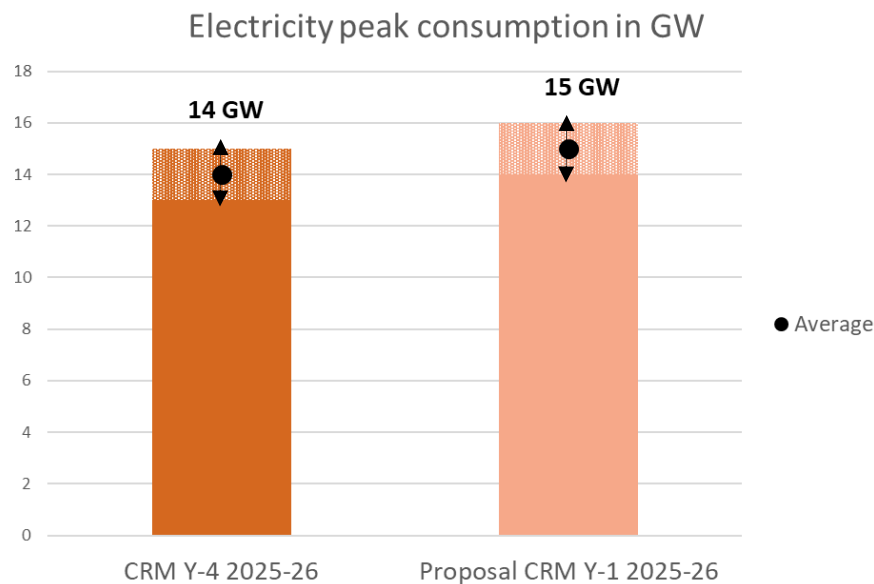


Assumptions:

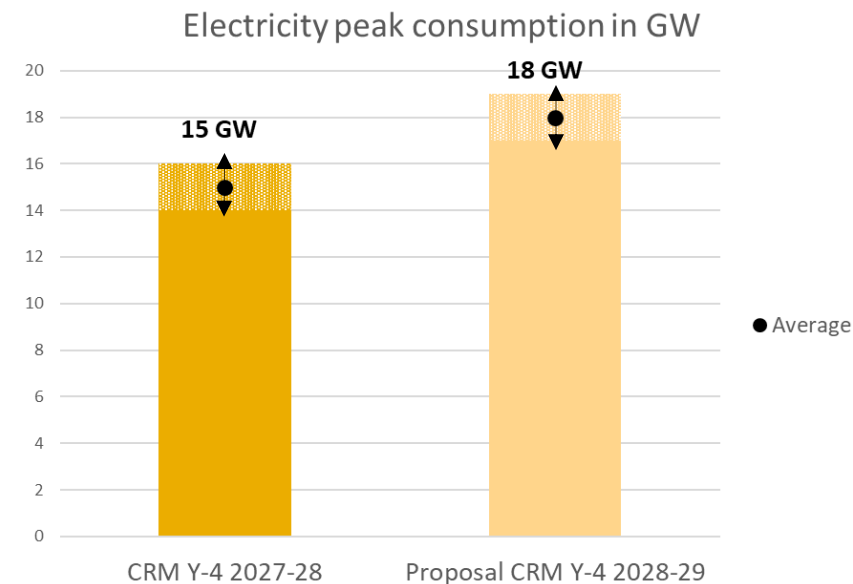
- Normalized total load proposed during the public consultation of AdeqFlex 23.
- These values are based on the Climact calculations and Plan Bureau economic estimates published in June 2022. An update based on the latest Climact calculation is foreseen in June 2023.



CRM Y-1 2025-26



CRM Y-4 2028-29



The electricity peak consumption as visible in the graphs above varies per climate year, this is visible as a range on the graph

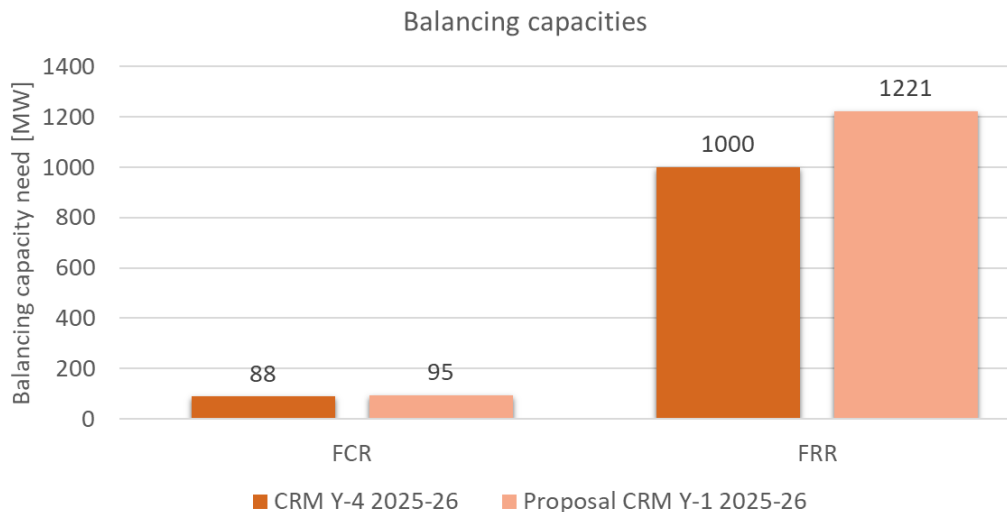
Does not include the flexibility activations of EV's, HP's, industry and out-of-market batteries which will level out the electricity peak consumption. The impact of flexibility can only be known after simulation.

This electricity peak consumption is therefore **not a good indicator** for the impact of the average load calculated in the CRM calibration reports.

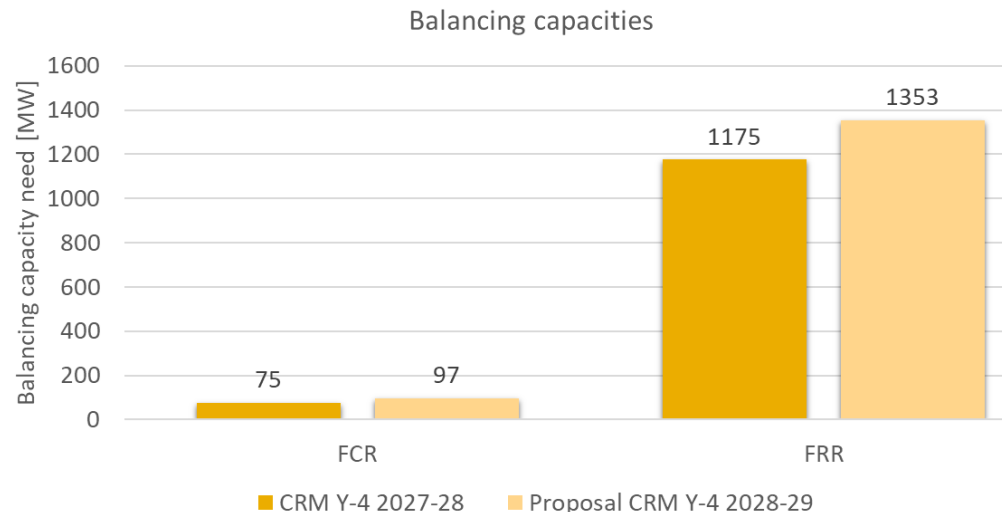
Overview of balancing capacities



CRM Y-1 2025-26



CRM Y-4 2028-29

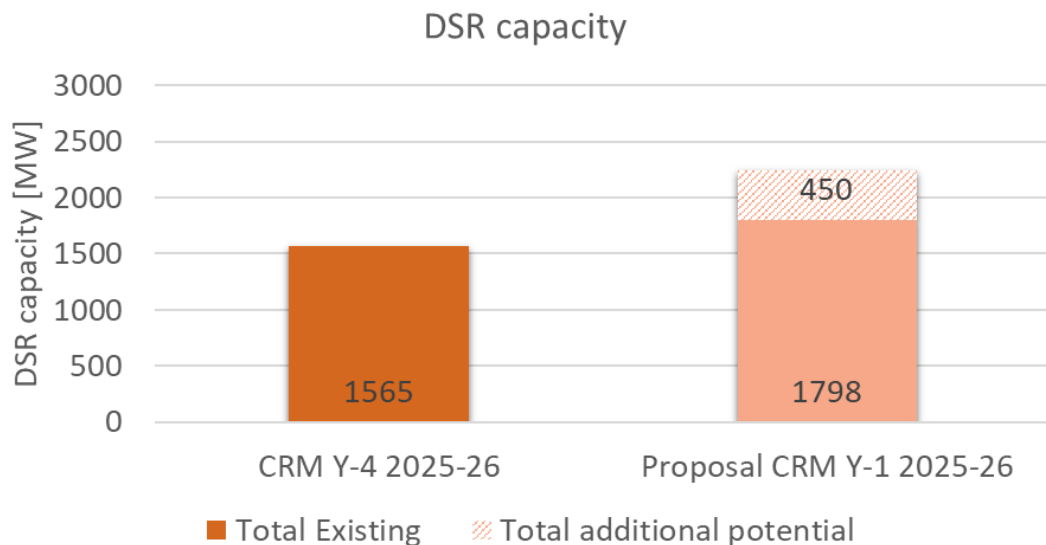


- These values were established in the framework of AdeqFlex 2023

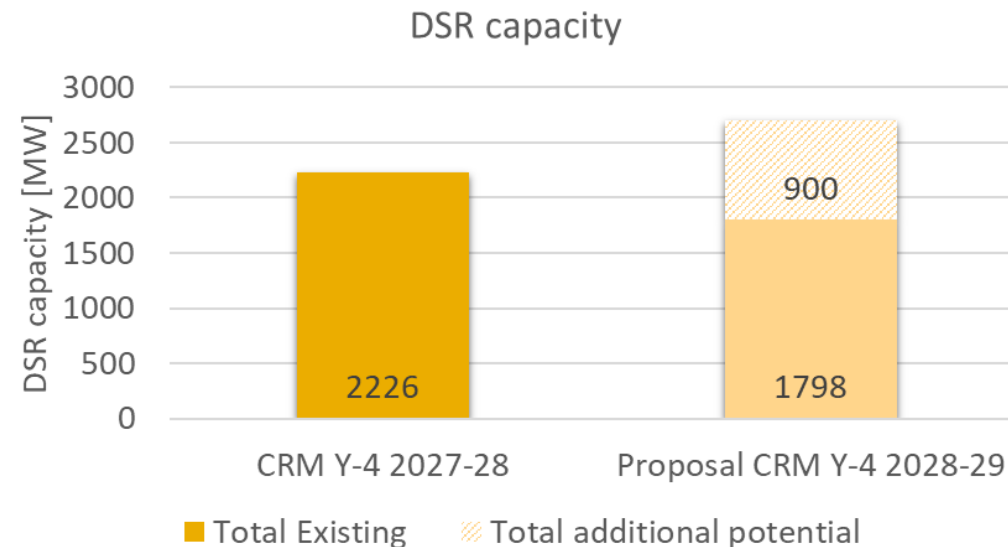
Overview of DSR capacities



CRM Y-1 2025-26



CRM Y-4 2028-29



Key points:

