STUDY

Reactive power control availability and competition analysis

Evolution of the available assets over the period 2025-2030 to provide the reactive power control service.

Conform art 8. §1 20° of the Electricity Act of 29 April 1999

Non-confidential version

Content

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l’Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

1. Executive summary

This study is made conform art 8. §1 20° of the Electricity Act of 29 April 1999, including a competition analysis. This is per request of the CREG in relation to the evaluation report, following from the same article, that needs to be created by the CREG in case a deviation from market-based procurement is required.

The ongoing energy transition has a large impact on many different aspects of the power system. And reactive power control is no exception here. The increasing demand for active power has led to an expanding transmission and distribution network infrastructure and the introduction of new technologies. These evolutions (more cables, conversion from traditional conductors to HTLS conductors, …) combined with the behavior of electrical assets connected to the power system have led to a general shift from a need for reactive power injection towards a need for reactive power absorption. However, at specific moments in time, a peak demand for reactive power injection still remains.

At the same time, the shift from the conventional production park towards more renewable energy sources also had a significant impact on the availability of the reactive power control service. Even though both asset types can do reactive power control as a by-product from their active power generation, up until today, the largest part of the absorption and injection of reactive power was coming from the conventional production park. An important aspect here as well is the connection level of these assets.

In the coming years, the running hours of the conventional production park, who are obligated to participate to the reactive power control service, are further reducing. In addition, a large part of the nuclear park will be phasing out. Of course, these assets are being replaced by renewable energy sources and batteries, but the impact of these assets on the high voltage grid is lower given their connection on lower voltage levels or at the distribution system operator and as such don't always have an obligation to participate. So, in absolute value, the potential for reactive power capacity will increase in the coming years, but this does not necessarily translate in a higher impact on the voltage issues in the grid.

The limited conversion of installed active power capacity to reactive power capacity can be seen as well in the evolution of reactive power capacity potentially available for the Reactive Power Control service. There is over 10GW of active power capacity that is added to the power system towards 2030, but this translates to only an increase of 1.4GVAr of reactive power absorption capacity. The increase in reactive power injection is slightly lower, with a total increase of 1.2GVAr of absorption capacity (Table 1).

Table 1: Evolution of the reactive power absorption and injection capacity

Evolution of reactive power capacity	2025	2030
Reactive absorption [MVAR]	-4100	-5480
Reactive injection [MVAR]	6310	7470

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

However, an increasing amount of reactive power absorption and injection capacity does not necessarily translate to an increase in competition in a currently non-competitive service. This depends as well on the evolution of the needs in reactive power control, the evolution of the availability of the means to control the reactive power and the location of these assets.

On the need, as mentioned above, there is a rising need for reactive power absorption. This trend has been ongoing in recent years and does not show any signs of reversing. Currently all available assets are required during peak times of reactive power absorption, and this will continue to be the case in the coming years. Certainly given the fact that the running hours of the conventional production park will further reduce and are being replaced by renewable energy sources with a lower impact on the higher voltage levels. These moments, with high RES infeed and low availability of the conventional production park, are the moments that pose the largest challenges for voltage control. In these situations, every MVAr is required to keep the system within its operational limits.

An important aspect are as well the technical characteristics of reactive power. Reactive power is a local product that unlike active power cannot travel for long distances. This means that assets need to be available on a local level to resolve the local voltage issues, in a robust manner considering various grid topologies or circumstances. So, from a competition perspective, sufficient reactive power control assets with different operators need to be available on a local level. In the current power system, neither of these two aspects is a reality.

Finally, the remuneration for the current reactive power service delivery is done on an activation basis. This means that contracting all assets does not necessarily increase the costs for the reactive power control service. On the contrary, contracting all assets is important to increase operational security and to limit the risk of avoid a grid incident (like a black-out). On top of that, reactive power is a by-product from active power generation. No specific investments beyond a communication system are required to deliver the reactive power control service.

Translating these evolutions to the level of reactive power capacity that needs to be contracted and the efficiency of the market-based procurement of the reactive power control assets, Elia comes to two conclusions:

1. Limiting the contracted volume does not significantly decrease the costs for the reactive power control service, given that it is a by-product of active power generation. However, this does create risks for the security of the system (with a potential black-out as a consequence) in situations with high need for voltage regulation.

2. The reactive power control service is a local service with a small amount of market parties delivering the service (locally and in the whole country). Given the rising needs and limited increase in resources there is insufficient potential to create real competition between market parties on a local level. This is also reflected in the previous tenders, where price impositions were needed.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l’Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

2. Introduction

2.1 Structure of the document

This study consists of four chapters. The first chapter is the executive summary, describing the main conclusions of the study. This is followed by the introduction. It consists of 3 parts: a description of the structure of this document, the relevant legislative framework and an overview of the reactive power control service.

In chapter 3, the availability analysis is presented. This chapter details the data that is used for the availability analysis and continues with the results per technology type. Based on these results, the conclusion is drawn in the final section of this chapter.

Finally, in chapter 4, the competition analysis is presented. This chapter gives some context for the analysis, provides an overview of the data that is used, describes the results and gives the final conclusions. This conclusions regard both the contracting and the competitiveness.

2.2 Legislative framework

This study on the availability of assets for the reactive power control service is created in accordance with art 8. §1 20° of the Electricity Act[1] of 29 April 1999. Conform the Electricity Act, every 3 years, Elia, as Belgian Transmission System Operator, must create and provide to the CREG, as Federal Regulator, and the minister a report on the availability non-frequency related ancillary services for a period of 5 years. This study also needs to be published on the website of Elia. .

> *" Art. 8.§ 1.20° Bezorgen aan de minister en aan de commissie uiterlijk op 1 april van elke driejaarlijkse periode die volgt op de inwerkingtreding van deze wet, een studie over de beschikbaarheid voor een periode van vijf jaar, van de middelen waarmee de niet-frequentiegerelateerde ondersteunende diensten kunnen worden gedekt. Hij publiceert die studie op zijn website.] "*

According to the same article of the Electricity Act., the commission has the option to evaluate the efficiency of the market for non-frequency related ancillary services. In case the market for a non-frequency related ancillary service is evaluated to be inefficient, a derogation on market-based procurement can be given. This is described in the following article:

[1] Electricity Act = Electricity Act of 29 April 1999 on the organisation of the electricity market (published in the Belgian Official Gazette on 8 January 2012) and its amendments (Justel databank).

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

> *" Art. 8.§ 1.20° continued*
>
> *….*
>
> *Het eerste en het tweede lid zijn ook van toepassing op de verstrekking van niet-frequentiegerelateerde ondersteunende diensten door netbeheerders, tenzij de commissie op basis van een evaluatieverslag, dat op haar website wordt gepubliceerd, tot het oordeel is gekomen, dat de marktgebaseerde verstrekking van niet-frequentiegerelateerde ondersteunende diensten niet in overeenstemming is met de voorwaarden voor de verstrekking van ondersteunende diensten zoals bepaald overeenkomstig artikel 11, § 2, en een afwijking van deze beginselen heeft toegestaan.„*

In agreement with the CREG, Elia includes in this study, next to the analysis on availability of means, complementary contextual and analytical information that is necessary for the CREG to conduct its own evaluation as referred in art. *Art. 8.§ 1.20°.*

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

2.3 Reactive power control service

The transmission of electrical power must be operated within the limits imposed by the grid (thermal limits) and by asset voltage limitations (in each substation/node[2]). Elia, as transmission system operator, is responsible for controlling voltages and relies on its own assets and on the assistance of grid users (called Voltage Service Providers, VSPs) connected to its grid to do so. The latter is contracted via the reactive power control service.

Similarly to the frequency in the grid, which is influenced by the behavior of active energy, the voltage is affected by reactive energy. However, there is an important distinction to be made between the two. Active energy is very easy to transport, so frequency can be managed at national and European levels. However, due to transmission losses of reactive power the influence on voltage and network loading is reduced for lower voltage levels. This means that all regulations means that take part in controlling the voltage have to be well distributed. This is further explained in Section 4.3.1.7.

Before diving into the regulation means, the question arises where the voltage fluctuations originate from. There are several factors causing reactive power offtakes or injections that are not controlled by Elia and that can impact the reactive power balance (hence also the stability of the voltage). Such may be injection or offtakes of reactive power from distribution grids or neighboring transmission grids, reactive loads connected to the Elia grid or even volatile injections from intermittent renewable energy sources (RES):

- Active power flows through the transmission grid induced by continuously fluctuating national and international market exchanges
- the fluctuations in power that are caused by the offtakes and injections that industrial activity and intermittent generation in Belgium;
- flows from the transmission-connected distribution grids, to which (very volatile) residential, other demand/production grid users and prosumers are connected;
- electrical flows and topological changes in the grid.

These are summarized as well in Table 2.

