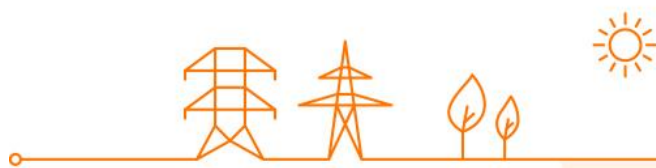


Evaluation of the need for a strategic reserve volume for the winter 2023-24

Draft version 13 October 2022



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2. Introduction

This report aims at evaluating the state of the country's security of supply and the need for a strategic reserves volume for winter 2023-24 based on the most recent adequacy analysis¹ complemented with recent (planned) evolutions in the electricity market in Belgium and abroad. This report was made in the framework of the Electricity law².

The current context brings a lot of uncertainties with regards to future assumptions. For some parameters, there is not enough information to assess the impact or the future evolution. Other planned or proposed policies can also lead to significant changes which could impact the adequacy requirements of the country. As Belgium relies on imports for part of its adequacy requirements, the changes abroad are also important to be closely monitored. Consequently, this report is subject to these different considerations.

In addition to the report, Elia wishes to stress that its Adequacy & Flexibility study for the years 2024-34 will be published in June 2023. Given that the upcoming winter situation in some countries could lead to stress moments resulting in significant policy changes abroad, as well as important lessons learned on the behavior of electricity demand at times of high wholesale prices, Elia proposes to also include a more detailed analysis of the winter 2023-24 in its upcoming Adequacy & Flexibility study to provide further information on the state of the security of supply for the concerned winter.

The report is structured as following:

- The first part clarifies the regulatory context in which this report is written;
- The second part explains the methodology applied in this report;
- The third part recalls the results obtained in the most recent Adequacy & Flexibility study;
- The fourth part quantifies the planned evolutions in the electricity market and the differences with the most recent Adequacy & Flexibility study;
- The fifth part combines the results of the previous two parts and provides an estimation of a volume.



¹ <https://www.elia.be/en/electricity-market-and-system/adequacy/adequacy-studies>

² <https://www.ejustice.just.fgov.be/eli/loi/1999/04/29/1999011160/justel#LNK0004>

3. Regulatory framework and disclaimer

Article 7*bis* and following of the Electricity Act of 29 April 1999 provides for a strategic reserve mechanism.

On 7 February 2018, Belgium obtained a positive State aid decision from the European Commission for this mechanism, but limited to 5 winters (SA.48648 (2017/NN)³). The approval was therefore valid until 31 March 2022.

As a result, under the current state of the law, it is no longer possible to contract a strategic reserve.

However, the preparatory acts for the contracting of a strategic reserve are not covered by this prohibition, so that according to Article 7*bis* of the Electricity Act, Elia must carry out a probabilistic analysis of the state of the country's security of supply for the coming winter period by 15 November at the latest.

This report consists of an evaluation of the need based on recent studies and information but does not constitute a full probabilistic adequacy assessment. A more in-depth analysis will be provided in the next 10-year Adequacy & Flexibility study that Elia has to perform by end June 2023.



³ https://ec.europa.eu/competition/state_aid/cases/272020/272020_1964726_118_2.pdf

4. Methodology

In order to provide an estimation of the needed volume, the most recent results for winter 2023-24 will be used. As the ERAA2021⁴ does not include results for the winter 2023-24, the most recent study to be used is the Adequacy and Flexibility study 2022-32 published in June 2021, which is compliant with the ERAA methodology and its implementation roadmap⁵.

From the many results published in that study, the so called ‘GAP volume’ can actually be interpreted as ‘the need for strategic reserve volume’. Indeed the ‘GAP volume’ is calculated following the methodology that was used for the previous strategic volume evaluations. The methodology is described in a nutshell in the following box.

The volume of strategic reserve needed for a specific winter is determined using an iterative process. First it is ascertained whether a margin or necessary strategic reserve volume has been identified for the situation under consideration. If the relevant legal criteria is not met, then additional strategic reserve volume is needed. On the other hand, if the simulation without any additional volume of strategic reserve already complies with both legal criteria, the margin on the system will be examined.

