WG Adequacy #25

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01/12/2023



Agenda

- > Welcome
- Approval of the Minutes
- Presentation auction results
- Presentation calibration reports
- Public consultation on the Functioning Rules
- Cross Border Update
- Go-to-Market Plan AM & PB Update
- Update to the regulatory framework
- Next meetings
- > AOB

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Approval of the Minutes

WG Adequacy #22 & #23





Approval of the Minutes

WG Adequacy #22

WG Adequacy #23

- Comment on the participants list adjustment realized.
- No further comments on the Minutes.





Presentation Y-4 27-28 auction results





Setting the demand curve

Demand curve	Volumes 27-28	Volumes 26-27
Average consumption during simulated scarcity	14 071 MW	14 089 MW
Balancing needs	1250 MW	1179 MW
Average unserved energy during simulated scarcity	-453 MW	-577 MW
Non-eligible capacity (incl. nuclear prolongation of 1662MW)	-4386 MW	-3948 MW
Reservation for Y-1	-1285 MW	-1249 MW
Reservation for foreign indirect contribution	-934 MW	-1428 MW
Already contracted capacity	-1658 MW	-1658 MW
Y-4 Auction volume (point B)	6605 MW	6408 MW

Demand curve after corrections



Demand curve set by Minister (point B)	6605
 Upward volume correction (Non-eligible capacity that participated) 	+ 621,72
 Downward volume correction (opt-out IN, improved derating factors, no PQ file, 	
rejected/archived CMUs)	- 5507,5
Corrected demand curve (point B)	1719,22



Derated Opt-out IN per technology, after clearing

- Aggregated technologies
- Combined Cycle Gas Turbine
- Combined Heat and Power
- Emergency generator
- Hydro run of river
- Large-scale batteries
- Open Cycle Gas Turbine
- Pump-storage plant
- Small-scale storage

Auction results

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Key take-aways

Volumes (after application of derating factor):

- > All offered capacity was retained
 - > 1576 MW ↔ 1719 MW point B of demand curve
 - ➢ Remaining 143 MW to be found in later auctions for '27 '28 → Y-1 & Y-2(tbc) still to come
- Existing capacity participated to the auction amounting to 972 MW
- New battery projects selected in the auction for a total of 357 MW, spread over 7 different projects and 5 different market parties
- Service life extension of existing OCGT equal to 246 MW
- Virtual CMU participated to the auction amounting to 1,3 MW

Prices:

Bid volume weighted average bid price = € 36 372,88 €/MW/year



Capacity volumes by technology and status

Presentation of the Calibration Reports

Y-1 Auction for Delivery Period 2025-26 and Y-4 Auction for Delivery Period 2028-29

Agenda



- Introduction
- Regulatory Context & Ministerial Decrees
- Overview of the CRM calibration report
 - Part I : Reference scenario and intermediate values selected by the Minister
 - Part II : Information and input for the establishment of the demand curve
 - Part III : Proposals for the other auction parameters



Introduction



- The report contains the input and parameters for the Y-1 auction for Delivery Period 2025-26 and the Y-4 auction for Delivery Period 2028-29, that will take place in October 2024.
- The legal & regulatory framework is the Royal Decree determining a methodology to calculate the CRM auction volume and parameters.
- The report has been transmitted to the cabinet of Minister Van der Straeten, FPS Economy and CREG on 15th of November 2023 and has also been published on Elia's website on 16th of November 2023.
- > The purpose of this presentation is to provide an overview of the CRM calibration report.
- In order to ease the reading the following acronyms will be used:
 - > 2025-26/Y-1: refers to the Y-1 calibration report for the DP 2025-26;
 - > 2025-26/Y-4: refers to the Y-4 calibration report for the DP 2025-26;
 - > 2027-28/Y-4: refers to the Y-4 calibration report for the DP 2027-28;
 - > 2028-29/Y-4: refers to the Y-4 calibration report for the DP 2028-29



Overview of the documents published by Elia



Content of the publication:

- 2 CRM Calibration Reports
 - Information and data for the demand curve building
 - Proposals for auction parameters (deratings, IPC, Strike Price)
- > Additional appendix to provide additional insights to stakeholders on the CRM calibration reports.
- Assumptions Workbook
 - Excel document updated after feedback from the public consultation and Ministerial Decrees in order to provide the final dataset used in the simulations.



Regulatory Context



The CRM calibration reports for 2025-26/Y-1 and 2028-29/Y-4 are based on Chapter 3 of the Royal Decree on Methodology and on the CRM law.

On basis of the reference scenario selected by the Minister, Elia's report should at least contain :

- 1. the load duration curve required to determine the 200h reserved capacity for Y-1 auction
- 2. the available information from Elia regarding the non-eligible volume
- Requested Input from Elia

Proposal from Elia

- 3. the max entry capacity for indirect cross-border participation for each neighboring European Member State
- 4. the revenues from the energy market for each technology required for the net-CONE calculation
- 5. the average load during simulated scarcity hours
- 6. the upward balancing need
- 7. the average energy not served during simulated scarcity hours
- 8. a proposal for the derating factors
- 9. a proposal for the intermediate price cap
 - 10. a proposal for the reference price
- 11. a proposal for the strike price