[2] Also depending on the grid users connected to it.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Factors causing needs
Reactive load
Inherent behaviour transmission grid
Intermittent generation (RES)
Coupled distribution grids
Neighboring transmission grids

Table 2: Factors causing reactive power needs

Elia may regulate reactive power using:

- its own reactive controlling elements such as manual or automatic control service type of transformers or management of the park of reactor and capacitor banks in the Elia grid, but also topological measures such as the switching off of cables…
- Contracted elements belonging to third parties connected to the Elia grid (contracted production units, batteries, demand response,…). In this later case, the reactive energy necessary to maintain the grid within its operational limits is currently supplied by the market parties called Voltage Service Providers (hereafter “VSPs”). In line with the voltage level measured in the grid, technical units connected to the grid stabilize the voltage by absorbing or generating reactive energy. This service, supplying reactive energy to Elia, is governed by a MVAR service contract between Elia and the VSP concerned.

These VSPs are contracted via a public procurement procedure. Every 1-2 years Elia launches a tender to which the VSP candidates can or are obligated to subscribe, depending on their connection point (voltage level), installed capacity and asset type. Following that, Elia evaluates the offers from the VSP candidates and summarizes these in a report towards the federal regulator, the CREG. Based on this report, the CREG does an analysis to determine if the provided offers are manifestly unreasonable. If the CREG judges that this is the case, she can impose a price via a public service obligation after a non-public consultation. This regulatory oversight is required given the lack of competition on a local level for the reactive power control service. The next tender is foreseen to be launched in 2026.

An overview of the technical means and/or techniques used by Elia to cover its needs in voltage control are shown in Table 3. This includes assets contracted via the procurement procedure, TSO owned assets and other tools at the disposition of Elia for voltage management.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l’Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Increasing voltage	***Decreasing voltage***
Capacitor	Reactor (self)
Contracted assets MVAR production	Contracted assets MVAR absorption
Limit active flows, to keep lines in capacitive range	Increase active flows, to push lines further into inductive range
Outage planning (cancel planned outage of cables)	Taking cables and long low loaded lines out of service (within N-1)
MVAR import from neighbouring grids	MVAR export to neighbouring grids
Contracted and non-contracted HVDC convertors MVAr production	Contracted and non-contracted HVDC convertors MVAr absorption
…	…

Table 3: Means to regulate voltage

The production and storage units that absorb and generate reactive power contracted via the procurement procedure remain key contributors to reactive power management to this day. The capacity to perform voltage control is inherent to these assets. In addition, unlike reactors and capacitor banks, these assets have the capability to absorb and inject reactive power in a relatively precise way. Furthermore, some assets also have the potential for automatic voltage control. This means that based on the local voltage, they automatically adapt their reactive power injection or absorption, greatly contributing to the dynamic stability of the grid. Next to the contracted production and storage units, reactors and capacitor banks installed at substations of transmission-connected distribution grids or demand facilities may also help in managing reactive power in the transmission grid in the future. These assets complement the dynamic assets by providing static reactive power injection or absorption.

Elia regularly performs power planning studies to verify whether existing capacities from third parties suffice to satisfy the grid's regulation needs, and if not, it identifies certain nodes in the grid which require reinforcements in years to come by installing its own reactors and/or capacitor banks. When evaluating the need for investments into new assets, Elia prioritizes to use reactive energy that comes from abovementioned resources because they do not require specific investments. As mentioned before, reactive energy is a by-product of generation of active energy and Reactive Power Management (RPM) assets installed by grid users for their own voltage regulation can have an additional capacity that can be put at Elia's disposal.

In recent years several evolutions have been happening linked to the energy transition. Given the rise in active power demand the grid has been expanding to manage this. The expansion of the grid has mainly focused on the introduction of additional cables, meaning that the need for reactive power control has been shifting from injection of reactive power to the absorption of reactive power. Besides the introduction of more cables and thus the increase in reactive absorption needs, also on the injection side there is an increase in needs due to the conversion of conventional conductors into HTLS conductors. These allow for the transport of higher power flows but come at the cost of more reactive power

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

losses. So, during some moments there will be lower power flows through the system due to more local RES production, together with a higher number of cables, whereas at other moments there will be higher power flows through the system due to a better working international power market. For the first set of moments, this will result into a higher need for reactive power absorption and for the other set of moments this results in a higher need for reactive power injection. So, also for the reactive power management the energy transition introduces new challenges.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

3. Availability analysis

3.1 Context

As mentioned in Section 2.2 Elia has an obligation to provide an availability analysis. In this analysis, all assets that are able to deliver the reactive power control services need to be identified. The analysis must cover the coming 5 years (2026 -2030).

3.2 Data

For the availability analysis, Elia used 2 resources:

1. Public consultation[3] on the installed capacity for the adequacy and flexibility study of 2025 (hereafter "AdeqFlex'25")
2. Internal database of the currently ongoing connection study requests (EOS and EDS) and existing capacity

Based on these 2 sources, the following information will be extracted for the next 5 years:

1. Installed capacity
2. Technology
3. Voltage level
4. Approximate location in the grid

Both resources will be used for different purposes. The main purpose of the adequacy and flexibility study is to determine the level of the evolution of the installed active power capacity in Belgium. However, there is no determination made on the geographical distribution of the installed capacity. Given that for reactive power, the locational aspect is an important factor (as highlighted in Section 4.3.1.7), an additional resource needed to be used for the competition analysis. Therefore, Elia will also make use of an internal database on study requests to provide this geographical distribution. This database does not accurately reflect the future installed capacity but gives an indication on the possible location of this installed capacity. Indeed, it is not likely that all projects associated to current connection study request will materialize and the database doesn't constitute a view on the future studies to come. Given the confidentiality of this information, some elements of this study will be not publicly available.

[3] https://www.elia.be/en/public-consultation/20241104_public-consultation-on-the-methodology-the-basis-data-and-scenarios

3.2.1 Adequacy and flexibility

The results section repeats the relevant information included in the public consultation[4] of the adequacy and flexibility report.

The scenario proposed for the AdeqFlex'25 study takes into account several references (see Figure 1). The AdeqFlex'25 study develops a scenario called the CENTRAL scenario which is built following the current commitment and announced policies of Belgium and other countries.

In particular for Belgium, it should be noted that the scenario is aligned with the updated draft Federal Energy and Climate Plan published in November 2023[5] or with more recent governmental announcement (e.g. 'Nieuwe Vlaamse Regeerakkoord' Sep. 2024)[6].

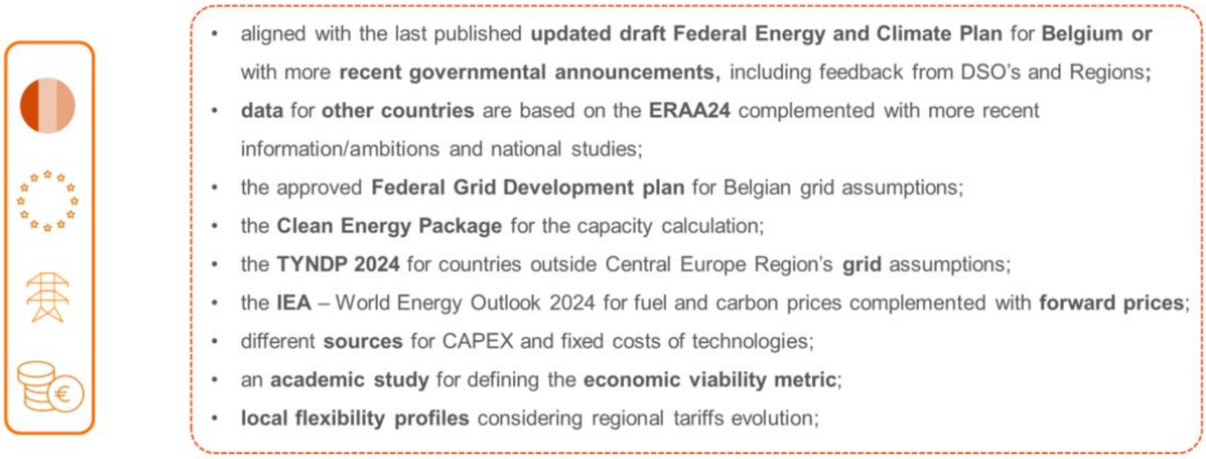

Figure 1: Main references used for the CENTRAL scenario

3.2.2 Internal database

The internal database of Elia includes all EOS (Etude d'Orientation / OrientatieStudie) and EDS (Etude Détaillée / DetailStudie) requests, on top of the already installed capacity. To distribute the additional installed capacity coming from the adequacy and flexibility study as accurately as possible, a filter was used on the study requests to only take the EDS requests into account and assets connected to the TSO grid. The additional installed capacity is determined

[4] https://www.elia.be/en/public-consultation/20241104_public-consultation-on-the-methodology-the-basis-data-and-scenarios
[5] https://www.nationalenergyclimateplan.be/en
[6] https://www.vlaanderen.be/nieuwsberichten/nieuwe-vlaamse-regering-en-vlaams-regeerakkoord-2024-2029

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

on a yearly basis. Given the uncertainty of this information, certainly on the longer term, the conclusions of this analysis are to be viewed in their correct context.