At each iteration of the adequacy assessment, a full probabilistic simulation of the Western European electricity market is carried out. Three steps are performed:

- *The first step is the definition of possible future states (or 'Monte Carlo' years). In this case a forward looking database was used in the Adequacy & Flexibility study combined with forced outages on thermal units and HVDCs, in-line with the ERAA methodology;*
- *The second step is the identification of structural shortage periods. The hourly output of this simulation is analysed to determine whether the adequacy criteria are fulfilled.*
- *The third step, is the assessment of the additional capacity need. Depending on whether a margin or a needed volume of strategic reserve is sought, the iterative process is halted.*
-

For more information and more details, the reader can refer to pages 122 to 132 of the Adequacy & Flexibility study 2022-32.

In order to estimate the required volume for winter 2023-24, the evolutions that have occurred/are planned to happen in the electricity market and that have a direct impact on the ‘GAP volume’ in Belgium will be listed. The changes in assumptions will be quantified when possible and, most important, their impacts on the final ‘GAP volume’ will be estimated, based on the analyses and sensitivities already performed in the last Adequacy & Flexibility report.



⁴ [European Resource Adequacy Assessment \(ERAA\) 2021 | ENTSO-E \(entsoe.eu\)](https://entsoe.eu/eraa2021)

⁵ [methodology for the european resource adequacy assessment.pdf](#)

5. Most recent quantified results covering winter 2023-24

The results for the winter 2023-24 obtained in the latest Adequacy & Flexibility study are summarized in Figure 1 below. Figure 1 also includes the different sensitivities performed on the French nuclear availability and on the availability of cross-border capacity used for market exchanges. One should understand from the figure that a margin of 1700 MW was found in the case of the EU-BASE scenario while no need nor margin (0 MW) was found for the EU-SAFE scenario where short notice risks that are beyond control of Belgium are taken into account (e.g. higher unavailability of French nuclear power plants).

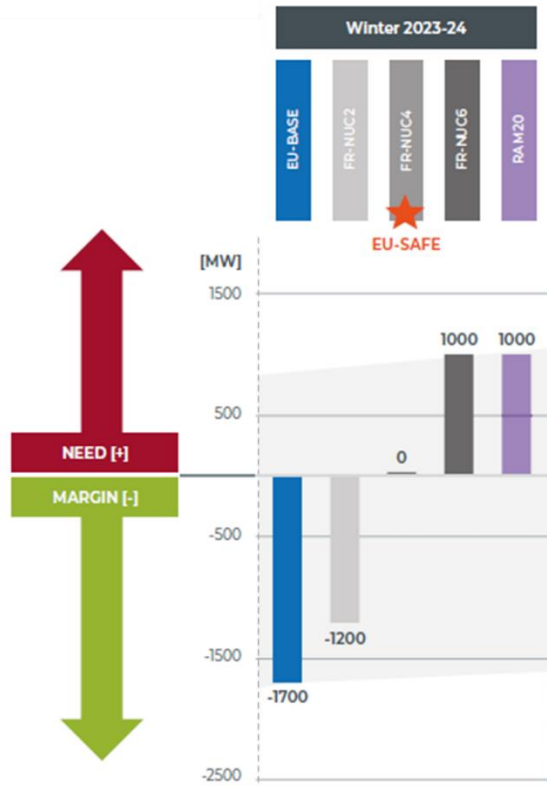


Figure 1: Impact of sensitivities on the gap volume in 'EU-BASE' Scenario for winter 2023-24 (derived from Figure 5-7 of the Adequacy & Flexibility study 2022-32)



6. Evolutions since the publication of the latest simulations results

Since the publication of the Adequacy and Flexibility study in June 2021, several evolutions have taken place in the electricity market. The list that will be presented in this paragraph represents the major changes having an impact on the adequacy situation in Belgium for winter 2023-24 but it does not aim to be exhaustive as the current context is evolving very fast with new proposals or measures that could be adopted. The assessment presented below only aims to give an indication of the impact that the change of some assumptions would have on the ‘GAP volume’ for Belgium.