- The potential additional capacity will be integrated (if needed) during the calibration with preselected capacity types.
- The DSR existing capacity for both DY could be updated based on the results of the **update of the DSR volume by E-Cube**.
- The electrification of the industry leads to additional new DSR capacity from the industry. This new DSR capacity is taken into account in the total DSR volume as further detailed in the explanatory note and assumptions workbook.

A sensitivity with a higher existing DSR capacity is proposed

DSR volume estimation by E-CUBE

Quantitatively estimating the existing DSR volume is a difficult process because of the variety of industrial processes providing DSR and limited public information available

- E-CUBE developed a methodology on behalf of Elia in discussions with stakeholders in 2017 and updated in 2020 based on the lessons learned from back testing.
- It provides a transparent, quantitative approach to determine the volume of DSR offered in market bids.
- NEMO bids above price threshold considered as DSR

Assumptions

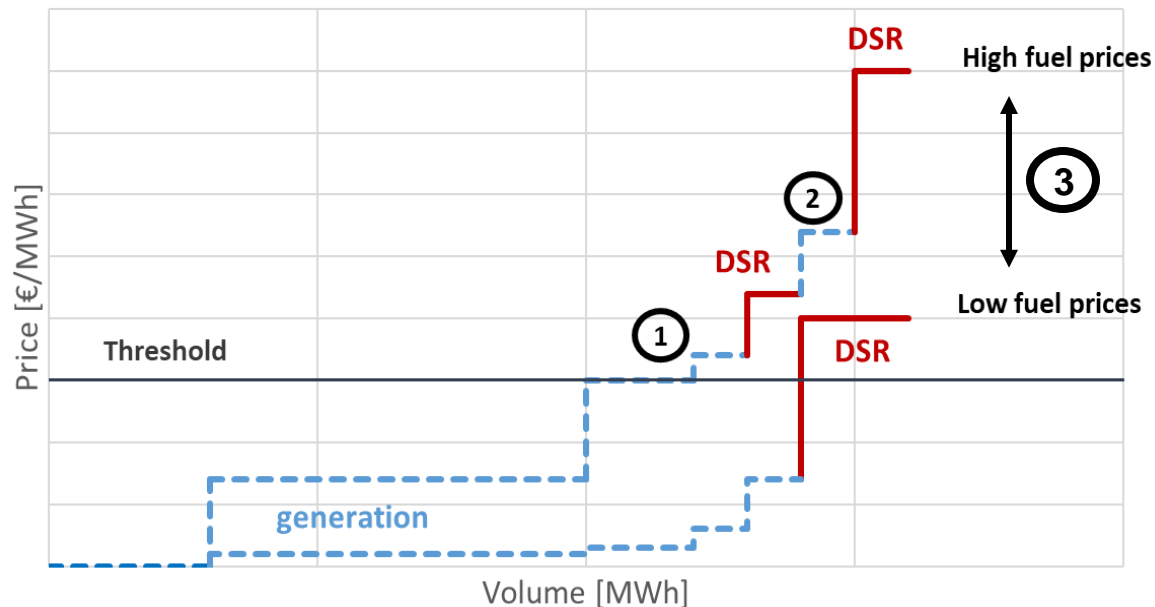
- DSR always most expensive technology in merit order
- No generation bids above the defined thresholds



Recent developments on the electricity market challenge these assumptions

Impact of recent market developments on DSR estimation method

Illustration of the impact of high fuel prices on merit order curves



Recent developments on the electricity market challenge the assumptions under which the DSR volume estimation method was established

- ① Cost increase of both DSR and generation
- ② Generation bids may be above DSR bids.
- ③ High volatility in prices



These developments create room for potential improvements in the methodology while keeping the minimum requirements:

- Quantitative method
- On NEMO bids

1. Calibrated price threshold instead of fixed price threshold

The price threshold should be calibrated to a relevant level on shorter time intervals

Options for calibration

- On expected DSR marginal cost (further detailed in the next slide)
- On highest generation marginal cost
- On a percentile of the electricity price
- ...

2. Avoid miscounting of generation as DSR

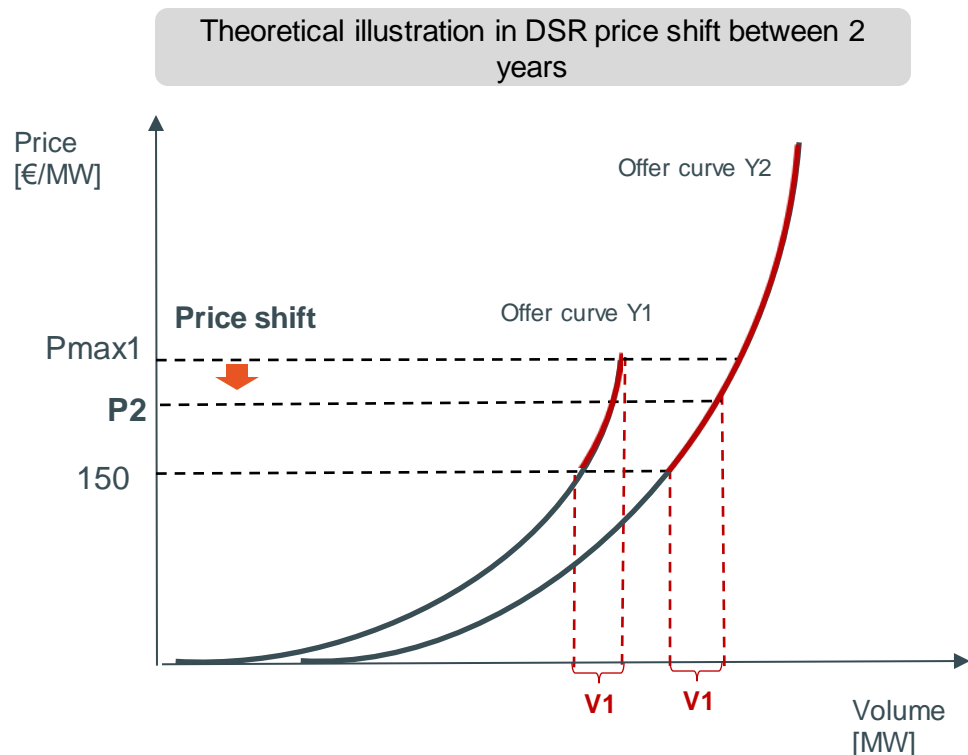
Even if the price threshold is calibrated at the lowest price DSR is offered, potential generation bids above this price should be filtered out

Options to avoid miscounting

- Estimation of generation capacity that has a marginal cost over the price threshold
- Fixed percentage
- ...

**These proposals are open for discussion.
Inputs on other potential improvements within the requirements are welcomed.**

Proposal on the calibration of the price threshold on the DSR marginal cost



Proposed methodology: calibration on expected DSR marginal cost

In general

- Estimating the historic relationship between the marginal cost of DSR and fuel and CO2 prices based on data from before the high energy prices. (max 2015)
- Apply this historic relationship to determine the new price threshold. In a dynamic manner

How?

- **V1** is the DSR volume found in year 1 at the price threshold of 150€/MWh.
- **Pmax1** is the price of the highest offer price from DSR in year 1.
- In year 2 you would identify the same volume **V1** if the **P2** is the theoretical maximal price for **V1** in year 2.

DSR price shift: The historic difference between the most expensive DSR of year 1 and **P2** can be interpreted as the historic difference in the marginal cost of DSR between year 1 and year 2.

$$= P_{max1} - P2$$

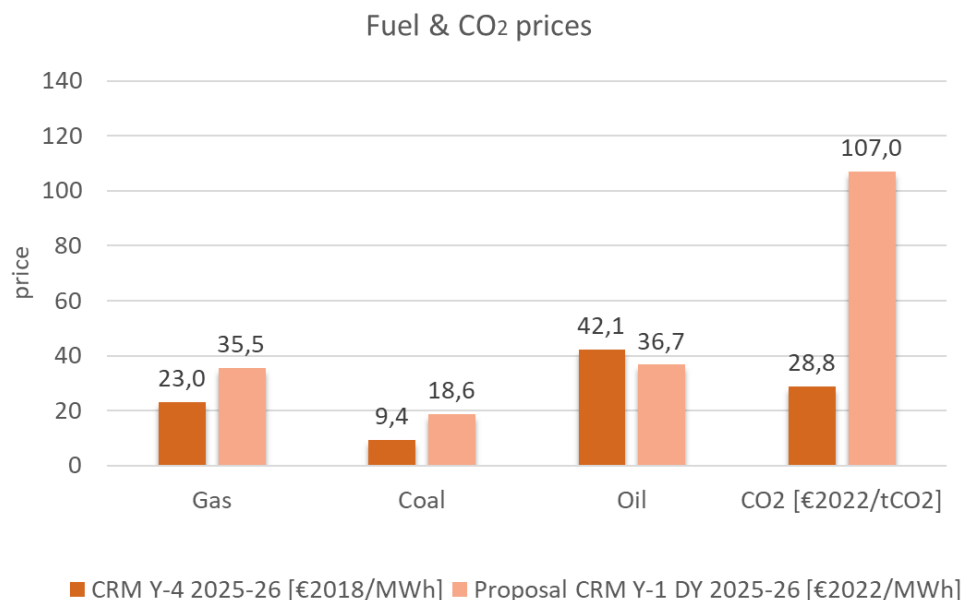
This price shift can then be **compared to fuel and CO2 prices** to determine a historic correlation (if existing) which can also be applied to the last winter to determine a dynamic price threshold above which volume is considered as DSR.