3.3 Results

As mentioned in the previous section, the results will be based on a combination of the information gathered from the adequacy and flexibility study and the internal database. These results are split up per technology type.

3.3.1 Thermal capacity

As shown in Figure 2 from the AdeqFlex25' study, a large part of the existing thermal nuclear generation is phased out and will be in part replaced by new CCGTs. In addition, the nuclear park will only be partially available during summer 2026 to 2028 included due to long-term operation (LTO) works. This means that less conventional thermal capacity will be available during some periods in the coming years for active power generation, but also for the provision of reactive power. Certainly in summer, when the needs for reactive power absorption are typically higher, this will be challenging. In addition, given the introduction of lower marginal cost units (solar – onshore wind – offshore wind), the running hours of the thermal capacity will also be more limited. Given the need to be above the Pmin for voltage services, this means that the availability of the conventional thermal capacity will be further reduced.

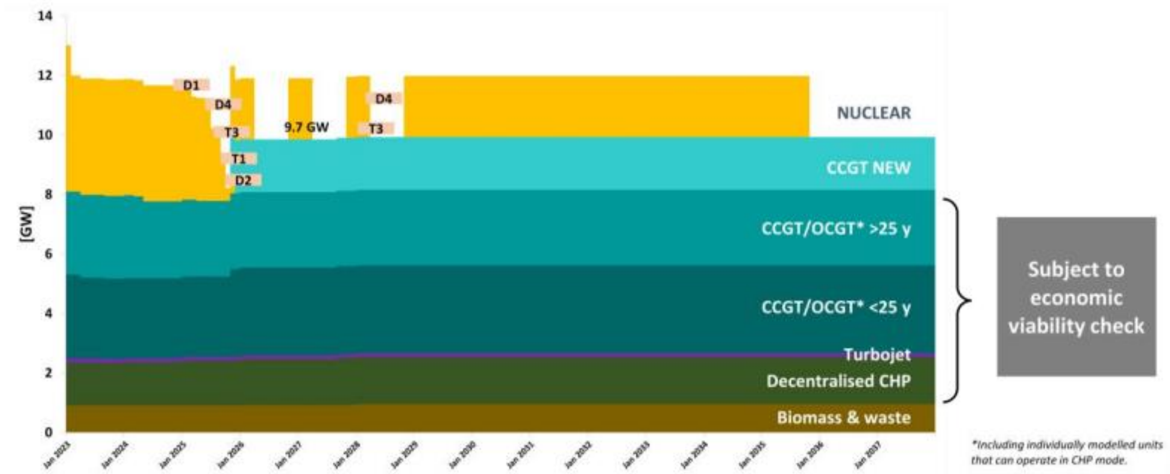

Figure 2: Proposed thermal capacity evolution in Belgium (Jan 2023 until Jan 2037)

3.3.1.1 Nuclear

For the CENTRAL scenario in adequacy and flexibility, the proposal was to use the following assumptions:
Closure of the following nuclear units as planned in the current official nuclear phase-out calendar being:

- Doel 3: 1 October 2022;
- Tihange 2: 1 February 2023;
- Doel 1: 15 February 2025;

- Doel 4: 1 July 2025;
- Tihange 3: 1 September 2025;
- Tihange 1: 1 October 2025;
- Doel 2: 1 December 2025.

10-year nuclear extension of Doel 4 & Tihange 3 with partial availability during summer 2026 to 2028 included due to long-term operation (LTO) works; those units are therefore available from the 1st of November 2025 until the 30th of October 2035 except for during standard maintenance works.

Those assumptions are summarised in Figure 3.

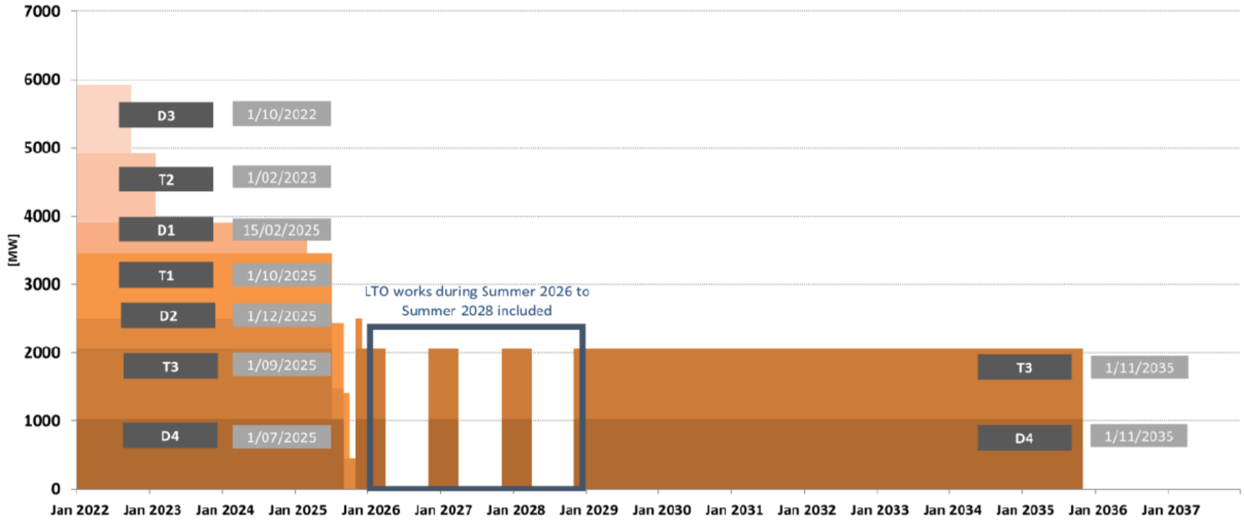

Figure 3: Planned evolution of the installed nuclear capacity in Belgium

3.3.1.2 Gas-fired units

The CENTRAL scenario considered the following assumptions:

- 2 new CCGT units (Seraing 885 MW and Flémalle 890 MW) contracted in the CRM Y-4 auction for Delivery Period 2025-26 with a 15 year contract, are assumed available as from 01/11/2025;
- Vilvoorde GT (255 MW) is considered as available as from the 1st of November 2025, following the information published on NordPool[7];

[7] https://umm.nordpoolgroup.com/#/messages/937ab00f-4cd1-4aca-9c2d-0ef05594fd28/2

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

- Vilvoorde ST (105 MW) and Zwijndrecht Lanxess ST (15 MW) are considered as decommissioned in 2023 and Sappi Lanaken (43 MW), Fluxys Zeebrugge (40MW), and Seraing ST (170 MW) are considered as de-commissioned in 2024 (Art. 4 bis)[8], therefore not considered for the time horizon of this study.
- Rodenhuize is considered as a backup unit to Zelzate Knippegroen for burning steel gas when Knippegroen is unavailable;
- A repowering of Zandvliet Power is considered as of November 2024

The capacity assumed for the smaller gas-fired CHP units is based on existing and future projects.

3.3.1.3 Oil-fired units

The oil-fired units are represented in this study for completeness' sake. However, currently they do not participate to the reactive power control service and given their low running hours do not have a significant impact on the total reactive power availability. These are units that run almost exclusively during peak load. So, in addition to being rarely activated, the moments that they are active, are the moments that the reactive power management is more manageable.

The capacity of turbojet (oil) is considered constant (140 MW) for the whole time horizon of this study (considering the closure of turbojet Volta in 2023).

3.3.1.4 Biomass & waste

The existing fleet of individually modelled biomass and waste units is considered constant throughout the time horizon of this study.
Regarding decentralised biomass and waste units (modelled as profiled thermal units in the simulations), the existing capacity is considered constant (no closure assumed) and about 40 MW of new projects in biomass by 2030 are assumed, based on information available in the internal database.

3.3.1.5 Aggregated results for reactive power capacity

Table 4 and Table 5 show the reactive power capacity resulting from the evolution of the installed active power capacity for the thermal fleet. [redacted] The decrease coming from the nuclear phase-out is compensated by the participation of the CRM gas power plants.