6.1 Known evolutions in the electricity consumption in Belgium

The normalized electricity consumption used in the Adequacy & Flexibility study amounted 87.5 TWh in the central scenario for Belgium. In the framework of the Adequacy Working Group from the 25th of August 2022⁶, the study bureau Climact has presented the latest forecast for the electricity consumption based on the Plan Bureau economic projections of June 2022 but also assuming a certain impact of the current high electricity prices on the consumption (see Figure 2).

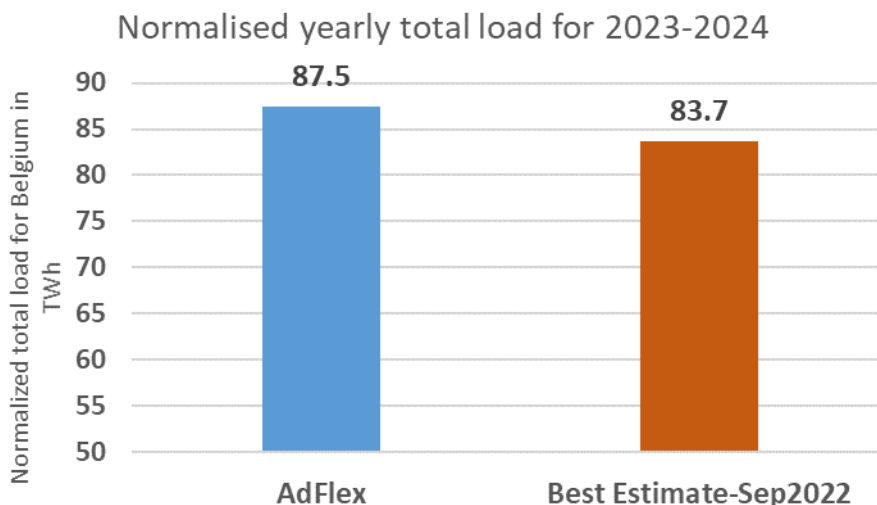


Figure 2: Evolution of the normalized total load for 2023-24

The difference of around 3.8 TWh, if equally spread over the whole year (assuming that the absolute reduction is equally spread), amounts to a reduction of at least 400 MW of the ‘GAP volume’.


- 400 MW

Based on the evolution of the electricity consumption in Belgium compared to the last Adequacy & Flexibility study, the impact of the delta on adequacy can be estimated to be -400 MW on the volume for the winter 2023-24.

⁶ <https://www.elia.be/-/media/project/elia/elia-site/users-group/ug/wg-adequacy/2022/20220825/20220825workinggroup9slidespresentation.pdf>

6.2 Known evolutions in renewable capacity additions in Belgium

Recent evolutions include a massive increase of PV installations in Belgium in 2022 which is expected to continue in 2023. It is currently hard to estimate the exact amount as the numbers for 2022 are not yet known. Concerning PV installations, their contribution to adequacy is rather limited (1% derating factor, according to the CRM calibration report for Y-4 auction with Delivery Period 2026-27⁷) but could have a secondary effect on the ability of storage to recharge during the day (given the low amount of storage in the system expected for winter 2023-24, such effect should be limited).

As for wind onshore, it is expected that the evolution foreseen in the last Adequacy & Flexibility study would not be met, falling a few tenths of MWs below the expected amount to be installed end of 2023. Similar to PV installations, the contribution to adequacy is rather limited.

As for other RES, there are no major developments on top of the already foreseen ones in the last Adequacy & Flexibility study.



Based on the evolution of RES capacities in Belgium compared to the last Adequacy & Flexibility study, the impact of the delta on adequacy can be estimated to be close to 0 MW on the volume for the winter 2023-24.