Economic parameters

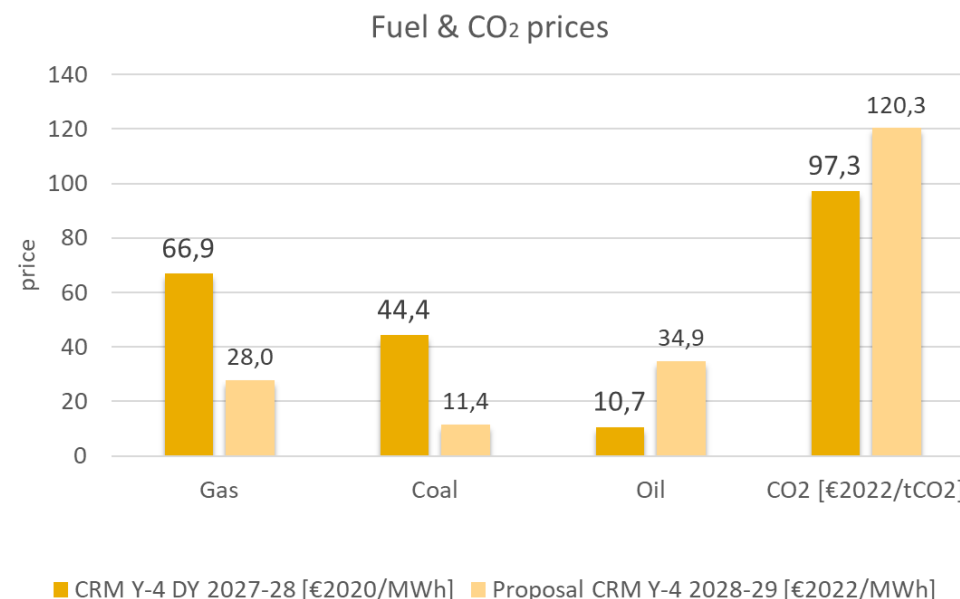


- Fuel prices for DY 2025-26: proposal based on forward prices
- Fuel prices for DY 2028-29: proposal based on interpolation between latest forward price converted to €2022 and the IEA WEO* price for 2030 in €2022

CRM Y-1 2025-26



CRM Y-4 2028-29



High and a low price sensitivities are proposed

Elia proposes to express all costs and prices in €2022 to disregard the effect of inflation. The price parameters in the calibration report would then also be expressed in **€2022**.

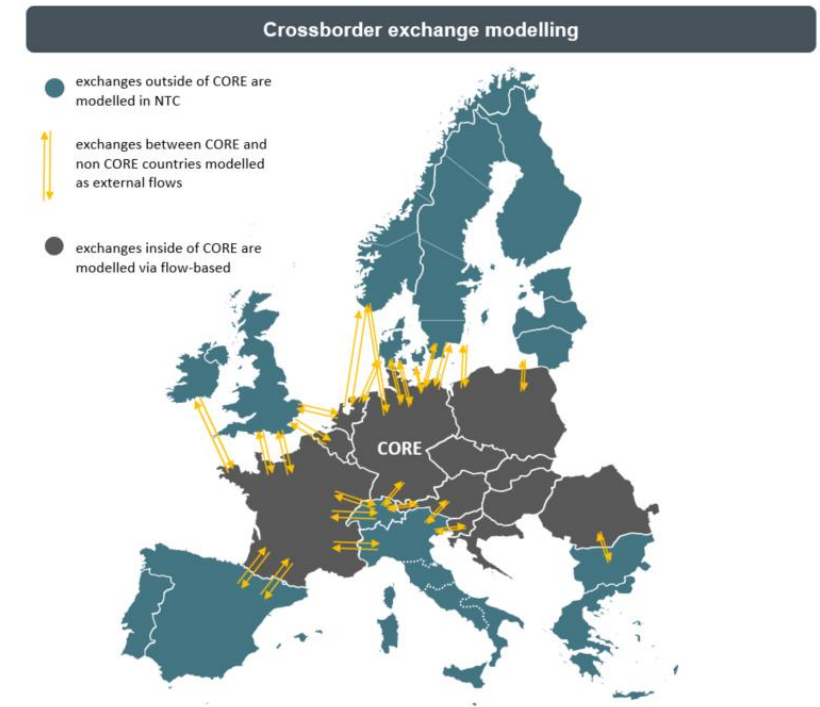
* Scenario selected from WEO : Announced pledges

Flow-based perimeter and bidding zone definition

- This approach is identical to the one consulted upon in the Adequacy and Flexibility study (2023)
- The bidding zones are assumed to be the same ones that we have today for all future time horizons.

	CRM Y-1 2025-2026	CRM Y-4 2028-2029
FB CCR	Core	
minRAM	70 %	
CNEC	Only XB CNECs	

A sensitivity on the RAM assumption for the flow-based domains is proposed





Updates proposed based on latest policies/published studies: ongoing

For neighboring countries

Updates proposed based on latest policies/published studies

The proposed data for the other countries are based on the ERAA 22 and updated based on the most recent national/regional adequacy studies and taking into account the latest European methodologies as described in the Adequacy and Flexibility public consultation (2023), in particular :

- **DE** : Coal phase out
- **FR** : No decrease in Nuclear installed capacity + Flamanville 3 running ('Bilan Prévisionnel' public consultation, March 23), coal extension (Décret n° 2022-1233 du 14 septembre 2022)
- **UK** : Based on Future Energy Scenarios (2022) + Latest announcement regarding nuclear extension (March 23)
- **NL** : Based on latest Monitoring leveringszekerheid (Jan 23)

Application to Y-1 auction for DY 2025-2026

2025-2026	France	Germany	Netherlands	United Kingdom	Spain	Italy	Poland	Denmark
Demand [TWh]	480	574	124	295	259	329	167	41
Onshore Wind [GW]	25	77	10	20	37	14	11	6
Offshore Wind [GW]	2	11	6	23	0	3	0,6	3
Solar [GW]	24	108	34	21	34	43	20	8
Coal [GW]	1,1	25,1	2,7	0,0	0,0	0,5	21	0,4
Nuclear [GW]	62,9	0,0	0,5	5,9	7,1	0,0	0,0	0,0

Application to Y-4 auction for DY 2028-2029

2028-2029	France	Germany	Netherlands	United Kingdom	Spain	Italy	Poland	Denmark
Demand [TWh]	506	619	141	316	261	342	178	50
Onshore Wind [GW]	27	99	11	27	45	17	11	7
Offshore Wind [GW]	3	15	12	36	0	6	6	5
Solar [GW]	40	172	43	29	50	62	25	15
Coal [GW]	0,0	7	2,7	0,0	0,0	0,0	20	0,4
Nuclear [GW]	62,9	0,0	0,5	4,4	5,1	0,0	0,0	0,0



Definition of sensitivities

Additional sensitivities that could be included in the reference scenario for 2025-2026

Sensitivities proposed for DY 2025-26

French nuclear availability 1

Decreased French nuclear availability based on historical figures

Lower availability during winter compared to **REMIT**
Calculated as the difference with the **high** EDF forecast on the **winter** only

French nuclear availability 2

Decreased French nuclear availability based on historical figures

Lower availability during winter compared to **REMIT**
Calculated as the difference with the **average** EDF forecast on the **winter** only

French nuclear availability 3

Decreased French nuclear availability based on historical figures

Lower availability during winter compared to **REMIT**
Calculated as the difference with the **minimum** EDF forecast on the **winter** only

French nuclear availability 4

Decreased French nuclear availability based on historical figures

Lower availability during winter compared to **REMIT**
Calculated as the difference with the **minimum** EDF forecast on the **whole year**

UK nuclear availability

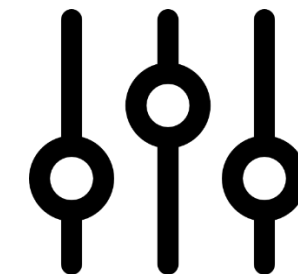
Nuclear extension in UK delayed

The nuclear units for which an extension was announced in the UK are not available

Export restrictions in Norway

Norway blocking export of electricity due to low hydro production

Export restrictions in Norway during periods of low hydro production



Additional sensitivities that could be included in the reference scenario for 2025-2026

Sensitivities proposed for DY 2025-26

FB CEP rules

Non achievements of the CEP rules to reflect the uncertainty on capacity calculation.