[8] https://economie.fgov.be/fr/themes/energie/securite-dapprovisionnement/electricite/mecanismes-de-capacite/reserve-strategique/notifications-de-mise-larret

[redacted]

		[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]

[redacted]

[redacted]		[redacted]	[redacted]
[redacted]			
[redacted]		[redacted]	[redacted]
[redacted]			
[redacted]		[redacted]	[redacted]

3.3.2 Renewable energy sources (non-thermal)

The decrease in thermal capacity is compensated by an increase in renewable power generation (non-thermal). There are four important contributors here:

1. Solar PV
2. Onshore wind production
3. Offshore wind production
4. Run-of-river hydroelectricity

In the next sections, the evolution of each of these resources will be described.

3.3.2.1 Solar capacity

Solar photovoltaic (PV) energy is becoming an increasingly significant part of Belgium's electricity landscape. Belgium has seen substantial growth in solar PV installations over recent years. The 2023 year was a record year with nearly 2,000 MWp installed. The total installed capacity in Belgium has now reached more than 10 GWp.
Even though the high increase observed in 2023 has been influenced by the recent energy crisis and by the rush in Wallonia to benefit of the advantages of net metering, the installed capacity is expected to continue growing in Belgium (reduced solar panel prices, legislation in Flanders for certain consumer to be equipped with solar panels, etc.).
The proposed evolution of solar capacity in Belgium is based on the following assumptions:

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

- A best estimate for installed capacity end of 2024 (using online data from BRUGEL for Brussels, data from SPWallonia and online data from VEKA for Flanders[9]);
- Interpolation between 2024 best estimate and 2030, considering for 2030 the latest official targets
    - For Wallonia, a target of 5 GWp is assumed, considering the 5100 GWh stated in the updated draft NECP[10];
    - For Brussels, a target of 0.325 GWp is assumed, considering the 334 GWh stated in the updated draft NECP;
    - For Flanders, a target of 11.2 GWp is assumed, considering the recent 10 GW announced in the recent Flemish governmental agreement
    - Extrapolation based on 2025-2030 growth rate for the period after 2030.

This leads to a proposed installation rate of 900 MWp per year in Belgium with a total capacity of 16.5 GW by 2030.

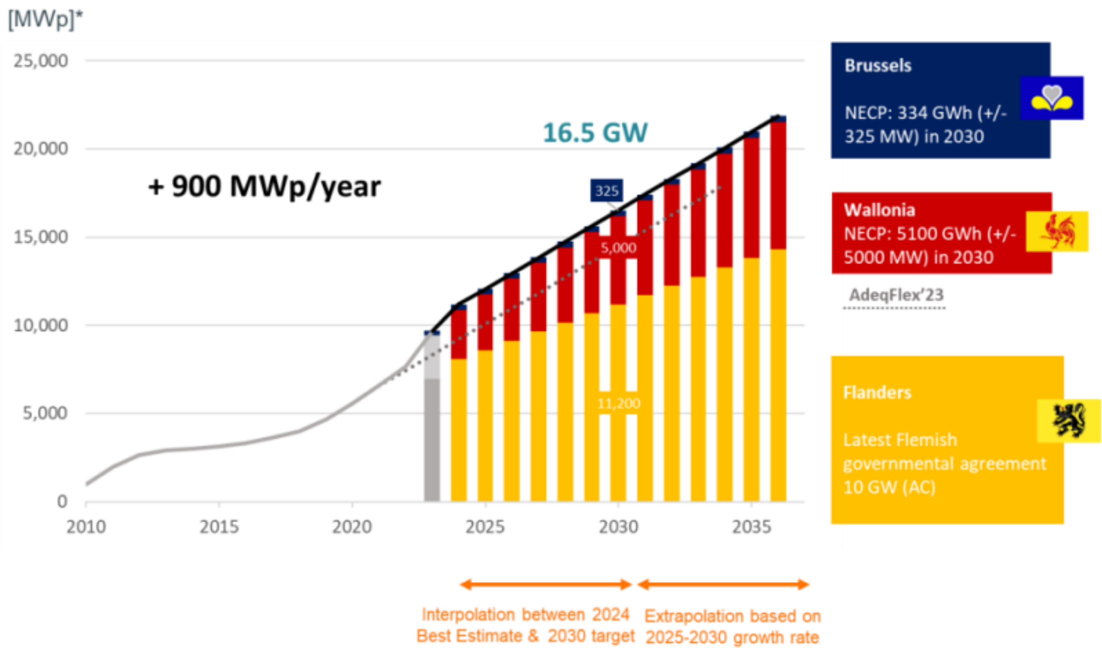

Figure 4: Proposed solar PV capacity evolution in Belgium

---

9 Considering a conversion factor MWp/MWac of 1.12 for the online data from VEKA
10 https://www.nationalenergyclimateplan.be/en

However, a large part of this solar capacity is connected to the distribution grid and very decentralized. The direct impact on the voltage of the transmission grid of these individual assets via participation to the reactive power control service is too low to be accounted for. Therefore, only assets connected to the transmission grid will be taken into account with respect to the potential that can deliver the reactive power control service to Elia [redacted] The total amount of reactive power capacity is relatively limited. It is important to note that these assets do contribute to the current challenges for voltage control. Moments with high solar infeed result in a low availability of the thermal capacity and a low load on the transmission grid. The low load increases the voltage, but given the low availability of the thermal capacity few assets are available to control this increase.

[redacted]

	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

3.3.2.2 Onshore wind capacity

Regarding onshore wind, the recent Flemish governmental agreement (Sep. 2024) has increased the 2030 target from 2.6 GW to 2.8 GW. In Wallonia, the Walloon governmental agreement confirmed its commitment to achieve the European objectives while revising the wind onshore development framework.
The proposed evolution of onshore wind capacity in Belgium for the CENTRAL scenario is based on the following assumptions:

- A best estimate for installed capacity end of 2024 about 3.4 GW (using EDORA data for Wallonia and VEKA data for Flanders)
- Interpolation between 2024 best estimate and 2030, considering for 2030 the latest official targets
    - For Wallonia, a target of 3.2 GW is assumed, considering the 6200 GWh stated in the updated draft NECP;

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

- For Flanders, a target of 2.8 GW is assumed, considering the announcement in the recent Flemish governmental agreement.
- Extrapolation based on 2025-2030 growth rate for the period after 2030 for Wallonia. For Flanders, a slower uptake after 2030 is considered (limited additional capacity under current permitting conditions, according to exchanges with the Region).

However, just like the solar capacity, the impact that a large part of the onshore wind capacity has on the transmission grid is limited, given that a large part of the volume is connected to the distribution grid or within a CDS. This also shows in the current participation rate of onshore wind to the reactive power control service.

[redacted]

The impact of the additional increase of onshore wind capacity is as such also estimated to be fairly limited. [redacted] Even though there is a significant increase in active power capacity, the amount that translates to potential reactive power capacity is limited.

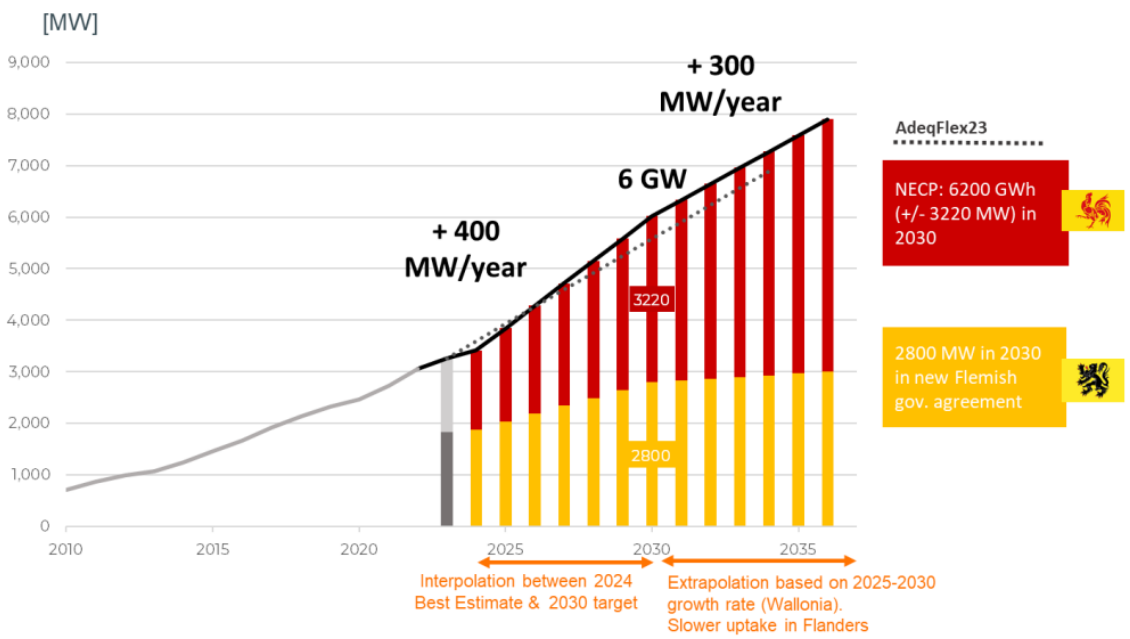

Figure 5: Proposed onshore wind capacity evolution in Belgium

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

[redacted]

	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

3.3.2.3 Offshore wind capacity

When it comes to offshore wind, Belgium already accounts for 2261 MW of installed capacity. Additional capacity related to the Princess Elisabeth Island (PEI) project is considered in the proposed trajectory, based on the foreseen realisation timing of the validated Federal Development Plan.