6.3 Known evolutions in storage capacities in Belgium

Storage evolutions in Belgium can be split in 4 categories:

- **Large scale batteries.** There are currently many projects being considered in the long run⁸ although the best estimate of projects being commissioned before winter 2023-24 should be in-line or slightly above the value assumed in the latest Adequacy & Flexibility study;
- **Small scale batteries.** Given the current subsidy scheme for home batteries in Flanders⁹, it is expected that the number of installed small-scale batteries would be more than 150 MW¹⁰ above the assumption in the latest Adequacy & Flexibility study for 2023;
- The assumed **Vehicle to Grid** capacities (13 MW assumed in Adequacy & Flexibility study for 2023) would not be met given the absence of vehicles and bi-directional charges;
- **Pumped storage.** The increase of the Coo reservoir (and the stepwise increase of the turbinning capacity: one unit in Coo should already be refurbished before end 2023 to higher capacity) was

⁷ https://www.elia.be/-/media/project/elia/elia-site/users-group/ug/wg-adequacy/2021/20211223_dy2026--y-4-auction-calibration-report_v3_without_annex_psp_with_erratum.pdf

⁸ <https://www.lecho.be/entreprises/energie/les-parcs-de-batteries-lancent-la-revolution-du-marche-de-l-energie/10409232.html>

⁹ <https://www.vlaanderen.be/premie-voor-de-aankoop-of-leasing-van-een-thuisbatterij-voor-zelf-opgewekte-energie>

¹⁰ <https://www.tijd.be/netto/analyse/energie/rush-op-thuisbatterijen-door-hoge-elektriciteitsprijen/10344671.html>

not accounted in the latest Adequacy & Flexibility study, while it is now supposed to be realized before the end of 2023¹¹.

As a result, the evolution in large and small scale batteries could reduce the GAP by 100 MW. In addition the developments in Coo could further reduce it by another 100 MW.



As conclusion, based on the evolution of storage capacities in Belgium compared to the last Adequacy & Flexibility study, the impact of the delta on adequacy can be estimated to be -200 MW on the volume for the winter 2023-24.

6.4 Known evolutions in thermal capacities and DSR in Belgium

There are no major developments regarding thermal capacities with daily schedule. One turbojet (Volta) should be decommissioned by the 26th of August 2023 but it only accounts for 18 MW¹². In addition, no major developments should be observed in CHP or other small scale thermal generation in Belgium.

Regarding DSR, an increase is expected. When taking into account the latest study performed by E-CUBE for the market response in Belgium¹³ (looking at the winter 2021-22) and if assuming a certain growth for the future, the installed volume of DSR would be around 50 MW above the one assumed in AdFlex for 2023. Given the derating factors for DSR, the impact should be limited.



As conclusion, based on the evolution of thermal and DSR capacities in Belgium compared to the last Adequacy & Flexibility study, the impact of the delta on adequacy can be estimated to be close to 0 MW on the volume for the winter 2023-24.



¹¹ <https://corporate.engie.be/fr/energy/hydraulique/centrale-daccumulation-par-pompage-de-coo/le-projet-dextension>
¹² <https://economie.fgov.be/sites/default/files/Files/Energy/22-54-EBL-FOD-N-Mahieu-fermeture-TJ-VOLTA-Art4-%20GHS-signed.pdf>
¹³ https://www.elia.be/-/media/project/elia/elia-site/users-group/ug/wg-adequacy/2022/20220913/20220913_wg10_updated-presented-slide.pdf

6.5 Evolutions in grid capacities

There are no major impacts on the evolution of grid (physical) capacities in Belgium or between Belgium and its neighboring countries for the winter 2023-24 compared to what was planned in the latest Adequacy & Flexibility study.

However, several elements have not been accounted in the latest Adequacy & Flexibility study. First, the way the market capacities are allocated between Great Britain (GB) and the continent has changed following the Brexit. The modelling taken into account in the latest Adequacy & Flexibility study can be seen as optimistic as it assumed an implicit auction (flows from/to GB were optimized together with the rest of Europe). Indeed, currently capacity between GB and the continent is allocated through explicit auctions. Such approach could reduce the expected capacities during simultaneous scarcity situations.