Fixed RAM 70% instead of 70% minRAM

High prices

Higher prices in Europe

Higher fuel costs

Low prices

Lower prices in Europe

Lower fuel costs

Lower demand

Lower demand in Belgium

Lower yearly consumption due to economic developments

Higher demand

Higher demand in Belgium

Higher yearly consumption due to economic developments

Higher DSR

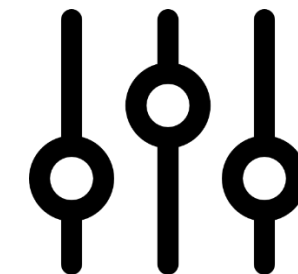
Higher existing DSR capacity in Belgium

Additional 50 % of potential DSR capacity considered as existing before calibration

Higher storage

Higher existing large-scale battery capacity in Belgium

Additional 50 % of potential large-scale battery capacity considered as existing before calibration



Additional sensitivities that could be included in the reference scenario for 2028-2029 (1/2)

Sensitivities proposed for DY 2028-29

French nuclear availability 1

Decreased French nuclear availability in continuity of last year's reference scenario
Lower availability by 2 units on average during winter compared to ERAA

French nuclear availability 2

Decreased French nuclear availability based on historical figures
Lower availability by 4 units on average during winter compared to ERAA

French nuclear availability 3

Decreased French nuclear availability based on historical figures
Lower availability by 6 units on average during winter compared to ERAA

French nuclear availability 4

Decreased French nuclear availability based on historical figures
Lower availability by 8 units on average during winter compared to ERAA

TJ closure

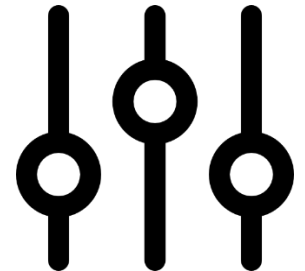
Closure of turbojets due to possible CO2 threshold
-140 MW

FB CEP rules

Non achievements of the CEP rules to reflect the uncertainty on capacity calculation.
Fixed RAM 70% instead of 70% minRAM

Export restrictions in Norway

Norway blocking export of electricity due to low hydro production
Export restrictions in Norway during periods of low hydro production



Sensitivities proposed for DY 2028-29

High prices

Higher prices in Europe
Higher fuel costs

Low prices

Lower prices in Europe
Lower fuel costs

Lower demand

Lower demand in Belgium
Lower yearly consumption due to economic developments

Higher demand

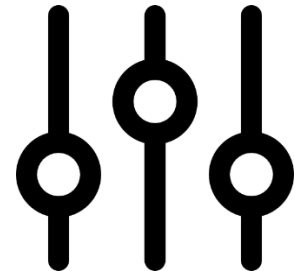
Higher demand in Belgium
Lower yearly consumption due to economic developments

Higher DSR

Higher existing DSR capacity in Belgium
Additional 50 % of potential DSR capacity considered as existing before calibration

Higher storage

Higher existing large-scale battery capacity in Belgium
Additional 50 % of potential large-scale battery capacity considered as existing before calibration





Other parameters to be consulted upon

Preselected capacity types

Royal Decree Context

Art. 6. §1er. Le gestionnaire du réseau s'assure que le scénario de référence tel que déterminé selon l'article 3, §7, répond au niveau de la sécurité d'approvisionnement requis par l'article 7undecies, §7, premier et deuxième alinéas, de la loi du 29 avril 1999 en ajoutant, si nécessaire, de la capacité supplémentaire à la zone de réglage belge :

1° provenant des types de capacité présélectionnés selon l'article 10 et proposés par le gestionnaire de réseau dans la consultation publique visée à l'article 5 et ensuite choisis par le gestionnaire de réseau en collaboration avec la Direction générale de l'Energie et en concertation avec la commission ;

2° d'une manière itérative sur la base d'une boucle d'optimisation économique avec un incrément à la hauteur de celui appliqué dans l'évaluation la plus récemment disponible de l'adéquation des ressources à l'échelle européenne ou nationale visée aux articles 23 et 24 du Règlement (UE) 2019/943, et de maximum 100 MW.

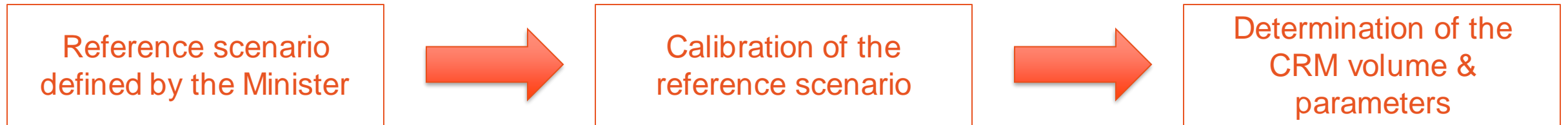
Art. 6. §1. De netbeheerder verzekert zich ervan dat het referentiescenario zoals bepaald volgens artikel 3 §7 beantwoordt aan het niveau van bevoorradingzekerheid dat worden geëist door artikel 7undecies, § 7, eerste en tweede lid, van de wet van 29 april 1999 door, indien nodig, aan de Belgische regelzone bijkomende capaciteit toe te voegen:

1° afkomstig van de volgens artikel 10 voorgeselecteerde types van capaciteit die voorgesteld worden door de netbeheerder ter openbare raadpleging bedoeld in artikel 5 en daarna door de netbeheerder in samenwerking met de Algemene Directie Energie en in overleg met de commissie gekozen worden;

2° op een iteratieve manier op basis van een economische optimalisatielus op basis van incrementele stappen ten belope van deze zoals toegepast in de meest recent beschikbare Europese of nationale beoordeling van de toereikendheid van de elektriciteitsvoorziening, bedoeld in de artikelen 23 en 24 van Verordening (EU) 2019/943, en van maximaal 100 MW.

Preselected capacity types

Purpose



This scenario does not necessarily meet the legal security of supply criteria, as defined in article 7undecies, 3 of the electricity law.

As long as the security of supply criteria is not reached, capacity will be iteratively added based on an economic optimization loop.

The output from the model ensures to be compliant with the legal security of supply criterion.



Preselected capacity types need to be selected for each CRM auction

Preselected capacity types

For DY 2025-26

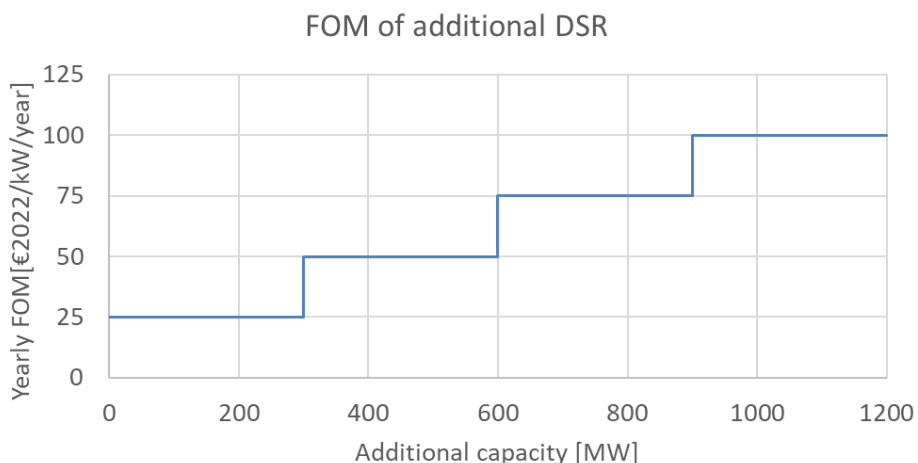
Category	Associated technology	Volume Calculation	Marginal Price Calculation	CAPEX [€ 2022/kW]	FOM [€ 2022/kW]	Economic lifetime [y]
Batteries	Large-scale bat. (4h)	Add new large-scale batteries	/	1200	20	15
DSR	DSR	Add new 4h DSR	Marginal price of 4h DSR	0	See below	1

For DY 2028-29

Category	Associated technology	Volume Calculation	Marginal Price Calculation	CAPEX [€ 2022/kW]	FOM [€ 2022/kW]	Economic lifetime [y]
Type 1 - Semi-baseload	CCGT, CHP	Add new CCGT	Marginal price of a new CCGT	700*	30	20
Type 2 - Peakers 1	OCGT	Add new OCGT	Marginal price of a new OCGT	550**	25	20
Type 3 - Batteries	Large-scale bat. (4h)	Add new Large-scale batteries	/	900	20	15
Type 4 - DSR	DSR	Add new 4h DSR	Marginal price of 4h DSR		see below	

* CAPEX for CCGT > 800 MW:

** CAPEX for OCGT > 100 MW



- Values taken from the upcoming AdeqFlex 23
- Proposition to not consider IC gas engines anymore due to CO2 thresholds and this category not being present on the Belgian market

Scenario choice post delivery period for market revenues calculation

Royal Decree Context

“Article 10, §6 Les rentes inframarginales annuelles estimées de la référence pour chaque technologie sont exprimées en €/MW/an et sont calculées, avec une périodicité annuelle, sur l’ensemble de la durée de vie de la référence pour chaque technologie, en prenant en compte la valeur du coût marginal de la technologie comme seuil inférieur. Ces rentes inframarginales sont déterminées, pour chaque année sur la durée de vie de l’unité de marché de capacité, sur la base de la médiane (P50) des revenus des années de simulation, sur la base du scénario de référence visé à l’article 3, §7 et tiennent compte du niveau du prix d’exercice applicable visé à l’article 26.

Si le scénario de référence n’est pas disponible pour une année sur la durée de vie de la référence pour chaque technologie, une interpolation est réalisée entre les valeurs des années pour lesquelles le scénario de référence existe, éventuellement corrigé par des données disponibles complémentaires. Ces données sont présentées par le gestionnaire de réseau et les sources de celles-ci sont soumises à une consultation publique visée à l’article 6, §2, 4° et sont choisies par le gestionnaire de réseau en collaboration avec la Direction générale de l’Energie et en concertation avec la commission ;

“Artikel 10, §6 De geraamde jaarlijkse inframarginale inkomsten van de referentie voor elke technologie worden uitgedrukt in €/MW/jaar en worden, op jaarlijkse basis, berekend over de volledige levensduur van de referentie voor elke technologie, rekening houdend met de waarde van de marginale kost van de technologie als ondergrens. Deze inframarginale inkomsten worden voor elk jaar over de levensduur van de eenheid in de capaciteitsmarkt bepaald op basis van de mediaan (P50) inkomsten van de simulatiejaren op basis van het referentiescenario bedoeld in artikel 3 §7 en houden rekening met het niveau van de toepasselijke uitoefenprijs bedoeld in artikel 26.

.Indien het referentiescenario niet beschikbaar is voor een jaar uit de levensduur van de referentie voor elke technologie, wordt een interpolatie uitgevoerd tussen de waarden van de jaren waarvoor het referentiescenario bestaat, eventueel bijgestuurd door bijkomende beschikbare gegevens. Deze gegevens worden voorgesteld door de netbeheerder en de bronnen ervan worden ter openbare raadpleging bedoeld in artikel 6, §2, 4° voorgelegd en worden door de netbeheerder in samenwerking met de Algemene Directie Energie en in overleg met de commissie gekozen.