Planning & Next Steps



NOVEMBER	DECEMBER	JANUARY	FEBR	UARY		MARCH	
↓ 15/11 Elia's Calibration Reports 01/	/12	01/ CREG's on deman advice o	/02 proposal id curve & on Elia's	↓ 01/0 FPS and advices on curve pro)3 d Elia demand oposal	31/ Ministeria	/03 al Decree
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- A proposal from CREG on the demand curves for both auctions and Y-1 reserved volume for 2028-29/Y-4 as well as an advice on Elia's proposal is expected by 1/02/2024;
- > An advice from Elia and SPF Economy on CREG's demand curve proposals is expected by 1/03/2024;
- A decision by the Minister on the volumes to auction (demand curves), the Y-1 reserved volume and other parameters (strike price, reference price, derating factors and intermediate price cap) is foreseen by 31/03/2024.
- Updated planning for 2024: calibration process shifted by 2 weeks to allow for more time after load proposal from Climact
 - > No impact on the scenario public consultation period



Overview of the CRM calibration reports

Part I : Reference scenario and intermediate values selected by the Minister



Reference scenario and intermediate values selected by the Minister





Overview of the scenario's updates with biggest impact on results

- > Additional electrification from transport, building's heat and newly electrified industry or new usages
 - > Total electricity consumption 2025-26/Y-1 : 85.7 TWh
 - Total electricity consumption 2028-29/Y-4 : 102.4 TWh
- > Increased shares of **flexibility** in the system & modelling improvements compared to 2027-28/Y-4, as defined in AdeqFlex'23
- Based on ERAA22
 - > Dataset updated based on the latest information for Belgium and other countries
 - > Other countries forced to reach their reliability standard in the market, even if they have no market wide CRM
- Lower prices compared to 2027-28/Y-4 based on futures and the World Energy Outlook 2022
- Unavailability of French nuclear fleet :
 - 2025-26/Y-1 : Integrate an additional unavailability of 4 units of 900 MW and one unit of 1300 MW on top of the French nuclear considered in REMIT
 - 2028-29/Y-4 : Integrate an additional unavailability of 4 units on French nuclear generation on top of the French nuclear unavailability considered in ERAA 22 for France.

Note that all assumptions and input data are summarized in the "Assumptions Workbook" published with the CRM calibration report. Among others, it contains all the data from the Ministerial Decree on the reference scenario



No additional capacities added in 2025-26/Y-1 & ~2100 MWd added in 2028-29/Y-4

- > No additional capacities added in 2025-26/Y-1 based on the reference scenario selected by the Minister
- > Additional capacity added for 2028-29/Y-4 to obtain a scenario compliant with the reliability criterium.
 - Reference scenario filled:
 - ✓ by adding the results of the Y-4 auction with Delivery Year 2027-28:
 - 235 MWd from peakers 1 (OCGT)
 - 357 MWd of batteries
 - ✓ by adding additional capacities from preselected capacity types:
 - 1200 MWd of semi-baseload (CCGT) category
 - 300 MWd of 24h DSR





Intermediate values selected by the Minister on 15/09

- A list of technology and a gross-CONE for each technology and for each auction as presented in the tables below
- Minimal risk premium of 4.7 % on top of which a technology specific risk premium is added to calculate the WACC
- A correction factor X equal to 1.1 for 2025-26/Y-1 and 1.5 for 2028-29/Y-4

Technology	EAC [€/kW/an]	Derating factor [%]	CONEfixed,RT [€/kW/an]	WACC [%]
IC gas engine	78.4	95	82.5	8.0
Photovoltaics	97.6	1	9760	5.1
Onshore wind	163.4	10	1634	6.0
Battery storage (4h)	135.6	60	226	5.0
DSR (0<300MW)	25	59	42.4	6.3
DSR (300<600MW)	50	59	84.7	6.3
DSR (600<900MW)	75	59	127.1	6.3
DSR (900<1200MW)	100	59	169.5	6.3

2025-26/Y-1

Technology	EAC [€/kW/an]	Derating factor [%]	CONEfixed,RT [€/kW/an]	WACC [%]
OCGT (>100 MW)	83.3	93	89.6	8.0
CCGT (>800 MW)	100.2	93	107.7	6.9
IC gas engine	78.4	95	82.5	8.0
CHP (<100 MW)	166.9	93	179.5	6.9
Photovoltaics	78.2	1	7 820.0	5.1
Onshore wind	148.0	10	1 480.0	6.0
Offshore wind	241.9	11	2 199.1	5.2
Battery storage (4h)	106.7	60	177.8	5.0
DSR (0<300MW)	25	59	42.4	6.3
DSR (300<600MW)	50	59	84.7	6.3
DSR (600<900MW)	75	59	127.1	6.3
DSR (900<1200MW)	100	59	169.5	6.3

<u>2028-29/Y-4</u>

Overview of the CRM calibration reports

Part II : Information and input for the establishment of the demand curve

Part II : Information and input for the establishment of the demand curve



Remark :

LOLE_B corresponds to the Belgian reliability standard as defined in the CRM Law (Article 7undecies, §3) X parameter has been defined by the Minister. X=1.1 in 2025-26/Y-1 and X=1.5 in 2028-29/Y-4

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Overview of the volume parameters required according to the Royal Decree

Parameters calculated in Elia's report in order for CREG to establish the volume parameters of the demand curve :

- > Average load during simulated scarcity hours from the calibrated reference scenario (for points A and B&C);
- > Average energy not served during simulated scarcity hours from the calibrated reference scenario (for points A and B&C);
- Upward balancing need;
- Information available regarding the non-eligible capacity;
- > Max-entry capacity for indirect cross-border participation of neighboring European Member State;
- Load duration curve (only for Y-4 auction).