In addition, a recent decision of the European court¹⁴ puts into question the way the cross border capacities are calculated for the market exchanges. Such decision can impact the ability to export capacities from neighboring countries and impact the adequacy in Belgium.

6.6 Other evolutions abroad

The evolutions for the other countries taken in AdFlex were based on the last published NECP for each country. Those did not include the increased ambitions of the FF55 package nor the rePowerEU, nor the national (or European) measures taken to face the current energy crisis.

As the present report focusses on next winter, long term ambitions and evolutions are less relevant in this context although the short term measures taken by some countries might have a significant impact on Belgium.

6.6.1 France

In France, the coal unit of Cordemais (1200 MW) should stay open for the winter 2023-24 as the French government has suspended the closure¹⁵. Initially, the objective of the government was to phase-out coal generation by end 2022¹⁶ (assumption taken into account in the latest Adequacy & Flexibility study published in June 2021).

Regarding the nuclear availability in France, the latest REMIT data (red curve in the chart below as depicted on Figure 3) indicate that we are already below the availability data taken for France (purple curve below) in the EU-BASE scenario of the AdFlex study as from December 2023. The difference between both curves amounts 2 units over the whole winter. On the 15th of September 2022, EDF announced a nuclear generation between 315 and 345 TWh¹⁷ for the calendar year 2024, still affected by the impact of the Covid and corrosion defects. Furthermore, we know from experience that the availability of the French nuclear fleet, tend to worsen towards delivery time.

¹⁴ CURIA - List of results (europa.eu)

¹⁵ <https://www.edf.fr/groupe-edf/ambition-neutralite-co2-pour-edf-a-l-horizon-2050/optimisation-et-trading/listes-des-indisponibilites-et-des-messages/liste-des-indisponibilites>

¹⁶ <https://www.statistiques.developpement-durable.gouv.fr/edition-numerique/chiffres-cles-energie-2021/12-charbon>

¹⁷ <https://www.edf.fr/groupe-edf/espaces-dedies/journalistes/tous-les-communiques-de-presse/point-dactualite>

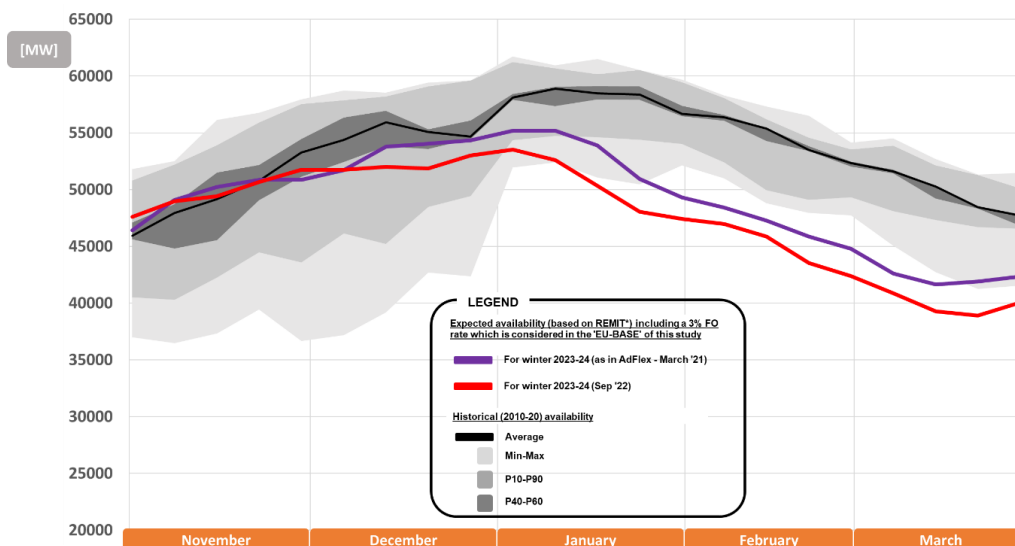


Figure 3: Expected nuclear availability in France for winter 2023-24

6.6.2 Germany

Germany has taken short term measures for the winter 2022-23 and some of those would also be applicable in 2023-24. Notably some coal and lignite units that have closed last years or were about to close in 2022 have been put back on the market for the winter 2022-23 and some of those would be allowed to operate also during winter 2023-24 if the situation requires it¹⁸.