The first phase of PEI, with an additional 700 MW, is to be realised by end of 2029 and is proposed to be assumed as available starting from 2030.

The second phase of PEI, with an additional 2,800 MW, is to be realised by end of 2030 and is not considered for this study. The total reactive power contribution can be found in Xxxxx 9.

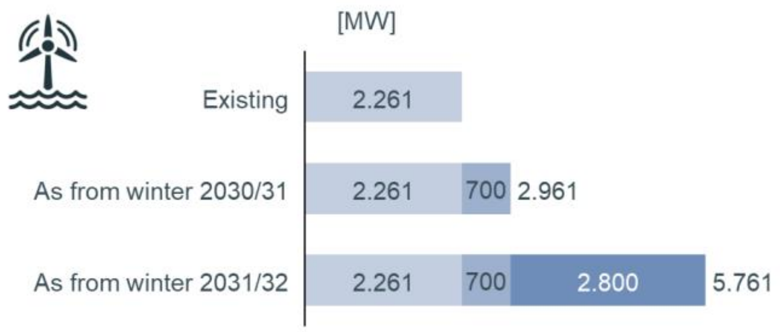

Figure 6: Proposed offshore wind capacity evolution in Belgium

[redacted]

	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

3.3.2.4 Run-of-river hydroelectricity

The existing run-of-river hydroelectricity capacity in Belgium consists of small hydro units installed along the river. Most of the capacity is located in Wallonia, along the Meuse. According to the Bilan Energétique de Wallonie 2020, the evolution of the installed capacity in Wallonia seemed to stagnate since the 1980's[11].

The proposed trajectory for run-of-river hydroelectricity is based on the following assumptions:

In the NECP, a target of 440 GWh of run-of-river hydroelectricity towards 2030 is specified. Based on

- Best estimate for installed capacity end of 2024 about 136 MW based data from estimation from internal database and historical data;
- Interpolation between 2024 best estimate and 2030, considering a target of 170 MW for Belgium (based on the 440 GWh specified for Wallonia in NECP and historical capacity factors), a capacity which is then maintained constant.

Currently there is no participation of the RoR capacity. The impact of the increase of the RoR capacity on the reactive power control service is expected to be very limited. [redacted]

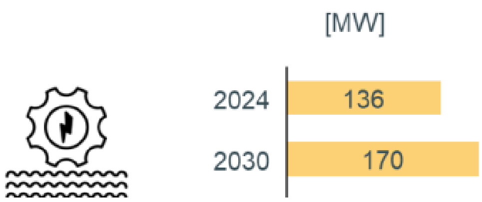

Figure 7: Proposed RoR capacity evolution in Belgium

3.3.3 Storage

3.3.3.1 Hydro-electric/pumped storage

Existing pumped-storage in Belgium consists in 2 sites: Coo and Platte-Taille.

[redacted]

[11] bilan-transformation-renouvelable-cogeneration-2020.pdf

[redacted]

[redacted]

	[redacted]	
[redacted]		[redacted]
[redacted]		[redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

3.3.3.2 (Large-scale) battery capacity

Large-scale batteries are batteries which are usually directly connected to a DSO or TSO grid. These operate in a similar way to pumped-storage, in the sense that they can produce electricity and store it at opportune moments.

Two categories of capacity are considered:

- In service: capacity based on:
  - total expected existing capacity at the end of 2024 and;
  - capacity already contracted in a CRM auction volume, including the 2024 auction results.
- Additional potential: capacity based on:
  - all the projects in the ‘realisation phase’;
  - percentages of the projects in ‘connection study’ and ‘feasibility study’ phase;
  - extra additional potential, considering an extrapolation of the installation rate.

The potential for their participation to the reactive power control service is summarized in Xxxxx 11.

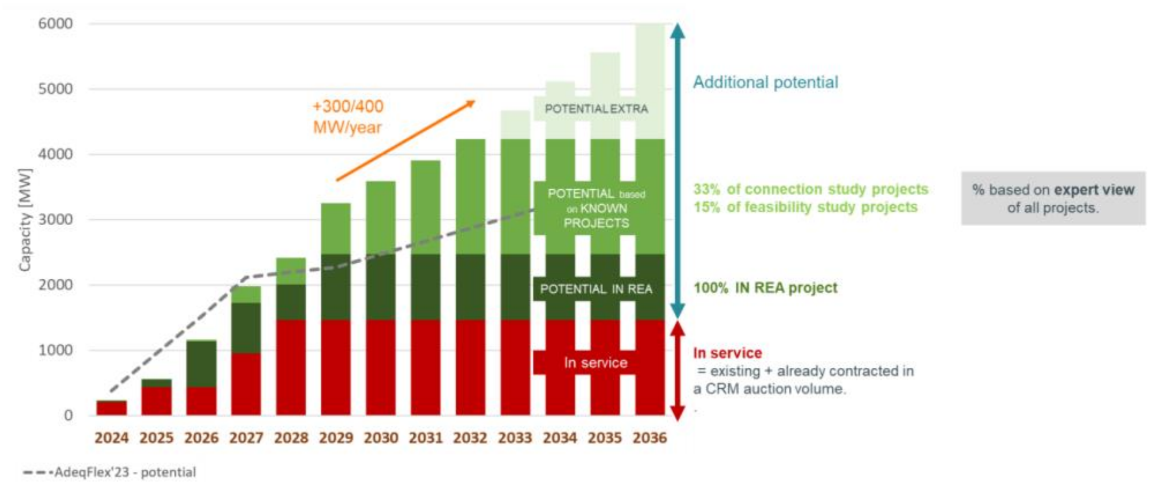

Figure 8: Proposed evolution of the large-scale battery capacity in Belgium

[redacted]

	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]						
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l’Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

3.4 Other assets

3.4.1 High-voltage DC connections (HVDC)

[redacted] This value is considered to remain stable for the period between 2025 and 2030.

3.4.2 Shunts and condensator banks

Currently there is a small capacity of reactive power injection via a condesator bank participating to the reactive power control service. This capacity is assumed to remain stable for the duration of the availability analysis.

3.4.3 Demand

Currently no demand participates to the reactive power control service. As such, no capacity is taken into account.

3.5 Geographical distribution

The geographical distribution of these means for 2025 and 2030 is displayed in *Figure* 9 & *Figure* 10 and *Figure* 11 [redacted]

[redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

3.6 Conclusions

Table 12 summarizes the evolution in reactive power installed capacity for both absorption and injection for the coming 5 years. For both absorption and injection a small yearly increase can be seen in the coming years. However, given that a part of these units don't have the obligation to participate, there is no clear evidence is that this increase will as well be reflected in the procurement volumes.
The relatively stable volumes between 2025 and 2026 are explained by the nuclear phase-out, compensated by the introduction of the CRM CCGTs. The steady increase for the other years is explained by the additional installed capacity of renewable technologies (wind and sun) and batteries.

Table 12: Summarizing table adding all capacities up for the coming 5 years

	2025	2026	2027	2028	2029	2030
Reactive absorption [MVAR]	-4100	-4400	-4670	-4830	-5120	-5480
Reactive in-jection [MVAR]	6310	6380	6640	6800	7100	7470

However, as shown in Section 3.5 this increase in means is not evenly spread across the country. [redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

4. Competition analysis

4.1 Context

In agreement with the CREG, Elia includes in this study, next to the analysis on availability of means, a complementary contextual and analytical information that is necessary for the CREG to conduct its own evaluation as referred in art. *Art. 8.§ 1.20°.*

4.2 Data

The data used in this competition analysis comes from multiple sources. A first input are the data (and results) and the installed and available MVAr capacity evolutions from the previous sections. In addition, historical data on the activations and resulting voltages is analysed as well. Finally, the results from the previous tenders are also used as a resource to support the conclusions from Elia.

4.3 Results

4.3.1 Contracting

It is essential for the reactive power control service to always be able to contract all available assets. The following sections describe the reasons why this is so important and what could happen in case insufficient reactive power control assets are available. In addition, this section also details why contracting all assets carries little to no financial risks or costs for both Elia and the VSPs.