Overview of the volume parameters requited according to the Royal Decree

Parameters calculated in Elia's report in order for CREG to establish the volume parameters of the demand curve :

- > Average load during simulated scarcity hours from the calibrated reference scenario (for points A and B&C)
- Average energy not served during simulated scarcity hours from the calibrated reference scenario (for points A and B&C)
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- Information available regarding the non-eligible capacity
- > Max-entry capacity for indirect cross-border participation of neighboring European Member State
- Load duration curve (only for Y-4 auction).





Volume Parameters - Higher average load in scarcity in 2028-29/Y-4 leads to higher volume to be contracted

Average electricity consumption during scarcity is a main factor determining the target volumes

Delivery Period	Point	Average consumption during scarcity [MW]	Energy Not Served during scarcity [MW]	Balancing needs* [MW]
2025-26	В	13473	443	1134
2028 20	А	15363	612	1136
2026-29	В	15453	478	1136

*The balancing needs are defined as the sum of the needs of FCR and FRR, where the FRR needs are equal to the dimensioning incident during scarcity periods.

→ The increase in average load during scarcity is mainly related to a higher electricity consumption coming mainly from electrification (EV, HP, industry)



Volume Parameters - Special attention should be given to the consideration of new types and methodology improvements regarding flexibility introduced in AdeqFlex'23

Certain types of flexibility are not expected to participate to the CRM, whilst nevertheless being present in the system.

→ These volumes are removed from the average load during scarcity

The methodology should be reassessed and fine-tuned based on observed auction results

		2025-26/Y-1	2028-29/Y-4	
DSR from existing industry (E-Cube)		Not removed from the average electricity consumption during scarcity	Not removed from the average electricity consumption during scarcity	
	Electric vehicles	Demoved from the	Domoved from the	
End-user flexibility	Heating	average electricity ave consumption during cons	average electricity average consumption during consump	average electricity consumption during
	Residential batteries		scarcity	
	Electrolysers			
	E-boilers			
DSR from additional electrification in industry	Data centres	79% removed from the average electricity consumption during scarcity	79% removed from the81% removedaverage electricityaver	81% removed from the average electricity
	Indust. HP		consumption during scarcity	
	Steel			
	CCS			



Overview of the volume parameters requited according to the Royal Decree

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Volume Parameters – Derated non-eligible capacity

- As mentioned in article 11, §2 of the RD Methodology, the volumes that are considered as non-eligible need to be subtracted from the required volume.
- The eligibility criteria are introduced in article 4 of the CRM Law and developped in the Royal Decree related.
 More in particular and based on the aforementioned laws, capacities are considered non-eligible if either:
 - > They benefit from state aid in the course of the Delivery Period; or
 - Their installed capacity multiplied with the appropriate derating factor defined in part III of this report is lower than the threshold of 1 MW.





Volume Parameters – RES non-eligible capacity is lower in 2028-29/Y-4 due to lower deratings

Criteria 1 : RES Capacities that already received subsidies

Assumption :

- All the RES capacities (solar, onshore wind, offshore wind, hydro run-of-river) are considered as already receiving subsidies
- > RES capacities are assumed to be both existing + forecasted (to be commissioned between now and the delivery period)
- > Derating factors applied as calculated in the framework of the CRM calibration report (cf. later slides)

Category	Installed Capacity [MW]	Derating Factor [%]	Non-eligible Capacity [MW]
Offshore wind	2261	12	271
Onshore wind	3928	9	354
PV	10090	2	202
Run-of-river hydro	137	48	66
TOTAL			893

2025-26/Y-1

Category	Installed Capacity [MW]	Derating Factor [%]	Non-eligible Capacity [MW]
Offshore wind	2261	9	204
Onshore wind	4918	7	344
PV	12730	1	127
Run-of-river hydro	145	48	70
TOTAL			745
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<u>2028-29/Y-4</u>

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Volume Parameters – Different capacities and deratings for thermal noneligible capacity

Criteria 2 : Thermal capacities that already received subsidies

Assumption :

- The installed capacity is equal to the categories modelled through thermal profiles as selected in the Ministerial Decree. All this capacity is considered as receiving subsidies
- All CHP, waste and biomass units individually-modelled are considered. Only the units that won't receive subsidies for the 2027-28 period are excluded from this list (meaning they are eligible) based on the latest information received by the regions.
- > Derating factor applied as calculated in the framework of the CRM calibration report (cf. later slides)

Category	Installed capacity [MW]	Derating Factor [%]	Non-eligible capacity [MWd]
Aggregation of thermal technologies without daily schedule	2094	67	1402
Individually modelled units	768	67 or 94	652
TOTAL			2054

2025-26/Y-1

Non-eligible Installed Derating capacity Category capacity Factor [%] [MWd] [MW] Aggregation of thermal technologies 2209 64 1414 without daily schedule 723 64 or 94 616 Individually modelled units 2030 TOTAL

2028-29/Y-4



Overview of the volume parameters requited according to the Royal Decree

Parameters calculated in Elia's report in order for CREG to establish the volume parameters of the demand curve :

- > Average load during simulated scarcity hours from the calibrated reference scenario (for points A and B&C)
- > Average energy not served during simulated scarcity hours from the calibrated reference scenario (for points A and B&C)
- Upward balancing need
- Information available regarding the non-eligible capacity
- > Max entry capacity for indirect cross-border participation of neighboring European Member State
- Load duration curve (only for Y-4 auction).





Significantly lower cross-border participation in 2028-29/Y-4 compared to¹⁵ 2025-26/Y-1

Cross-border participation



- XB is rather stable between the two Y-4 auctions, the difference can be explained by the fact that Germany is now ensured to comply to its reliability standard (additional capacity was added in Germany)
- XB in 2025-26/Y-1 nearly doubles compared to 2028-29/Y-4 auction due to fewer scarcity periods in neighboring countries (NL, DE, GB), resulting in increased cross-border capacity available during Belgian scarcity.



Higher correlation between scarcity moments in Belgium and other countries in 2028-29/Y-4 compared to 2025-26/Y-1 leads to lower cross-border contribution

- Scarcity situations in 2025-26/Y-1 are mainly correlated to scarcity situations in France, due to nuclear, while some margin are found in other countries
- Scarcity situations in 2027-28/Y-4 were strongly correlated to scarcity situation in Germany. This effect is reduced in 2028-29/Y-4, as Germany is assumed to be compliant with its reliability standard.





Volume Parameters – Max Entry Capacity (MEC) for indirect cross-border participation

- > The total volume of cross-border participation for 2028-29/Y-4 is to be reserved for Y-1
- Given the current draft legal framework, Indirect Cross Border participation will be possible for NL and DE CRM candidates for 2025-26/Y-1.
 - > More information on the Cross Border participation will be shared through the foreign TSOs in the coming weeks

	2025-26/Y-1	2028-29/Y-4
	Capacity [MW]	Capacity [MW]
France	0	10
Netherlands	976	497
Germany	284	132
Great-Britain	709	379
TOTAL	1969	1018





Overview of the volume parameters requited according to the Royal Decree

Parameters calculated in Elia's report in order for CREG to establish the volume parameters of the demand curve :

- > Average load during simulated scarcity hours from the calibrated reference scenario (for points A and B&C)
- > Average energy not served during simulated scarcity hours from the calibrated reference scenario (for points A and B&C)
- Upward balancing need
- Information available regarding the non-eligible capacity
- > Max entry capacity for indirect cross-border participation of neighboring European Member State
- > Load duration curve (only for Y-4 auction).





Volume Parameters – Load Duration Curve for 2028-29/Y-4

- Elia's responsibility is to provide the "load duration curve" for 2028-29/Y-4 necessary for the CREG to calculate the 200h reserved capacity for Y-1 auction
- > This curve is based on the electricity consumptions profiles integrated in the Monte-Carlo simulation.
- > This curve is noted C(h), which represents the consumption to be covered at least during at least h hours by year.



Part II : Information and input for the establishment of the demand curve



Remark :

LOLE_B corresponds to the Belgian reliability standard as defined in the CRM Law (Article 7undecies, §3) X parameter has been defined by the Minister. X=1.1 in 2025-26/Y-1 and X=1.5 in 2028-29/Y-4

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Price parameters - Determination of the missing money



Net-CONE = missing money of the technology with the lowest missing money Missing money = gross-CONE - Revenues



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Price Parameters – Energy Market Revenues

- > Market revenues have to be determined on the whole economic lifetime of the technologies
- Reference scenarios selected by the Minister are used for the respective Delivery Periods
- AdeqFlex'23 scenarios are used for later Delivery Periods
 - > CENTRAL/EU-SAFE: in line with the selected sensitivities on French nuclear availabilities
 - > Mix: additional capacity to reach the reliability standard in line with results of CRM auctions
 - > Central price: in line with fuel prices taken into account in the CRM reference scenario





Energy Market Revenues of CCGT's increase for both auctions



Comparison of marginal cost of CCGT and OCGT



- Electrification + higher share of flexibility in 2028-29/Y-4
 - \rightarrow impact on merit order
 - → higher revenues for CCGT and OCGT
- The prices in the 2025-26/Y-1 are higher than 2028-29/Y-4
 - \rightarrow higher revenues for CCGT
- More units cheaper than OCGT's in 2025-26/Y-1 compared to the load
 - \rightarrow lower revenues for OCGT (less dispatched)

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Price Parameters – Energy Market Revenues 2025-26/Y-1



- Revenues tend to decrease as fuel prices decrease
- Revenues for batteries increase as there are more price variations
- Revenues for IC gas engines increase between 2025 and 2028 in line with OCGT as mentioned previously



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Price Parameters – Energy Market Revenues 2028-29/Y-4



- Revenues tend to decrease as fuel prices decrease
- Revenues for batteries increase as there are more price variations



> The estimation of these net revenues must be provided for the technologies listed earlier.

- They are calculated in accordance with the Royal Decree Methodology : based on the net revenues arising from the reservation of frequency-related balancing services.
- The retained value for these revenues is equal to a percentage of the average historical reservation fee of balancing services, based on the last 36 months data
 - The application of this percentage takes into account the arbitrage being made by these technologies between the energy and balancing markets (including the opportunity cost).
 - A correction is made per balancing product for the energy crisis and/for other relevant factor (eg. FCR convergence expected for LT).
 - Another correction takes into account the future installed capacity of the relevant technologies (including last auction results) and the competing technology mix expected to participate to the different balancing products.



Price Parameters – net ancillary services revenues







- Elia has improved the methodology for the determination of the net balancing revenues together with Compass Lexecon.
- Compass Lexecon has finalized the net balancing study, the final result will be available on the Elia website.

Price Parameters – net ancillary services revenues



Technologies	Y-1 for DY 2025-26	Y-4 for DY 2028-29
IC gas engines	27 €/kW	15 €/kW
OCGT	Not in the list	15 €/kW
CCGT	Not in the list	3 €/kW
PV	0	0
Batteries	25 €/kW	21 €/kW
Onshore wind	0	0
Offshore Wind	Not in the list	0
CHPs	Not in the list	0
DSR (0-300 MW)	12 €/kW	10 €/kW
DSR (300-600 MW)	12 €/kW	10 €/kW
DSR (600-900 MW)	12 €/kW	10 €/kW
DSR (900-1200 MW)	12 €/kW	10 €/kW



Overview of the CRM calibration reports

Part III : Proposals for the other auction

parameters



Part III : Proposals for the other auction parameters

- In addition to the inputs for the determination of the demand curve, it is up to Elia to provide concrete proposals for several other parameters for the auction, according to article 6, §2° of the draft amendment to the Royal Decree on Methodology
- Elia's proposals concern :
 - Derating Factors (Chapter 5 of the Royal Decree on Methodology)
 - Intermediate Price Cap (Chapter 6 of the Royal Decree on Methodology)
 - Strike Price & Reference Price (Chapter 8 of the Royal Decree on Methodology)





A specific focus on scarcity situations is relevant as most of CRM parameters and calculation are derived from that

- > Simulated scarcity situations are one of the main drivers for the calculation of CRM parameters
- > Some volume parameters are calculated during these periods :
 - Average load during simulated scarcity hours
 - Average energy not served during simulated scarcity hours
 - Max-entry capacity for indirect cross-border participation
- Some parameters proposed by Elia are also calculated during those periods :
 - > Derating Factors for SLA's and energy-limited technologies (market response, batteries, psp)
 - > Derating Factors for RES (solar, onshore wind, offshore wind, hydro ror)
 - Derating Factors for aggregated thermal technologies

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For these reasons, it seems relevant to have a close look to the evolution of those simulated scarcity situations. All information presented here is available in the "Appendix: Complementary analysis on results", published on Elia's website.





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Scarcity situations are more concentrated around the evening peak

- Scarcity hours for 2025-26/Y-1 are more concentrated around specific times of the day (lower share of flexibility)
- The main explanation of the difference between 2027-28/Y-4 and 2028-29/Y-4 is less long scarcity periods due to other countries not forced to reach their reliability standard in the market, unless they have a market wide CRM in 2027-28/Y-4



Intra-day distribution of scarcity moments



Distribution of scarcity according to duration provides a good overview of expected derating factors

1 The amount of short-term simulated scarcity situations are found to be higher in 2025-26/Y-1 than in 2028-29/Y-4 due to scarcity moments more concentrated around the morning and evening peaks

→ expected higher derating factors for energy-limited technologies with low or medium duration for 2025-26/Y-1

2 More long-term simulated scarcity situations in 2025-26/Y-1 due to the strong correlation with nuclear in France \rightarrow expected lower derating factors for energy-limited technologies with long duration for 2025-26/Y-1

Distribution of scarcity according to duration weighted by duration





Purpose of the derating factors

CRM Law

« facteur de réduction: le facteur de pondération d'une capacité considérée, déterminant sa contribution à la sécurité d'approvisionnement afin de fixer le volume éligible à participer à la mise aux enchères »

"reductiefactor: de wegingsfactor van een bepaalde capaciteit, die diens bijdrage aan de bevoorradingszekerheid bepaalt, teneinde het volume vast te leggen dat in aanmerking komt om deel te nemen aan de veiling"



Evaluation of the contribution to security of supply of each technology

Each technology does not contribute the same way to adequacy





Derating Factors : Calculation methodology

Derating factors are determined based the methodology set in the Royal Decree on Methodology

Categories	Calculation methodology		
Thermal technologies with daily schedule	100 – FOR		
Energy-limited technologies with daily schedule SLA (Service Level Agreement)	 Average contribution of each category of technology during simulated scarcity situations based on a fictive unit of 1 MW. Average contribution of each category of technology during simulated scarcity situations / Aggregated Nominal Reference Power of the technology 		
Weather-dependent technologies			
Thermal technologies without daily schedule	Average contribution of each category of technology during simulated scarcity situations / Aggregated Nominal Reference Power of the technology		



Derating Factors - Thermal technologies with daily schedule

- > Thermal technologies with daily schedules are determined based on the forced outage rate.
- > The derating factors are the identical for 2025-26/Y-1 and 2028-29/Y-4
- > The forced outage rate are in line with the values provided in the Ministerial Decree.

DRF [%] = 100 [%] - Forced Outage Rate [%]

Category II : Thermal technologies with daily schedule					
Sub-Category	Derating Factor [%]				
CCGT	94				
OCGT	92				
Turbojets	90				
IC Gas Engines	92				
IC Diesel Engines	90				
CHP/Biomass/Waste	94				
Nuclear	80				
Coal	90				



Derating Factors – SLA's

- Derating Factors for SLA & energy-limited technologies with daily schedule categories are calculated based on the average contribution of each category of technology during simulated scarcity situations based on a fictive unit of 1 MW.
- Units of 1 MW are considered in order to provide a value for each technology and category using the same methodology

Category I : SLA						
Sub Catagory	Derating Factor [%]	Derating Factor [%]				
Sub-Category	2025-26/Y-1	2028-29/Y-4				
SLA-1h	22	19				
SLA-2h	38	35				
SLA-3h	50	48				
SLA-4h	59	57				
SLA-5h	65	65				
SLA-6h	71	71				
SLA-7h	75	76				
SLA-8h	79	81				
SLA-9h	82	86				
SLA-10h	86	89				
SLA-11h	89	93				
SLA-12h	91	95				
SLA unlimited	100	100				

Derating factors for SLAs are significantly higher in 2025-26/Y-1 compared to 2025-26/Y-4

Comparison between auctions with Delivery Periods 2025-26 shows significantly higher derating factors for SLAs.

- > Mainly the result of the future looking climate database. Many changes in scenario due to FF55, RePowerEU, war in Ukraine...
- Derating factors for SLAs are found to be aligned between last 2 Y-4 auctions.



Derating factors for SLAs between DP 2025-26



Derating factors for SLAs between last 2 Y-4 auctions

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Derating factors for SLAs are aligned with CRM in other countries

- Derating factors in the Belgian CRM are found to be on the upper end of the range provided in other CRM at European level.
- It should be noted that the derating factors for energy-limited technologies tend to decrease in other CRM.



Comparison of derating factors with other CRM countries



69%

65%

6h

60%

- 52%

PSP

56

Derating factors for storage are aligned with previous CRM calibration report

- > Derating factors for batteries are higher than last year due to better scarcity profiles
- > This effect is however partially compensated by the introduction of :
 - Forced-outage rate of 2%
 - Decrease of the roundtrip efficiency from 90% to 85%
- > This compensation is not observed for PSP, which leads to better derating factors for both auctions.

Category III :	Energy-limited techn	ologies with daily				Derating	facto
	schedule		100% -				
Sub Catagory	Derating Factor [%]	Derating Factor [%]	90% — 80% —				
Sub-Category	2025-26/Y-1	2028-29/Y-1	70% —			57%	
Storage 1h	28	22	60% — 50% —		46%		
Storage 2h	46	38	40% -	28%		50%	
Storage 3h	57	50	30% -	20%	38%		
Storage 4h	63	57	20%	22%			
Storage 5h	66	62	0% —	1h	2h	3h	
Storage 6h	69	65				B	atterie
PSP	60	52			 Y-	1 2025-26	— Y-4



63%

57%

4h

2027-28

66%

62%

5h

WG Adequacy #25 - CRM Calibration Report



Derating Factors – Weather-dependent technologies

Weather-dependent technologies categories are calculated based on the average contribution of each sub-category during simulated scarcity situations from the Monte-Carlo simulation's output of the calibrated reference scenario.

> DRF [%] = Average contribution during simulated scarcity situations [MW] Nominal reference power [MW]

> Derating factors for RES decrease due to higher installed capacities

Category IV : Weather-dependent technologies					
Sub Catagory	Derating Factor [%]	Derating Factor [%]			
Sub-Category	2025-26/Y-1	2028-29/Y-1			
Offshore Wind	12	9			
Onshore Wind	9	7			
Solar	2	1			
Hydro Run-of-River	49	48			





Derating Factors – Thermal DSO- or CDS-connected technologies

Derating factors for thermal technologies without daily schedule are calculated based on the average contribution of each sub-category during simulated scarcity situations from the Monte-Carlo simulation's output of the calibrated reference scenario.

Category V : Thermal technologies without daily schedule						
Sub-Category	Derating Factor [%]	Derating Factor [%]				
	2025-26/Y-1	2028-29/Y-1				
Aggregated thermal technologies	67	64				





Technologies	Y-1 for DY 2025-26	Y-4 for DY 2028-29
OCGT	27-30 €/kW	15-16 €/kW
CCGT	1-4 €/kW	1-3 €/kW
DSR (4h activation)	12 €/kW	10 €/kW
Turbojets	40 €/kW	27 €/kW

- Net balancing revenues for IPC have been estimated thanks to the study realized by Compass Lexecon.
- Main difference between net balancing revenues for Net-CONE and IPC lies in the efficiency of the technologies considered:
 - Observed trend for existing technologies : units with a lower efficiency compared to new units are expected, all things being equal, to capture small revenues from the energy market and have thus a lower opportunity cost to provide balancing services.
 - This results in slightly higher net balancing revenues for IPC than for Net-CONE

Intermediate Price Cap





- Based on AFRY (2022) and Fichtner (2020)
- Entras study is not fully finalized yet; will be used next year
- Net revenues from Ancillary Services
 - Based on Compass Lexicon study (cf. previous slide)
- > For the Y-1 and Y-4 auction, the IPC is set by **OCGTs**
 - Y-1 DY 2025-26: 25 €/kW/y
 - Y-4 DY 2028-29: 23 €/kW/y



* As proposed by Elia in the respective calibration reports

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Intermediate Price Cap: Missing-money estimations

Investments with an economic lifetime of >3 years



• Missing Money calculation for Y-1:

		Missing-money divided by Derating factor [€/kW-derated/year]					
Technology	Derating factor [%]	Level 1 – Mid cost high rev	Level 2 – Mid cost mid rev	Level 3 – Mid cost Iow rev	Level 4 – High cost high rev	Level 5 – High cost mid rev	Level 6 – High cost Iow rev
CCGT	94	0	0	0	0	0	18
OCGT	92	0	0	0	13	19	25
Turbojet	90	0	0	0	0	0	0
DSR (activation duration of 4h)	59	3	3	3	13	13	13

• Missing Money calculation for Y-4:

		Missing-money divided by Derating factor [€/kW-derated/year]					
Technology	Derating factor [%]	Level 1 – Mid cost high rev	Level 2 – Mid cost mid rev	Level 3 – Mid cost Iow rev	Level 4 – High cost high rev	Level 5 – High cost mid rev	Level 6 – High cost Iow rev
CCGT	94	0	0	0	0	0	8
OCGT	92	0	0	0	12	19	23
Turbojet	90	2	8	13	2	8	13
DSR (activation duration of 4h)	57	6	6	6	17	17	17

Reference price



- The reference price is defined in the Electricity Act as "the price reflecting the price that is supposed to be obtained" by the capacity provider on the electricity market".
 - It must be observed for every single hour of the Payback Obligation in the spot Day Ahead market on a NEMO active in the Belgian bidding zone (EPEX or Nord Pool spot)
 - It must be expressed in €/MWh
 - The modalities related to such reference for indirect XB capacities are described in the draft Royal Decree Cross-Border and will be specified further in a future version of the Functioning Rules
 - All other practical related details are provided in the Functioning Rules (choice, modification, ...)

Elia proposes EPEX or Nord Pool Spot for the reference price^{*}, or any other NEMO that becomes active before the start of the Delivery Period



Strike Price

determination of the calibration curve and strike price range



- To construct the calibration curve used for the calibration of the strike price, E-CUBE analyzed the data of EPEX and Nord Pool Spot for the **peak hours of the winter weekdays** for the 3 previous years :
 - 2020-21
 - 2021-22
 - 2022-23
- This analysis is based on both aggregated curves and (complex) block orders
- As detailed in the Royal Decree on Methodology, the strike price must be calibrated in a range equivalent to a volume of elastic reaction from the market of (75 -85) % from the constructed calibration curve corresponding to a price range of (292 - 431) €/MWh

For the Y-4 auction, the application of the methodology leads to a [292 ; 431] €/MWh range for the strike price calibration



Source : E-CUBE, Construction of the calibration curve for the calibration of the Strike Price linked to the Delivery Period 2025-26 and 2028-29, June 2023

Strike Price Considerations for the calibration



- Elia has updated the design of the actualization mechanism for the Strike Price, which will now be updated ex-post during the Delivery Period
- Elia has taken into account these evolutions in the calibration process of the Strike Price for the 5 criteria listed in the RD Methodology
 - Variable cost of Daily Schedule units on the Belgian market: set by Turbojets, the Strike Price must exceed 319 (for Y-1) and 305 (for Y-4) €/MWh, respectively
 - Shape of the calibration curve: the calibration curve only starts to display asymptotic behaviour towards to upper range of the calibration window, indicating that the Strike Price must be considered there
 - Evolutions on the energy market: overall prices are more volatile compared to pre-COVID era; this criteria according to Elia does not provide a strong indication
 - Stability in time: see next slide
 - **Reasonable probability of being reached**: compared to 2022, excessively high prices have not been reached in 2023. Be that as it may, the actualization mechanism makes this criterion less impactful

Strike Price Results



Elia proposes the following Strike Prices:

- 2025-26/Y-1: **410 €/MWh**
 - > Price level ensures that the fixed component is identical to the one of the Y-4 DY 2025-26 auction
- 2028-29/Y-4: **431 €/MWh**

> As in previous calibrations, upper limit of the calibration window; fixed component is in line with previous auctions





Functioning Rules

Public Consultation





Timeline for the coordination of the Functioning rules (FR)



The public consultation will run from **December 1st to January 5th** (EN, FR, NL).A **cover note** (EN) will also be provided during the public consultation with an overview of the most relevant changes.

After processing the comments from the public consultation and approval by CREG, the Functioning rules will be published on the **Elia website on May 15.**

Elia invites all stakeholders to reach out during the public consultation in case of questions.



Some changes integrated in the 4th version of the Functioning Rules should be highlighted (1/2)

Elia recognizes that for certain proposed changes an amendment of the legal framework is ongoing:

- Y-2 auction
- Dynamic 200h rule
- Indirect Foreign Cross border participation

Some of the changes have an impact on all chapters of the Functioning Rules

Integration of the Y-2 Auction

All chapters have been adapted to consider the Y-2 Auction.

• Integration of the Indirect Foreign Cross border participation

Chapter 17 has been updated to specify the rules for processes specific to Cross Border participation (Light Prequalification & Pre-Auction) For other processes, paragraphs have been added to the relevant chapters.

The Design note' structure is similar to the Functioning rule's structure:

- Each chapter corresponds with the eponymous chapters of the Functioning Rules
- In case no significant changes were made to a chapter, "null" is used
- This cover note serves to guide stakeholders through the most notable changes in the Functioning Rules. It is intended to be used alongside the Functioning Rules





Cross Border Update





A design note for the Indirect Foreign Capacities participation has been published on Elia Website

- The aim of this document is to highlight the specificities of the Cross-border participation.
- The design note will be revised with the latest version of the Functioning Rules and will be republished in the coming weeks.



 \rightarrow Alignment is underway with foreign TSOs to determine all the design & operational modalities





Go-to-Market Plan AM & PB – Update





Lookback to invite of experts working on Availability Monitoring & Payback Obligation

- As a reminder: As we will operate together an integrated business process, participation of your company's experts in the discussions with Elia is key for a good implementation and operation of Availability Monitoring & Payback Obligation Process
- Results of Call for Experts:
 - # Companies: 10
 - # Experts:
 - Business: 15 experts
 - IT: 5 experts
- Contribution of your experts
 - **Participate in workshops** organized by Elia (combination of online & on-site @ Elia HQ)
 - Feedback via email on requests from Elia
 - Collect & distribute the relevant information within your company concerning the implementation

→ Please contact us in case you still want to join this community of experts

Thanks for your subscription!

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Save the Date! First Workshop with experts: Which Data Entry/Retrieval Methods fitting Your Business Needs?



- **Timing: 14th December 13h-16h30** (Optional: Sandwich lunch at 12h to meet your experts)
- Location: Elia Office
- **Type of session:** Business-oriented view
- Topic session: Which Data Entry/Retrieval Methods fitting Your Business Needs?
- Input data in scope: CMU Data submitted by CRM Capacity Provider for the entire Delivery Period per Quarter Hourly Granularity subject to operational deadlines & validation rules:
 - Remaining Maximum Capacity
 - [CMU's without Daily Schedule] Declaration of Declared (Partial) Prices (& Associated Volume)
- Agenda:
 - Introduction: High-level view of Operational Process Availability Monitoring & Payback Obligation
 - Obligation CRM Capacity Provider Concerning CMU data
 - Refresh of design context per CMU input data
 - Overview of different data entry/retrieval methods
 - Q&A Go-to-Market Plan



Preparation before the workshop

Which Data Entry Methods are fitting Your Business Needs ?

- Experts invited to
 - Read the proposed version of Functioning Rules in Public Consultation since 1st December:
 - Introducing the concept of Scheduled Maintenance
 - Integrating Availability Plan (cf. OPA contract) with Remaining Maximum Capacity
 - Consider the different data entry methods (see below) in the view of the respective business process

Data entry methods	Remaining maximum capacity	Declaration of (Partial) Prices (& Associated Volume)
1) Via web-application	Yes	Yes
2) Via Excel Upload in web-application	No	Yes
3) Via B2B implementation (*)	Yes	Yes
4) Import iCAROS (**) data	Yes (only if CMU subject to OPA contract)	No

- Be aware about the obligations to provide up-to-date CMU data as described in the CRM functioning rules
- Discuss internally between IT and business if a B2B implementation is relevant
- Analyze for which other scope B2B implementation is relevant (publication of AMT hours, sufficient via the Elia and CRM website?)

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Key impacting content for our workshop Candidate Action



Reminder: Availability Monitoring & Payback – Go-to-Market Planning





Evolution to the regulatory framework



Update changes to the regulatory framework

An update following discussions in CdS on the following topics is presented:

- 1. Dynamic reservation
- 2. Y-2 Auction/volume split
- 3. Art. 4bis

Dynamic reservation correction

The **intention** behind the dynamic reservation correction is to compensate for the impact of capacities for which the 200h-volume was already reserved in the Y-1 timeframe, on auctions that precede the Y-1 auction.

Following principles apply:

- Correction is ex-ante
- Correction is technology neutral

The proposal is a two-step approach:

- 1. Define which capacities are included in the correction
- 2. Define the correction volume for the individual capacities

Technology neutral dynamic reservation correction

The correction of the 200h-volume is defined in a **technology neutral** way. The **selection of the CMUs** included in the correction is proposed to be determined as follows:

"Capacities that have no obligation to prequalify, as described in article 7undecies, §, 8 al. 2 of the Electricity Act, and that submit a bid in the auction for a 1-year capacity contract following the standard prequalification process"

Capacities that have no obligation to prequalify include:

- 1. capacities related to offtake
- 2. capacities related to production and storage that are not far enough in the connection process
- 3. capacities < 1MW (derated)
- 4. unproven capacities

→The evaluation of the obligation to prequalify will take place at the prequalification file submission deadline

Technology neutral dynamic reservation correction

The final correction volume is calculated as the sum of:

- 1. The maximum Bid Volume of each relevant CMU
- 2. In case a CMU only partially contains capacities to which the correction applies, the Bid Volume will be taken into account pro-rata, based on the Delivery Point NRPs



Dynamic reservation correction applied to previous auctions

The table below shows the result of applying the proposal to previous auctions.

Auction year	Dynamic correction [MW]	200h volume [MW]	% of 200h volume
2021	287,07	1467	19,6%
2022	138,92	1249	11,1%
2023	52,68	1285	4,1%

Y-2 auction: principles

Concept:

- > Recurring auction defined in E-law with usual yearly calibration cycle
- > Market wide auction: all capacities allowed to participate

→ These assumptions lead to a design fully in line with Y-4 auction principles (welfare maximization, reservation for Y-1,...)

 \rightarrow Introducing the Y-2 auction requires a similar dynamic reservation process of the 200h-reserved volume

Volume split between auctions – key principles:

- A reserved volume for the Y-1 Auction
- The total volume for the dynamic 200h rule does not exceed 50% of the 200h volume
- The details of the volume split will be included in an amended RD methodology after public consultation

Article 4bis* revision

	NO CRM prequalification obligation (< 1 MW)	CRM (> 1MW)		
		Selected	Not selected	Opt-out IN Y-2
Notification	15/01/Y	N.A	15/01/DP	15/01/Y
Closure	01/04/Y+1	N.A	01/04/DP	01/04/Y+2
Examples	Notification: 15/01/2026 Closure: 01/04/2027	N.A	30/10/25: Not selected Y-1 DP26 Notification: 15/01/2026 Closure: 01/04/2026	30/09/25: Opt-out IN Y-2 DP27 Notification: 15/01/2026 Closure: 01/04/2028

*Only concerns production and big storage units



Next meetings



Foreseen timeslots for next meetings

- Wednesday 31st of January 2024 AM
- Thursday 22nd of February 2024 AM
- Friday 23rd of February 2024 PM CRM General Info Session
- Friday 1st of March 2024 AM CRM Detailed Info Session
- Friday 15th of March 2024 PM CRM General Info Session
- Friday 22nd of March 2024 PM– CRM Detailed Info Session
- Friday 29th of March 2024 PM
- Friday 5th of April 2024 PM CRM General Info Session
- Friday 12th of April 2024 PM CRM Detailed Info Session





Thank you.