In addition, it is expected that the electricity demand would increase mainly driven by electrical heating¹⁹ as also assumed by the German TSOs in their recently published winter 2022/23 analyses²⁰.

More in the long run, the ‘Easter package’ approved by the German government could already have some effects in winter 2023-24 where a stronger electrification is expected.

It is also not sure how the gas supply for winter 2023-24 will look like. Given the current situation and uncertainties, it is possible that the gas supply could cause problems for some electricity generators in Germany. In addition, there are several considerations regarding the ability of Germany to export electricity that are arising²¹.

6.6.3 The Netherlands

Dutch coal-fired power plants can, by law, remain in operation until 2030, after which they are not allowed to use coal anymore as a fuel. In order to meet short-term CO2-targets, a national law was passed to temporarily reduce the allowed output to 35% of their maximum annual capacity from 1.1.2022 until 31.12.2024. After that, they would be allowed to use 100% of their capacity again until 2030. However in order to reduce gas usage because of the war in Ukraine, the Dutch Minister decided to again lift this limitation of 35%. As per now, the power plants are allowed to use their full 100% annual capacity again.²²

¹⁸ [Germany extends run times for coal-fired power plants to boost supply | Reuters](#)
¹⁹ [Germans switch to costly fan heaters as gas shortage fears bite | Reuters](#)
²⁰ [Langfassung Ergebnisse Stand 12092022.pptx \(bmwk.de\)](#)
²¹ [Germany faces prospect of slashing energy exports, grid operator warns | Financial Times \(ft.com\)](#)
²² [Netherlands activates energy crisis plan, removes cap on coal plants | Reuters](#)

The Dutch Gas TSO Gasunie analyzed the consequences of a disruption of Russian Gas supply this winter and concluded that no shortage of gas is to be expected, which in turn seems to indicate no significant impact for the Dutch gas-fired power plants electricity production this winter²³.

Also due to the current crisis situation and high gas prices, the demand for electricity is sharply increasing towards the next winter, as reported by the Dutch DSOs.²⁴ Furthermore, increased electrification of households is expected, driven by an increased penetration of HPs and EV as well as a steady increase on PV solar installations.²⁵

There are no further major changes (to our knowledge) in the evolution of installed capacities in the Netherlands.

6.6.4 Great Britain

Since the publication of the latest Adequacy & Flexibility study, the Brexit has entered into force. As a result, Great Britain is no longer implicitly coupled with continental Europe. This can further create risks of availability of the interconnectors between GB and the rest of the countries. Historically, Belgium was exporting to Great Britain more than the opposite. However since the increase in gas prices, the trend has been reversed with Great Britain exporting more to Western continental Europe.²⁶

The government of Great Britain made several announcements regarding winter 2022-23. Notably: prolonging 2 GW of coal up to March 2023²⁷, putting into place a new DSR mechanism until March 2023. As of 5/10, campaigns on rationing energy were being discussed²⁸. However, at this point, there is no way of knowing if these measures will be put into place for the winter 2023-24 as well.

6.6.5 Other countries and Europe

Since the publication of the latest Adequacy & Flexibility study (prior to the FitFor55 package and RePowerEU), several countries have announced coal phase outs or much stronger RES penetration and/or electrification of the heat and transport sectors. Those elements will be analysed more in details in the next Adequacy & Flexibility study. Some short term impacts could arise from those plans and ambitions.