4.3.1.1 Reactive power as a by-product

As explained in the previous sections, reactive power is often delivered by assets that are already present in the power system, typically for active power production, and thus no large investments (except for a communication infrastructure) need to be performed to be able to deliver the reactive power control service. This is why the production and/or absorption of reactive power can be considered as a by-product from the active power production.
Given that the additional investments are very limited, the additional value that the participation of these assets provides, vastly outweighs the overall costs to participate.

4.3.1.2 Activation-based remuneration

The remuneration for the reactive power control service is activation-based. This means that the market parties will only be remunerated for the reactive power that is requested by Elia. In addition, there is no capacity remuneration foreseen given that no specific investments are required for the delivery of reactive power control service (beyond a communication system) and no availability is imposed by Elia. So, the contracting of additional assets does not come at an additional cost. The overall cost would only increase if these assets would also be required for the security of the grid, which would mean that they are essential to avoid grid incidents. Therefore, there is no reason not to contract all assets that are able to deliver the reactive power control service.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

4.3.1.3 Risk of a black-out

Having insufficient assets available for the reactive power control service can have severe consequences. Depending on the situation in the grid, a black-out can occur. The potential costs associated with this, are far greater than the cost to contract the available assets (which are close to zero). This means that contracting all assets, certainly given an activation-based remuneration, does not have any downsides.

This is illustrated by the incident[12] that happened in the summer of 2024. There was a voltage collapse followed by a total black-out in the South-Eastern part of the European continental power system. Voltage drops after 2 unexpected Over-Head Lines (OHL) trips (N-2 event), leading to protections on other lines to disconnect from the grid.

For reference, the last black-out that occurred in Belgium in 1982 was also triggered by a voltage collapse, namely due to a lack of voltage support. Having sufficient voltage service providers available, to withstand even deteriorate situation, is an essential element to ensure grid stability.

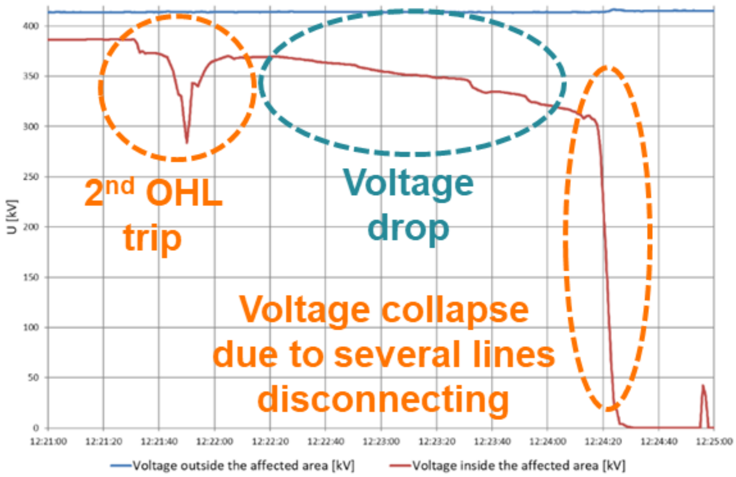

Figure 12: Evolution of the voltage during the grid incident

12 Grid incident in south-eastern part of the Continental Europe power system - Update

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Figure 13: Affected area of the grid incident

4.3.1.4 The availability of assets delivering the reactive power control service is not continuous.

Assets are only available to deliver the reactive power control service when they are above their minimum active power threshold for the reactive power control service. This means that the assets are not continuously available, and thus not all capacities that were contracted during the procurement procedure are available when they are needed. This means that limiting the procurement in a certain area could lead to a lack of available resources in case the contracted assets are not available.

An example of this is shown in Figure 14[13]. This figure shows the estimated running hours for CCGTs for the coming years. This clearly shows that the availability of the assets is not continuous (and will decrease for this type of assets).

[13] https://www.elia.be/en/public-consultation/20241104_public-consultation-on-the-methodology-the-basis-data-and-scenarios

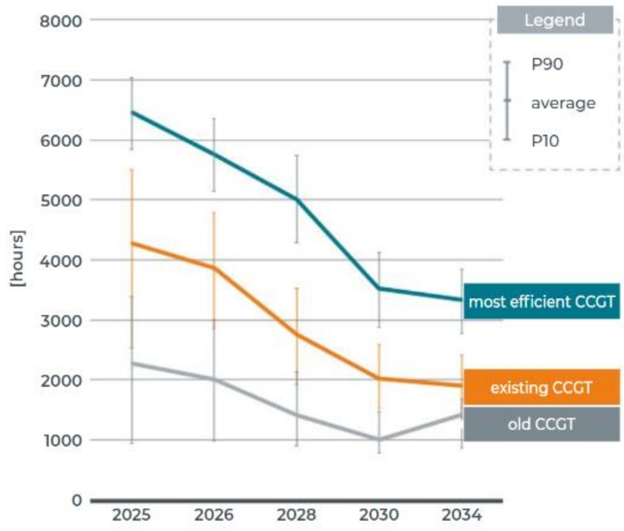

Figure 14: Running hours of CCGT's over the coming years

4.3.1.5 The grid structure is subject to change

The structure of the grid can change caused by for example grid incidents or maintenance efforts. This means that the impact that a certain asset has on the grid changes. In case there is a limitation on the number of assets that Elia can contract, the impact of incidents and maintenance will significantly increase, reducing Elia's ability to cope with these situations.

4.3.1.6 European and Belgian obligation

There is an obligation coming from the European connection codes for new assets to be able to inject reactive power based on the local voltage and based on a setpoint sent by the TSO. This follows from Article 29 § 6 from the SOGL (System Operation GuideLines), Articles 17 and 20, 18 and 21, 19 and 22 from the RfG (Requirements for Generators), Article 15 from NC DCC (Network Code Demand Connection Code) and Article 22 from NC HVDC (Network Code High-Voltage Direct Current).

The reason behind this obligation to have the capability to control voltage is deriving from the same reasoning as developed in the previous sections: it comes at little cost and it delivers a huge value to enhance the robustness of the grid in all situations. Consequently, Elia is contracts this capability to avoid creating risks in the power system.

4.3.1.7 Locational service delivery - contracting

The reactive power control service is a local service. An activation at a certain location can only travel for a relatively small distance. [redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

[redacted] This means that assets need to be available near the voltage issue in order to be able to resolve it. This shows the importance of contracting everything.

In addition, contracting all assets allows Elia to activate the asset that has the highest impact on the voltage issue, at the lowest cost. So, this effectively allows Elia to reduce the overall costs for the reactive power control service on top of being able to better assure the security of the grid.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

[redacted]

[redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l’Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

4.3.1.8 Conclusion

Limiting the contracted volume does not significantly decrease the costs for the reactive power control service given the activation-based remuneration. On the contrary, this would increase the cost given that the most techno-economic asset might not be available to resolve the local voltage issue. Furthermore, limiting the contracted volume creates risks for the security of the system, as exemplified by the black-out in the summer of 2024. Therefore the obligation to participate to the reactive power control service mentioned in Section 4.3.1.6 in the European grid codes is essential for the security of the system. Applying this as well to the regional grids would further strengthen the security of the grid at almost no cost.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

4.3.2 Competition in the reactive power control service

Next to the amount of reactive power capacity that should be contracted, a question can also be raised on how this contracting should be done. Currently there is a yearly (or biennial) tender with market prices with an ex-post analysis by the CREG in order to check if the proposed prices are manifestly unreasonable. This oversight is necessary because of the absence of competition in the reactive power control service. This is visualized in .

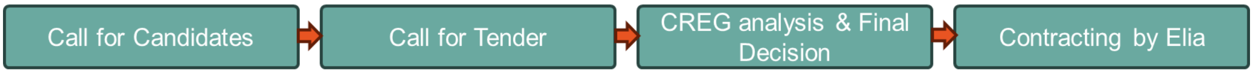

Figure 15: High-level steps in the tendering process

4.3.2.1 The available means for reactive power control do not always match the needs

An important aspect for a competitive market is to have at all moments in time sufficient means to cover the needs. If this is not valid, service providers know that they will be activated at any price. As such there is no incentive to provide a reasonable price to deliver the service. This is currently the case for the reactive power control service for the absorption of reactive power. However, thanks to the regulatory oversight the risk of manifestly unreasonable prices is mitigated.

An example of the pressure on the reactive power control service for absorption is shown in Figure 16 & Figure 17. These graphs show the highest voltages [redacted] and the remaining margin[14] in available reactive power during these periods on the Transmission Grid connected assets. This shows that during peak times of reactive power need, Elia uses all available resources that have an impact on the voltage issue(s) to their maximal capacity[15], even on a national level. So, additional (costly) measures to need to be taken to keep the grid safe.