Scenario choice post delivery period for market revenues calculation

Purpose

Determination of market revenues

Calculation of market revenues on the technology lifetime

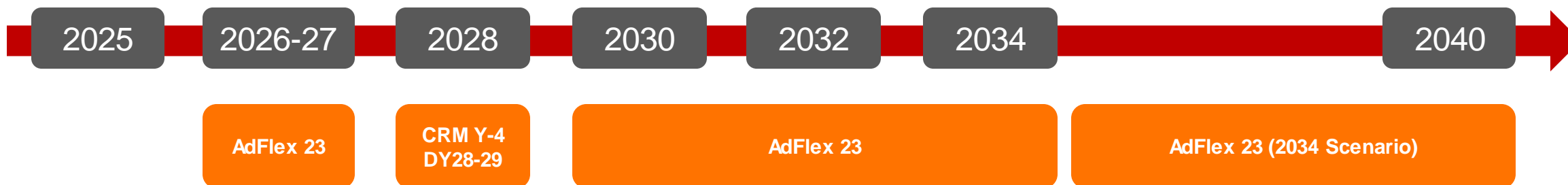
➡ Only the delivery period scenario is not enough

The purpose of the scenario choice post-delivery period is :

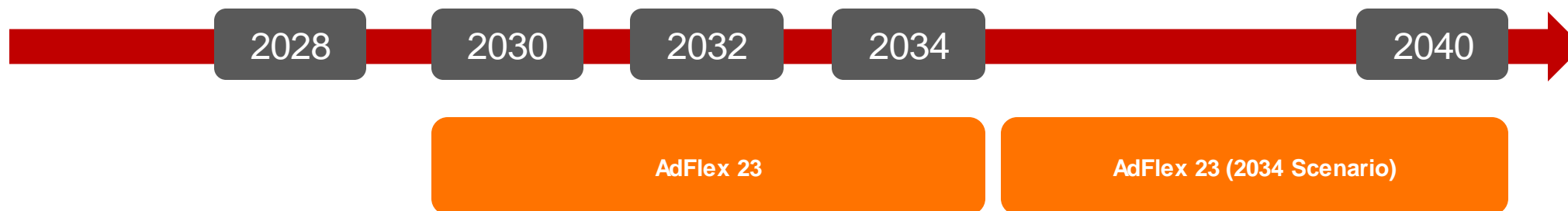
- To use available scenario from public sources for the delivery period after the 2028-2029 delivery period
- If such a scenario is not available for one delivery period, to interpolate the market revenues between the pivotal delivery period from the 1st bullet.

Scenario choice post delivery period for market revenues calculation

Application to Y-1 auction for DY 2025-2026



Application to Y-4 auction for DY 2028-2029



Shortlist of existing technologies for the determination of the Intermediate Price Cap : same shortlist as in the calibration report related to DP 2027-28

Royal Decree Context

“Article 18, § 1

Le gestionnaire du réseau détermine, sur la base de l'étude visée à l'article 17, après la consultation publique visée à l'article 6, une liste réduite de technologies existantes ou raisonnablement attendues qui seront considérées pour la détermination du prix maximal intermédiaire.”

“Artikel 18, § 1

De netbeheerder stelt op basis van de studie bedoeld in artikel 17, na de openbare raadpleging bedoeld in artikel 6, een beperkte lijst op van bestaande of redelijkerwijs te verwachten technologieën die in aanmerking genomen zullen worden voor de bepaling van de intermediaire maximumprijs.”

- CCGTs
- OCGTs
- Turbojets
- PSP
- Market Response 4h



- In first instance identical to last year
- Elia is launching a new study on cost of capacity cfr. Article 17 of the RD methodology soon, which includes an update of the list. A possible evolution is that RES will be considered, even though it is not expected this will have an impact on the calibrated IPC.

Fixed Operations and Maintenance costs including provisions for major overhauls

both Y-1 DP 2025-26 and Y-4 DP 2028-29

	Yearly Fixed O&M [€2022/kW/year]			Source
	Low	Mid	High	
CCGTs	37	38	53	AFRY 2022
OCGTs	25	25	50	AFRY 2022
Turbojets	29	36	36	AFRY 2022
PSP	20	32	40	AFRY 2022
MR 4h	7	12	17	AdFlex 2023

➤ Numbers used last year:

- These numbers are subject to change depending on the results of the updated “cost of capacity” study (cf. previous slide)
- The study will also elaborate on the cost components that are taken into account
 - These components will be publicly consulted

Parameters for the calculation of market revenues

Technologies	Efficiency [%]			VOM [€ 2022/MWh]		
	low	mid	high	low	mid	high
CCGT	50	54	58	2,4	2,4	2,4
OCGT	35	40	44	13,2	13,2	13,2
Turbojet	21	28	35	4	4	4

Methodology for the calculation of net revenues from balancing services

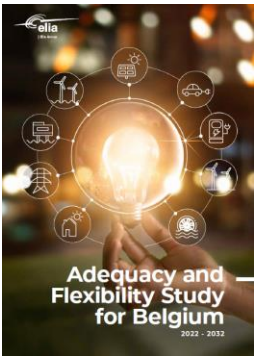
- Elia is working on a more robust methodology for the balancing net revenues, the results of which will be shared in WG Adequacy.

Adequacy assessment for delivery year 2024-2025 executed in the framework of the assessment of the need to organise a Low Carbon Tender

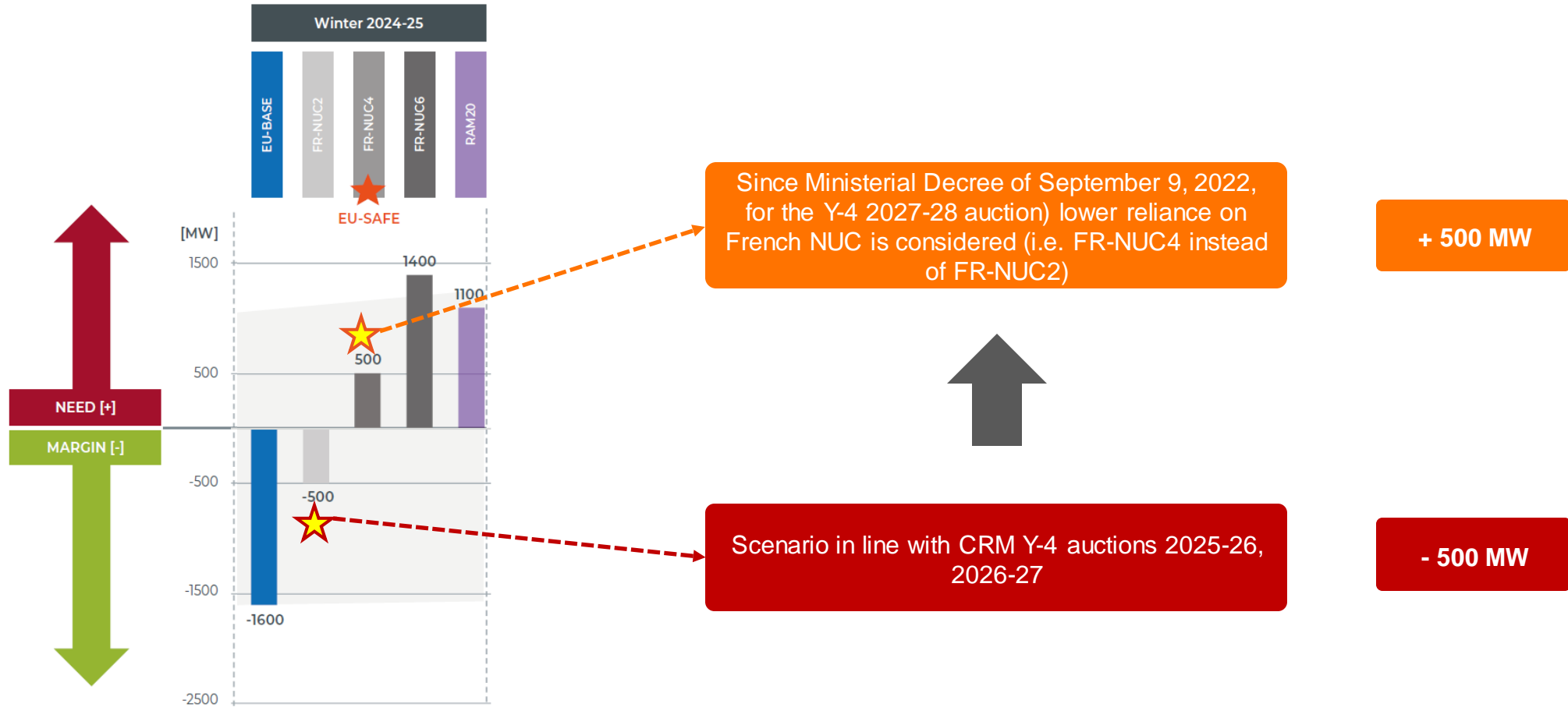


Context

- In the context of its Winter Plan, the government decided to take the preparatory steps to organise a one-off auction for the delivery year 2024-2025, **if a need was confirmed** in the adequacy and flexibility study 2023
- Several steps were made:
 - Public consultation on the design of the LCT & scenario – input data (October – November 2022);
 - Public consultation on the functioning rules of the LCT (January 2023)
 - Choice of scenario made by the minister of energy following advices from Elia, CREG, FPS Economy (March 2023)
- Elia has calculated the requirements for the winter 2024-25 based on the selected scenario.