In addition, regarding other countries and more in general, there are several trends that can be identified following the very high gas and electricity prices that consumers are paying:

- Short term measures taken by countries to counter the lower availability of gas supply in Europe (coal re-openings, nuclear extensions...);

²³ [Deze winter geen tekort in Nederland bij wegvallen Russisch aardgas › Gasunie](#)

²⁴ <https://nos.nl/nieuwsuur/artikel/2447062-netbeheerders-slaan-alarm-vraag-naar-stroom-explodeert>

²⁵ [Voorlopige raming van broeikasgasemissies in 2030 \(pbl.nl\)](#)

²⁶ [Britain has exported more power to EU than ever before - Energy Live News](#)

²⁷ These include Ratcliffe (500 MW), West Burton A (400 MW) & 2 units (2x 660 MW)

<https://www.reuters.com/business/energy/uniper-signs-deal-with-uks-national-grid-extend-coal-unit-operations-2022-09-22/>

<https://www.theguardian.com/business/2022/aug/28/national-grid-nears-deal-third-coal-power-station-on-standby>

<https://www.theguardian.com/business/2022/jul/06/drax-agrees-to-extend-life-of-coal-fired-power-units-over-winter>

²⁸ [UK prepares for winter blackouts as energy rationing campaign discussed | Energy industry | The Guardian](#)

- Stronger electrification of heat/transport to reduce fossil fuel consumption and reduce primary energy demand (as foreseen/happening in Poland, Germany or the UK);
- Stronger decentralized generation (many countries in Europe are facing big increases in PV installations);
- Reduction in electricity consumption following governmental measures, energy efficiency or people's will;
- Exceptional prolongation of capacities under the risk of scarcity situations.



7. Conclusions and recommendation

The present report collected the information regarding the known evolution of installed capacities and demand in Belgium and abroad and gave an estimation of their impact on the 'GAP volume' of winter 2023-24.

Since the publication of the Adequacy and Flexibility study published in June 2021, **several evolutions with a potential positive impact on Belgian adequacy can be noted:**

- For Belgium, it is estimated that the impact on the GAP volume is around –600 MW mainly driven by an expected reduction of consumption in Belgium and more storage in the Belgian market (also summarized on Figure 4 below);
- A similar reduction trend in electricity consumption in other countries for winter 2022-23 could have a spillover effect on the winter 2023-24;
- For other countries, governments have decided to keep temporarily some coal units in the system both for this winter as well as for winter 2023-24;
- In Europe, a strong increase in decentralized generation is foreseen (mainly PV).

On the contrary, **several evolutions affecting the capacity abroad negatively have also taken place:**

- Stronger electrification than expected following updated national plans and ambitions but also more recently with the current crisis;
- Lower French nuclear availability of about 2 units already expected compared to the forecasts from REMIT taken into account in the Adequacy & Flexibility study. This observation remains still within the range of our previous recommendation (FR-NUC4/EU-SAFE scenario) although other events in the French nuclear fleet (or updates on the maintenance and outage planning) could further arise as we know from experience that the availability of the French nuclear fleet, tend to worsen towards delivery time;
- The current gas supply crisis that could have a spillover effect in winter 2023-24.

It is yet unclear how those evolutions would affect quantitatively the adequacy requirements of Belgium for winter 2023-24. More details will be provided in the next Adequacy & Flexibility study to be published in June 2023.

Considering all elements described in this note and with the current knowledge of the situation, no GAP volume is expected for winter 2023-24. Elia commits itself to re-assess the situation as part of the next Adequacy & Flexibility study that will be published end of June 2023.



GAP impact estimation* impact compared to AdFlex for winter 2023-24 when taking into account the expected changes in Belgian assumptions

Load	- 400 MW
RES	0 MW
Storage	- 200 MW
Other	0 MW

* this is an estimation of the impact that the evolution of several known elements would have on the GAP in Belgium. Those were not calculated with a probabilistic simulation but are based on the results of the most recent AdFlex study.

Figure 4: Summary of the GAP estimation impact for Belgium