Figure 18 shows this further. Throughout the year in 2024, there were over 500 hours with a margin below 550 MVAr in absorption. The sum of the considered capacity for absorption was 2650 MVAr. So, on a national level, for over 500 hours, less than 20% of margin remained. This is including the offshore capacity but taking the operational limitations of nuclear into account. [redacted]

---

[14] This margin is calculated by comparing the contribution of these assets to their installed reactive power capacity. There are 2 modifications made for offshore and nuclear. [redacted]

[15] For reference, a certain margin is required as well to cover N-1 situations. So Elia needs to keep some capacity available.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

[redacted] So given the locational character of the reactive power control service (as shown in Section 4.3.1.7) this shows the tightness of the Service.

Finally, Elia also owns and operates shunt reactors for the absorption of reactive power. However, as shown in Figure 19, all available assets have been used almost continuously, even when additional shunt reactors were added. This also shows that currently the need for absorption capacity is not yet diminishing.

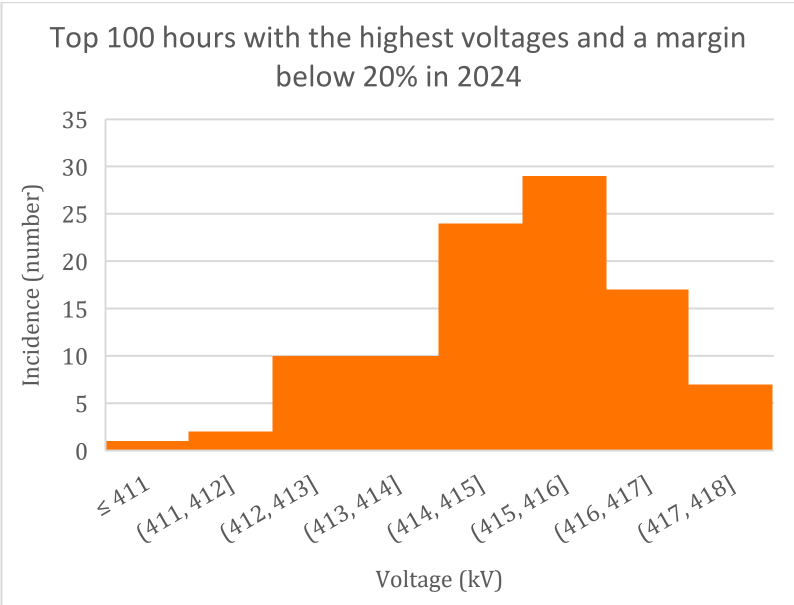

Figure 16: Top 100 hours with high voltages and a margin below 20% in 2024

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

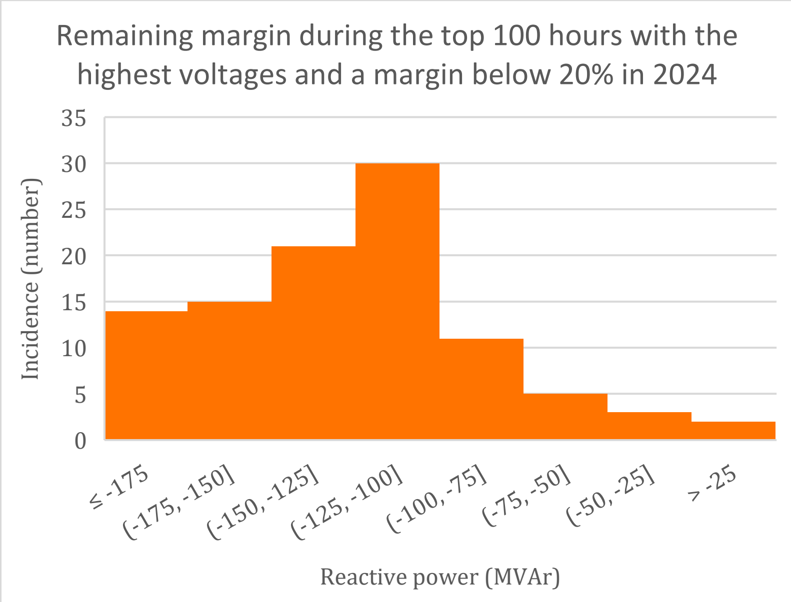

Figure 17: Remaining margin during the top 100 hours with high voltages and a margin below 20% in 2024.

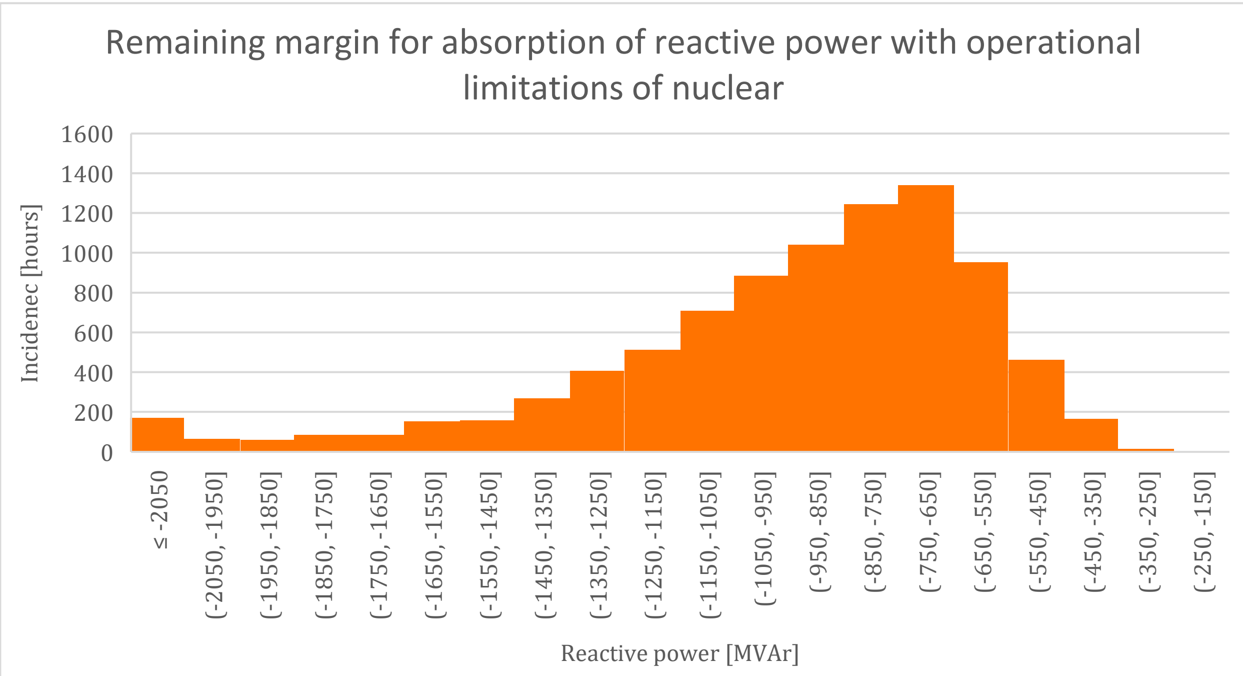

Figure 18:Remaining margin for absorption of reactive power with limitations of nuclear in 2024