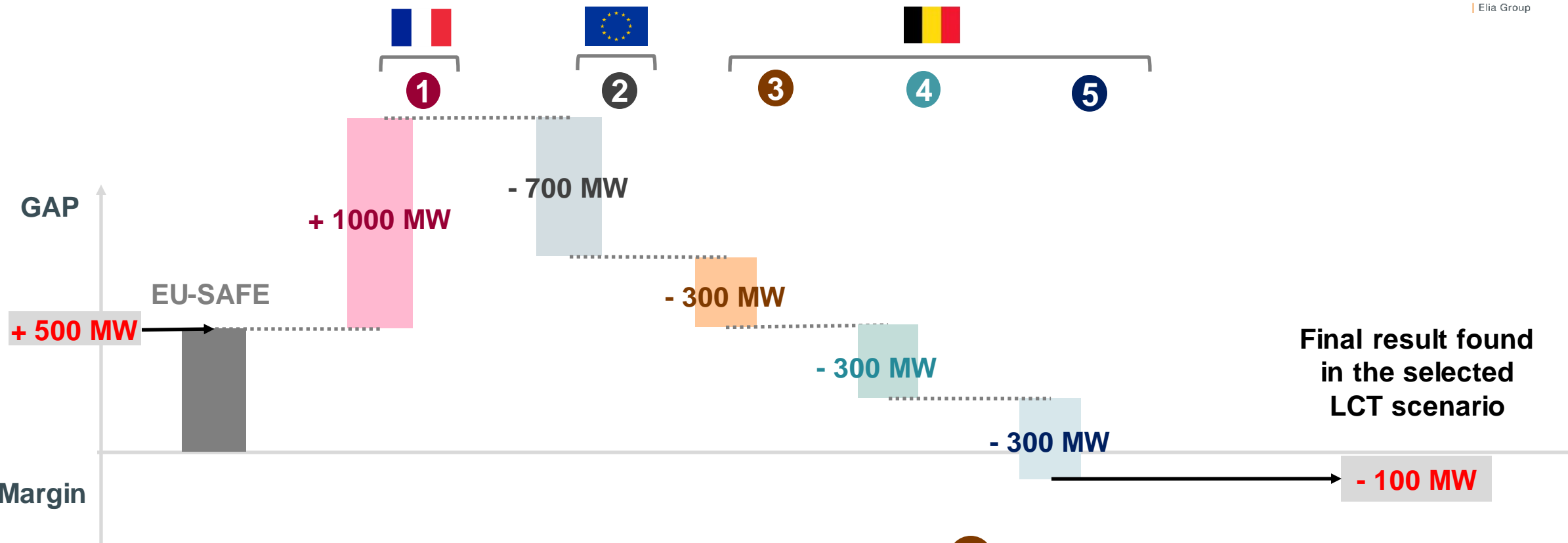


The previously simulated need for 2024-25: 500 MW based on the Adequacy & Flexibility study published in June 2021 – FR-NUC4 sensitivity (cfr. CRM Y-4 2027-28 scenario decision)



Source: AdeqFlex '21

Impact on the GAP (= new capacity compared to what is installed today) for Belgium for 2024-25 compared to Adeqflex 2021



1 Changes in France compared to the FR-NUC4 scenario of AdFlex '21: less nuclear availability partly compensated by extension of coal capacity.

2 Impact of other changes abroad: lower consumption and much more storage capacity.

3 Impact of a lower consumption in Belgium.

4 Impact of more small thermal generation, better thermal derating factors, extension of Co...

5 Impact of assumed higher derating factors for nuclear capacity in Belgium

Impact of changes in France

1

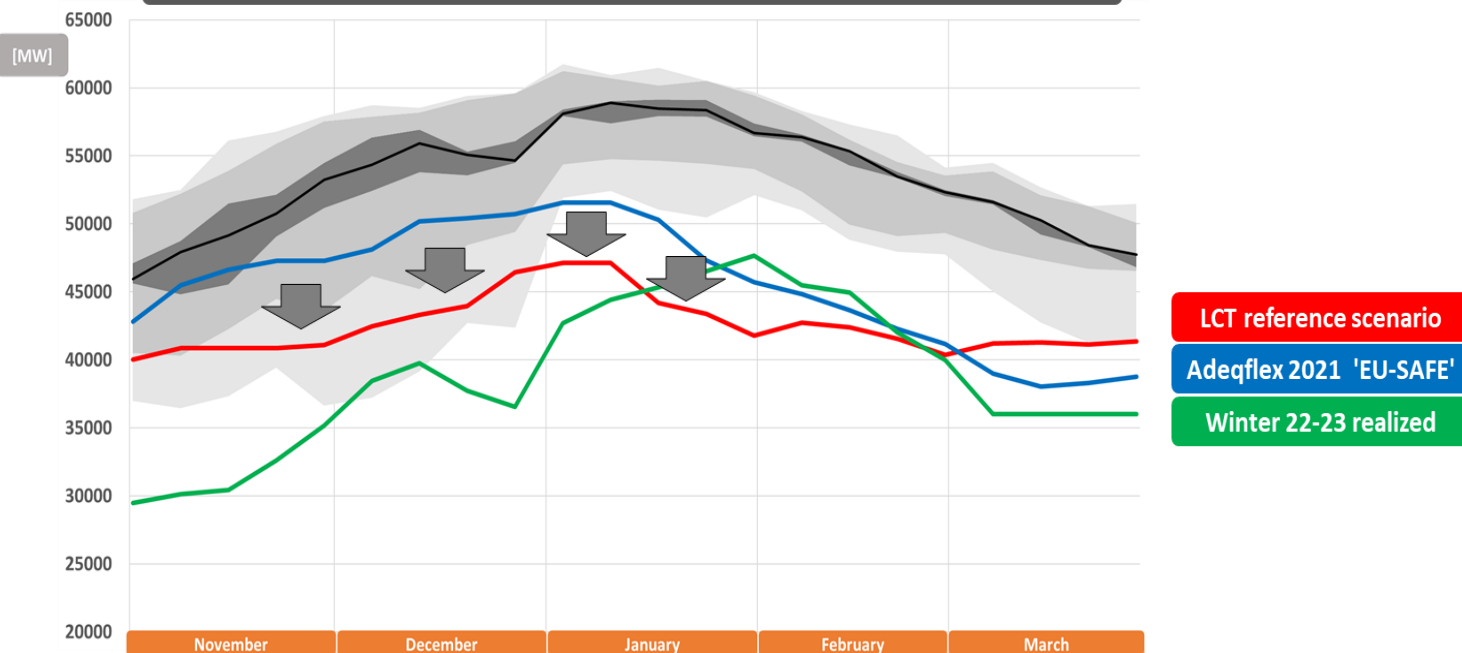
Changes in France compared to the FR-NUC4 scenario of AdeqFlex '21: less nuclear availability partly compensated by extension of coal capacity [+1000 MW]

Lower nuclear availability



Partly compensated by extending the lifetime of coal capacities (Cordemais) (decret 2022-1233)

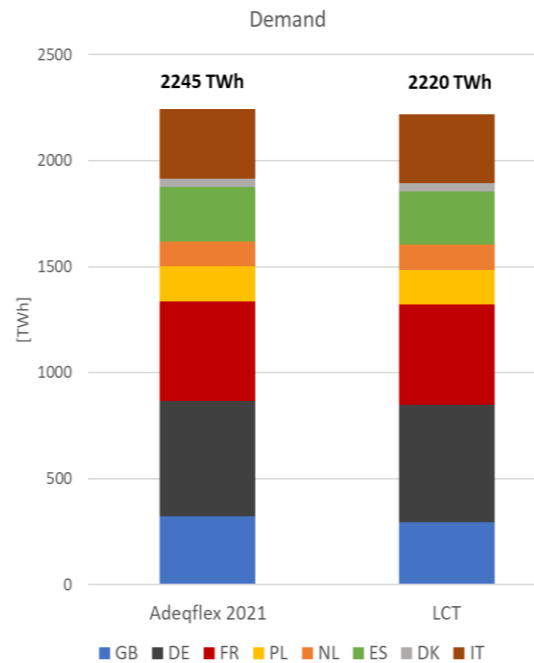
Nuclear availability in France for winter 2024-25



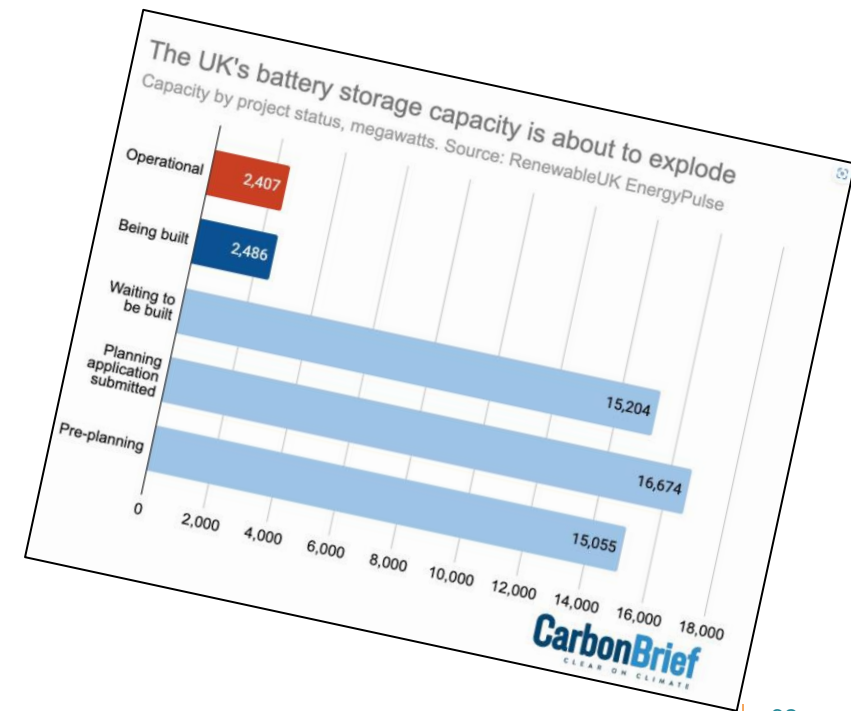
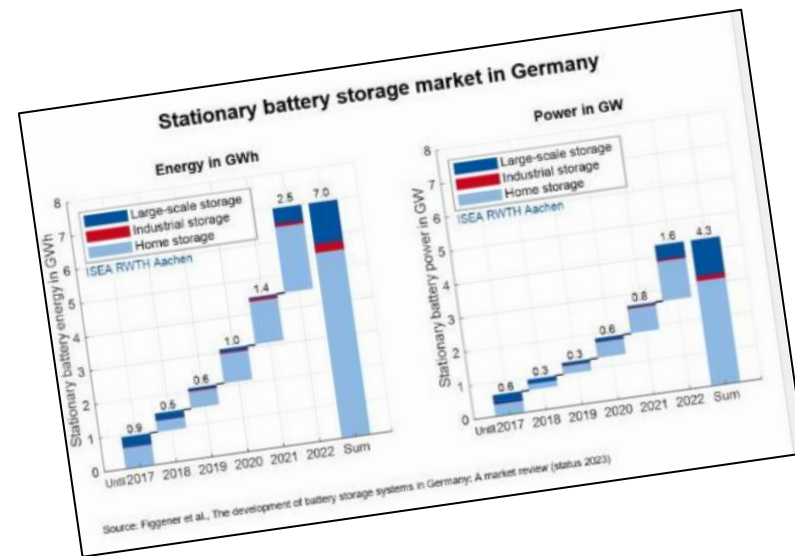


2 Impact of other changes abroad: lower consumption and much more storage capacity [-700 MW]

Slight decrease in the demand



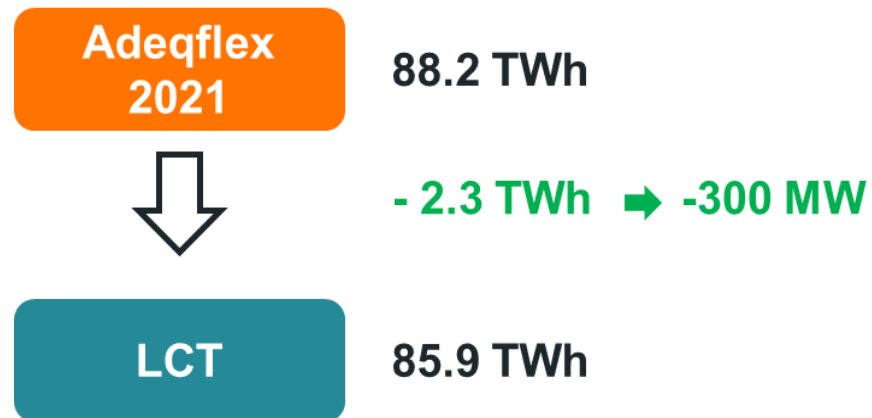
More storage and DSR abroad (more than 20 GW additional capacity in the Netherlands, Germany, France, Poland, Spain, Great Britain, Italy and Denmark) compared to AdeqFlex21



A lower consumption compared to AdeqFlex 2021

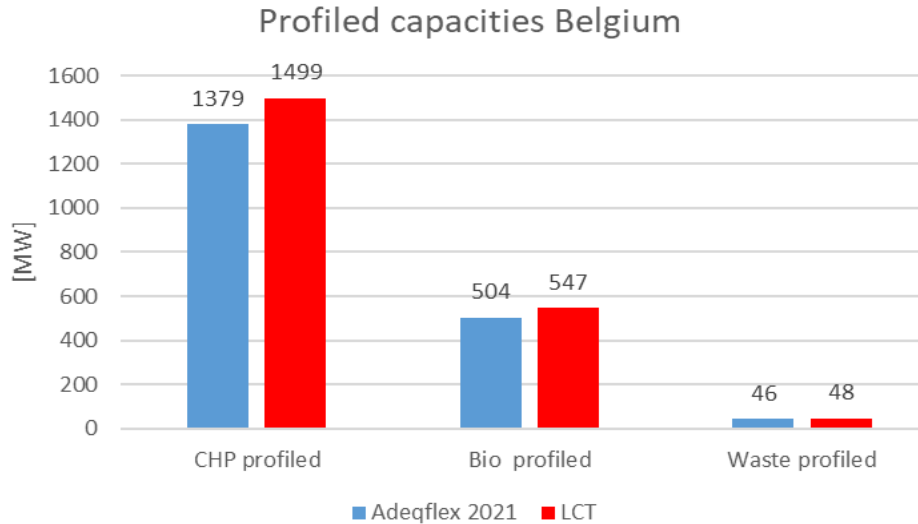
3 Impact of a lower consumption in Belgium [-300 MW]

A decrease of 2,3 TWh of electricity consumption mainly linked to the observed reaction to high prices decreases the demand over the year



More generation in Belgium and better deratings

4 Impact of more small-scale thermal generation, better thermal deratings, extension of Co, better FO rates... [-300 MW]



	Adeqflex 2021	LCT
CCGT	8,4%	5,5%
OCGT	9,2%	8,2%
TJ	3,6%	9,8%
Waste	1,0%	6,4%
CHP	7,0%	6,4%
Pumped storage	4,5%	2,9%
Batteries	0%	2,0%

N-Side study 2022

5 Impact of assumed higher derating factors for nuclear capacity in Belgium [-300 MW]

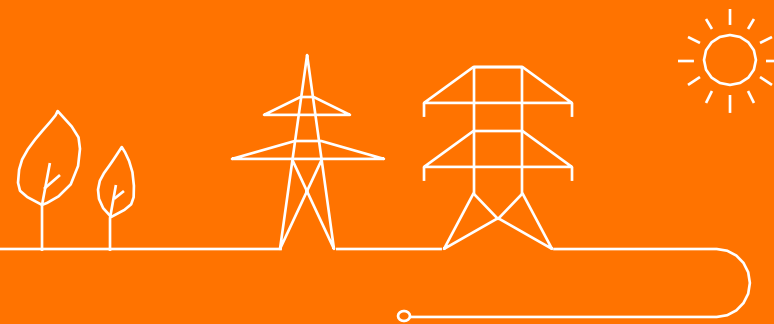
- AdeqFlex '21: 1 GW out of 4 GW assumed unavailable on top of an FO rate of 3,6 % → **derating 71,4 %**
- LCT scenario based on a 20,5 % of unavailability (4 % + 16,5 %) → **derating 79,5 %** (// Ministerial Decree of 31 March 2023)

The delta in capacity need for winter 2024-25 cannot simply be extrapolated for future years

- Some effects explaining the decrease in the need are only valid for 2024 and cannot be applied to other winters:
 - The demand will further increase in Belgium due to the recovery after the energy crisis as well as the electrification of demand;
 - The improved nuclear deratings have less impact in Belgium due to the decreasing installed capacity;
 - The situation abroad will evolve as well (coal phase-outs, electrification of demand...).

The impact for next winters will be quantified in the upcoming Adequacy & Flexibility study.

Cross Border Status Update



Status Update Cross Border CRM

Decreed on EU level that every CRM should (plan to) allow for “Indirect*” Cross Border Participation

**Indirect: through interconnector and not directly connected to the Belgian grid.*

- Capacities from **France, Germany and the Netherlands** (“Foreign Capacities”) should be able to participate in the Auction and deliver in the CRM.
- Maximum participation is limited to the “**Maximum Entry Capacity**” (MEC), determined for each Delivery Period, each Auction and for each border.

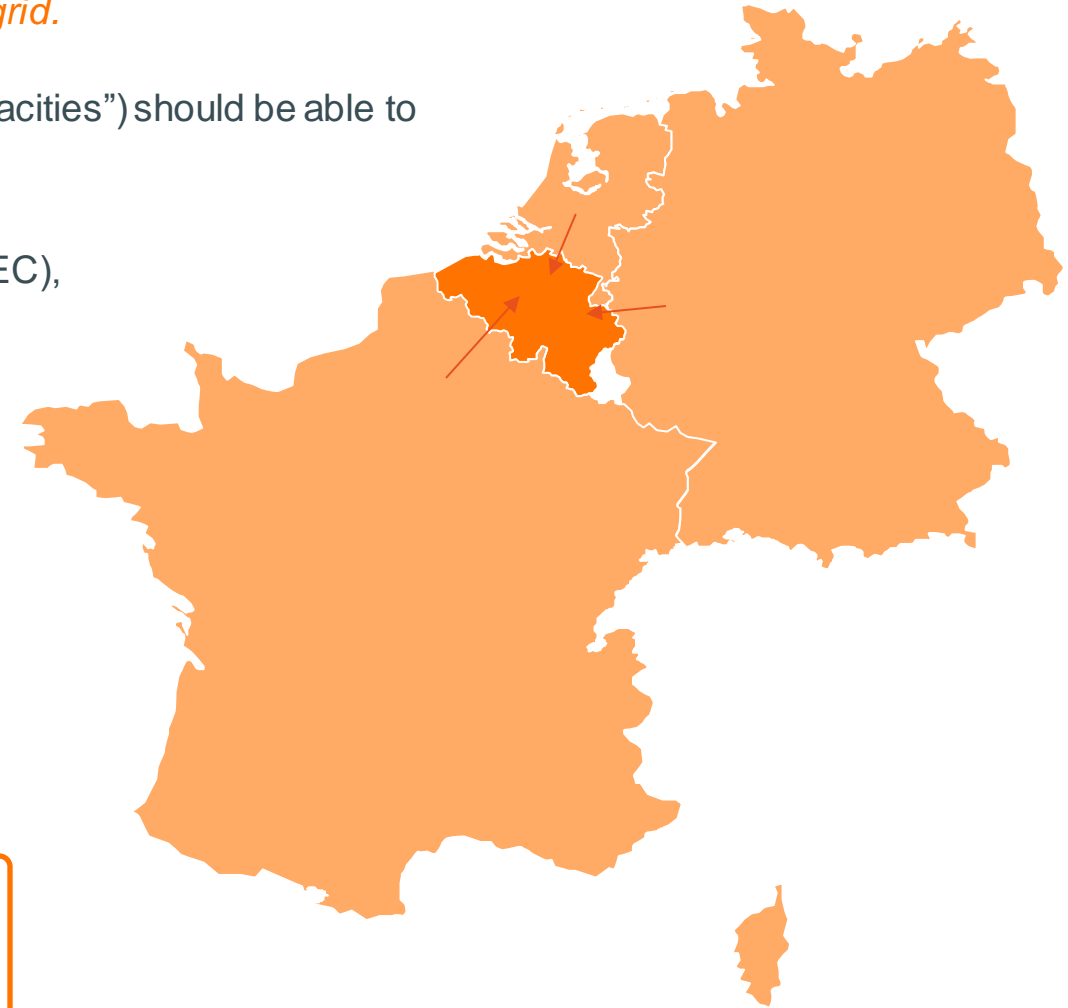
Status

TSO-TSO Agreements with neighbouring TSOs awaiting approval of the CREG

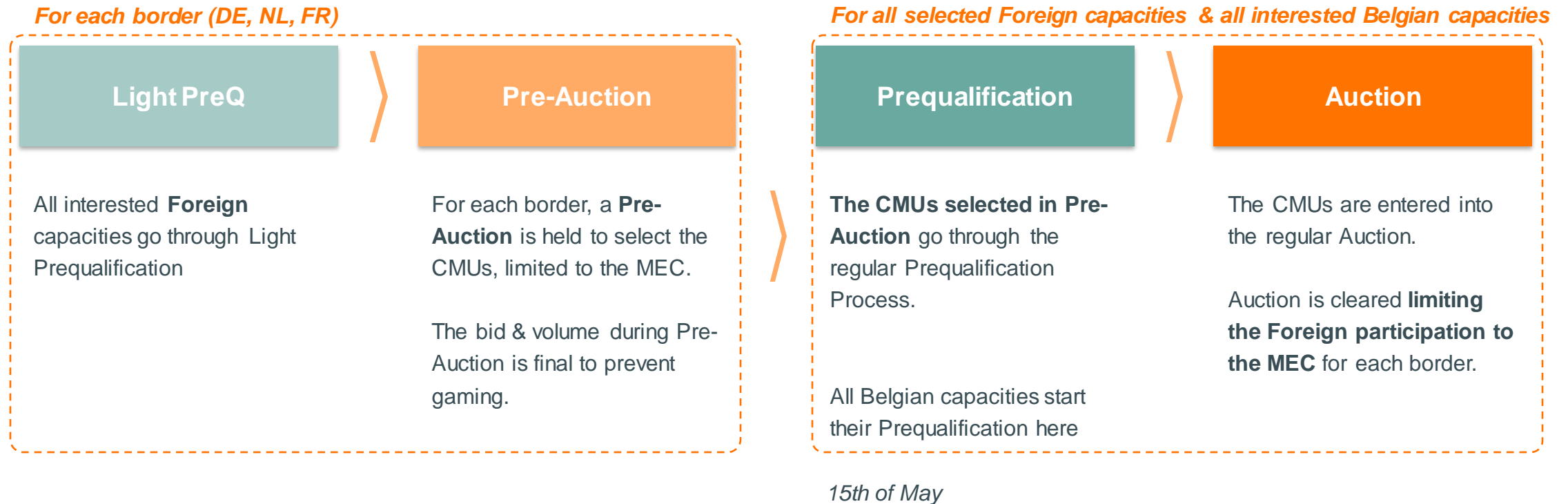
Design & (operational) processes required for Cross Border Participation are being developed



First XB Participation in Delivery Period ‘25-’26, with Prequalification and Auction for Y-1 and Y-4 in 2024

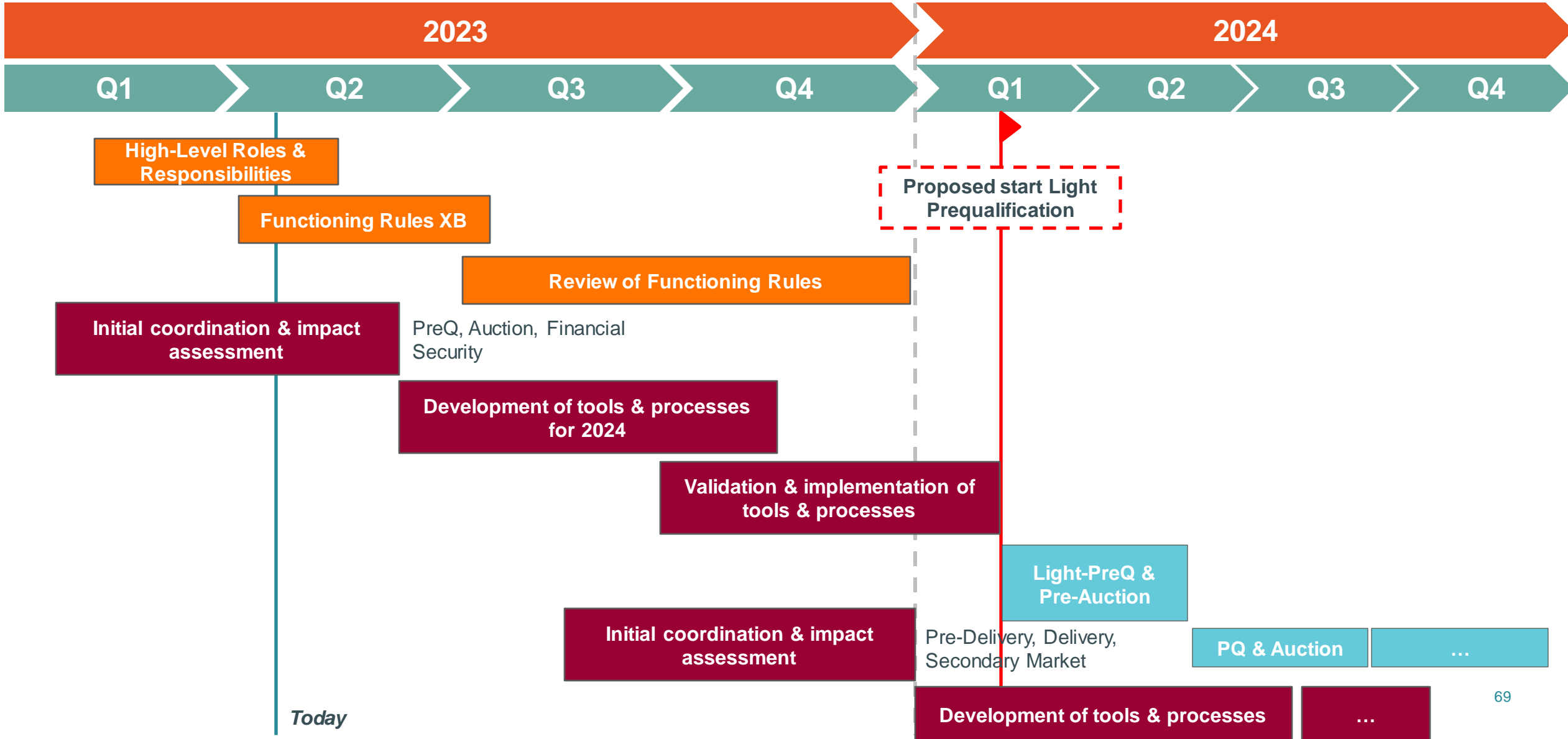


Additional processes are required before Prequalification & Auction to take into account the Maximum Entry Capacity limit

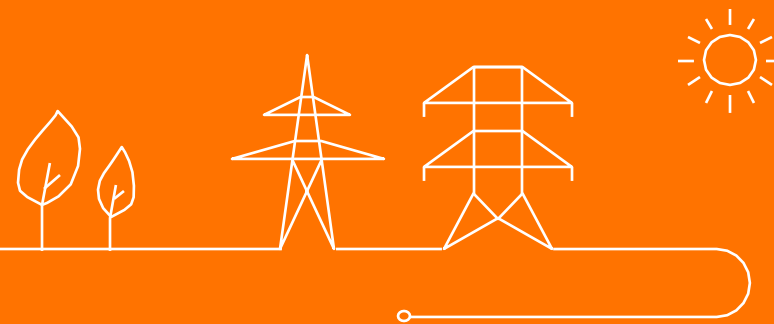


- ✓ All subsequent processes will be **identical or very similar to the known Belgian process**.
- ✓ Interactions and automated processes **with Foreign TSOs** will be crucial to obtain the **correct data** to run these processes.

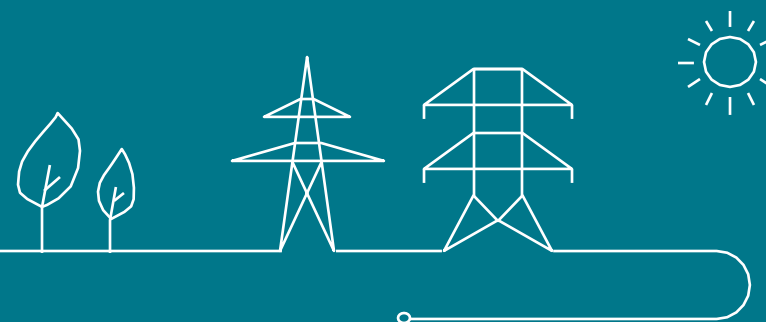
The following timeline has been proposed to achieve Cross Border Participation and Light Prequalification in 2024



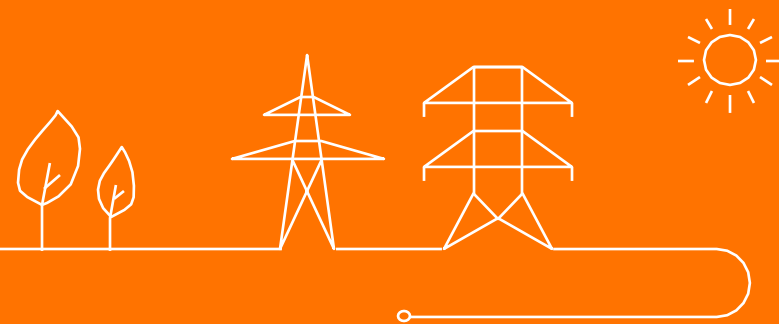
Regulatory Framework Evolutions



AOB



Next meetings



Foreseen timeslots for next meetings

- Tuesday 23rd of May 2023 am
- Friday 16th of June 2023 am
- Thursday 29th of June 2023 am
- Thursday 14th of September 2023 am



Thank you !