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

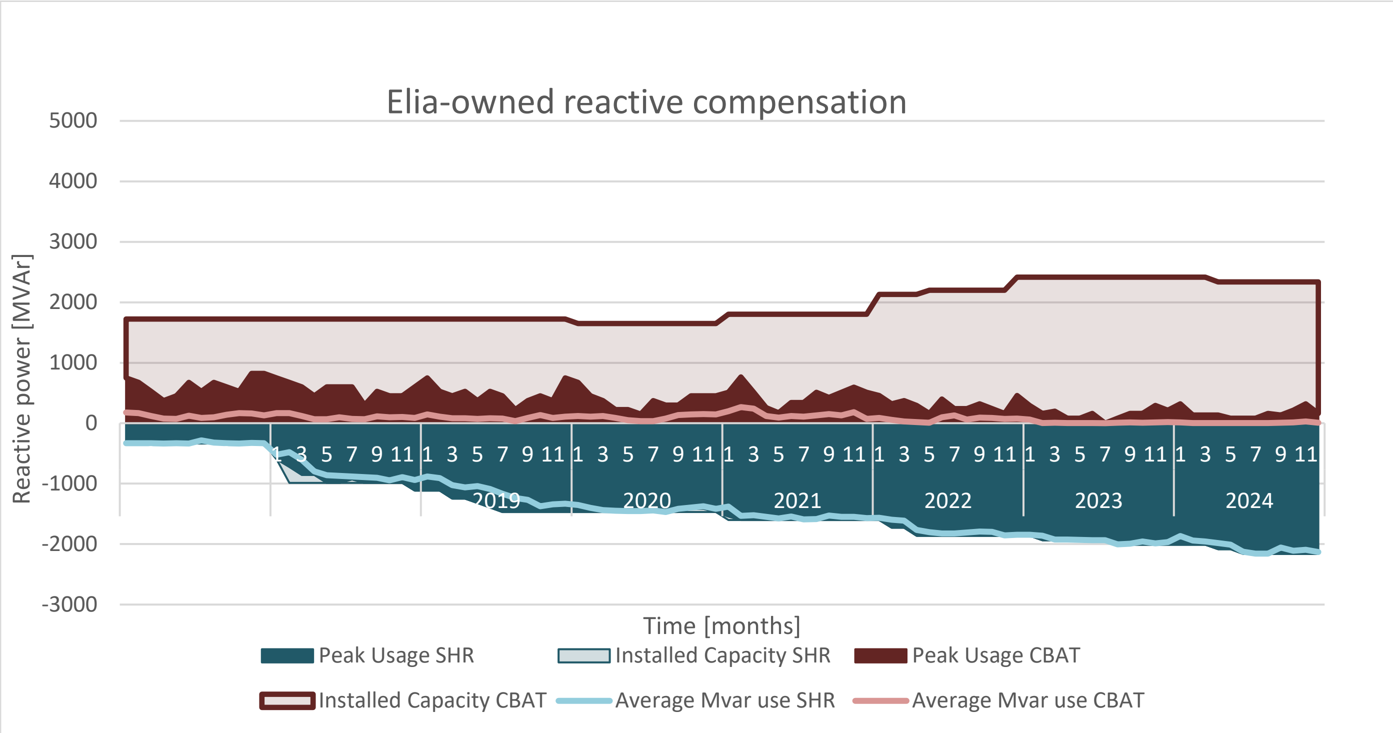

Figure 19: Reactive power absorption and injection by Elia-owned assets

This increase in absorption need and reducing margin observed in Figure 20 comes from two sources: the load in the power system has become more and more capacitive and the running hours of the conventional power plants are reducing.

First, regarding the evolution of the load: as shown in Figure 20, the load is becoming more and more capacitive and thus the needs for Elia to absorb reactive power have been rising steadily. However, as shown in Chapter 3, the available capacity to absorb reactive power is significantly lower than the capacity to inject reactive power. In addition, there is a historical gap in the available Elia-owned absorption means.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

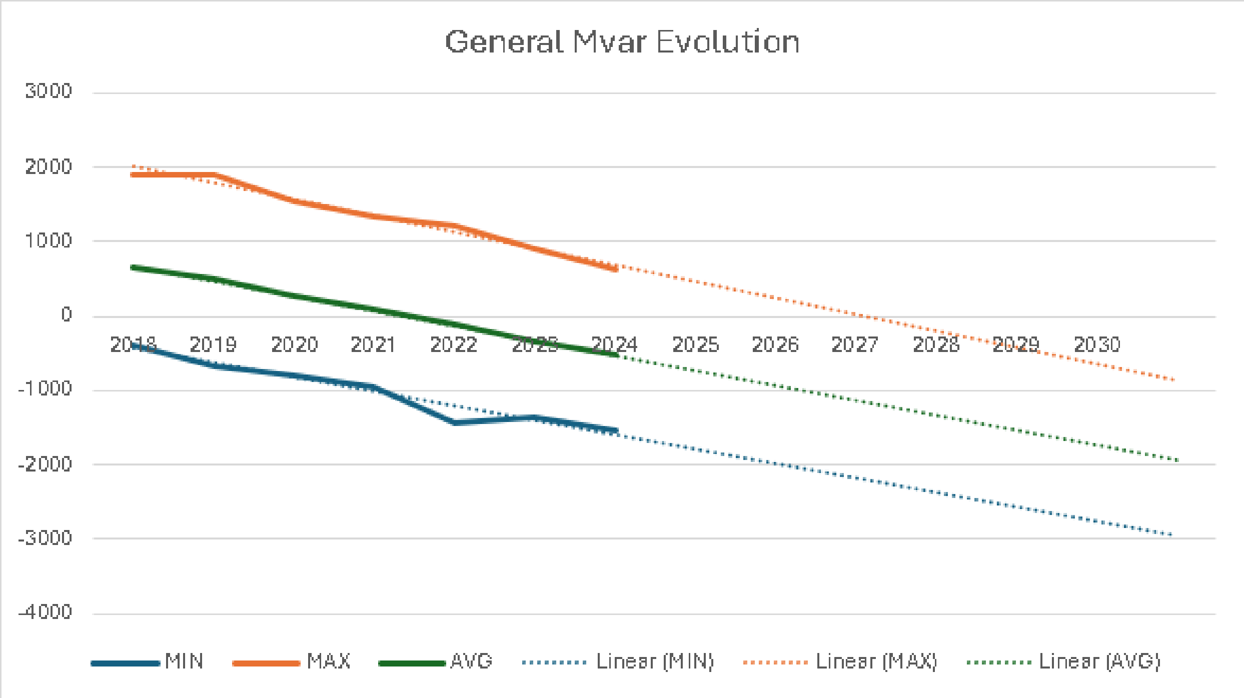

Figure 20: The extrapolated trend of the general Mvar Evolution

Secondly, regarding the reducing running hours: Already in the past years the running hours of the CCGTs have been reducing thanks to the increase in renewable power. And as shown in Figure 14, this trend is expected to persist. In addition, a large part of the nuclear capacity will be phased out by the end of 2025. Both the CCGTs and the nuclear capacity currently are major contributors to the reactive power control service. So, the reduction of their availability means an important reduction in the assets available for the reactive power control service.

Of course, the reduction of running hours of the conventional assets is offset by an increased amount of renewable energy sources. However, these renewable energy sources are typically connected to lower voltage levels. This can either be the distribution grid, a closed distribution system or the local transmission grid. [redacted] the impact of an activation on the 36 kV is more local and has less impact on the higher voltage levels than an activation in the higher located grids [redacted].

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

[redacted]

[redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

[redacted]

[redacted]

So, to conclude, currently there is already little competition during times of peak demand for reactive power in the reactive power control service (even on a national level). In the coming years, an increase in the needs for absorption is projected based on the evolution of the past years. On the other hand, a decrease in the availability of the conventional assets can be seen. This decrease is compensated by an increase in renewable energy sources, but the potential for reactive power control of these assets per installed MW is substantially lower than the current reactive power capacity of the conventional assets.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

4.3.2.2 Price impositions

As mentioned in the introduction of this section, in the current procurement the CREG does an ex-post reasonability analysis to judge if the offered prices are manifestly unreasonable. In the previous tender, for delivery year 2025-2026, the CREG judged several offered prices to be manifestly unreasonable [redacted] This shows that at present there is still insufficient competition to avoid manifestly unreasonable prices. The same was true for the previous tenders. A price imposition for some selected assets was required.

In case the ex-post reasonability analysis would not be performed, Elia would be required to remunerate the VSPs at significantly higher prices (not imposed prices), given their importance to control the voltage.

[redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

4.3.2.3 Locational service delivery - competition

Section 4.3.1.7 described the local character of reactive power. Given this local character, assets far away from the voltage issue cannot contribute (significantly) to resolve the issue. So, assets can only go in competition on a local level. This means that sufficient means need to be available locally to create any competition. If this is not the case, the service providers can offer at any price, knowing that they are required for the security of the system.

4.3.2.4 Market concentration

The amount of market players that currently provide the service is limited and the largest part of the available reactive power band comes from a limited amount of market players. [redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

		[redacted]		[redacted]	
[redacted]		[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]		[redacted]	[redacted]	[redacted]	[redacted]

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

4.3.2.5 Conclusion

The reactive power control service is a local service with a small amount of market parties delivering the service (locally and in the whole country). Given the rising needs and limited increase in resources there is insufficient potential to create competition between market parties. This is also reflected in the previous tenders, where price interventions were needed.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

4.4 Conclusions

Section 4.3.1 shows two important elements:

1. There is no (significant) financial cost to contract all assets
2. In case the contracted capacity would be limited, there is a risk that insufficient assets are available. In case insufficient assets are available, a black-out can occur.

This leads Elia to the conclusion that a limitation on the amount of assets that can be contracted should not be introduced.

Section 4.3.2 shows that:

1. The needs for reactive power absorption are trending upwards, whilst currently Elia already uses all the margin available on the assets during peak times. This comes at the same time as a phase-out of large thermal production units that are replaced by smaller decentralized volumes with a smaller impact on higher voltage levels.
2. In the current market it is not possible to create sufficient competition, on a local and national level, to avoid market parties offering manifestly unreasonable prices. In addition, there is a large concentration of capacity with only a very limited amount of market players.

This leads Elia to the conclusion that a derogation to market-based procurement is required to avoid manifestly unreasonable prices and there is no trend that shows this will change in the foreseeable future.

Contact

Project spokesperson
Carsten Bakker | Carsten.bakker@elia.be

Elia System Operator SA/NV
Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium