

**CONSULTATION REPORT**

# **Report on the public consultation regarding the adequacy and flexibility study 2022-2032**

**FINAL VERSION**

**22/02/2021**



## Contents

|           |   |           |
|-----------|---|-----------|
| <b>1.</b> | <b>Introduction .....</b>                                     | <b>4</b>  |
| <b>2.</b> | <b>Feedback received.....</b>                                 | <b>4</b>  |
| <b>3.</b> | <b>Instructions for reading this document .....</b>           | <b>5</b>  |
| <b>4.</b> | <b>General comments received .....</b>                        | <b>6</b>  |
| <b>5.</b> | <b>Comments received on input data .....</b>                  | <b>14</b> |
| 5.1       | Generation .....  | 15        |
| 5.1.1     | Individually modelled thermal generation.....                 | 15        |
| 5.1.2     | Combined Heat and Power CIPU and non CIPU thermal units ..... | 17        |
| 5.1.3     | Renewable energy sources .....                                | 20        |
| 5.1.4     | Storage .....   | 24        |
| 5.2       | Demand.....   | 29        |
| 5.2.1     | Total electricity demand.....                                 | 29        |
| 5.2.2     | Demand Side Response .....                                    | 37        |
| 5.3       | Flexibility characteristics.....                              | 43        |
| 5.4       | Economic and technical variables .....                        | 46        |
| 5.4.1     | Fuel and CO2 prices.....                                      | 46        |
| 5.4.2     | Investments costs .....                                       | 46        |
| 5.4.3     | Outages.....  | 50        |
| 5.5       | Flow-based domains .....                                      | 52        |
| 5.6       | Data for other countries .....                                | 55        |
| <b>6.</b> | <b>Comments received on methodology.....</b>                  | <b>60</b> |
| 6.1       | Target years.....   | 60        |
| 6.2       | Climate years.....  | 60        |
| 6.3       | Flexibility.....  | 68        |
| 6.3.1     | Balancing reserves.....                                       | 69        |
| 6.3.2     | Market design and scarcity pricing .....                      | 70        |
| 6.3.3     | Balancing energy exchange platforms .....                     | 72        |
| 6.4       | EVA.....  | 73        |
| 6.4.1     | Metric .....  | 73        |
| 6.4.2     | Forward markets.....  | 77        |
| 6.4.3     | Additional revenues .....                                     | 81        |
| 6.4.4     | Type of capacity.....   | 82        |

|           |  |           |
|-----------|--|-----------|
| 6.4.5     | Multiyear – Multicountry.....                          | 84        |
| 6.4.6     | Amount of Monte-Carlo years .....                      | 86        |
| 6.5       | Out of market capacities .....                         | 87        |
| 6.6       | Price limits .....                                     | 87        |
| 6.7       | Reliability standard .....                             | 90        |
| 6.8       | Others .....   | 90        |
| <b>7.</b> | <b>Comments on suggestions for sensitivities .....</b> | <b>93</b> |
| <b>8.</b> | <b>Next steps.....</b>                                 | <b>94</b> |
| <b>9.</b> | <b>Attachments .....</b>                               | <b>94</b> |

# 1. Introduction

ELIA organized a public consultation from 30/10/2020 to 31/11/2020 regarding the adequacy and flexibility needs of the Belgian power system for the 2022-2032 time horizon.

The submitted documents for public consultation had been presented and discussed with the FPS Economy and the Federal Planning Bureau with whom this study is performed in collaboration and with the CREG, with whom this study is performed in concertation, following Article 7bis 4bis of the Electricity Law.

The contributions from market parties have been shared and discussed with these institutions, over several exchanges of e-mails and during virtual meeting interactions. Valuable inputs resulting from these interactions have been integrated in this consultation report.

The purpose of this report is to consolidate the feedback received from the public consultation, while at the same time reflecting ELIA's position on these reactions which were discussed and agreed within the Comité de Collaboration (CdC).

This consultation report is publicly available, alongside with the non-confidential received stakeholder contributions and will be presented on 08 of March 2021 to the market parties during the ad hoc Task Force Adequacy & Flexibility study.

# 2. Feedback received

In response to the public consultation, ELIA received non-confidential replies from the following parties:

- COGEN Vlaanderen
- Belgian Offshore Platform
- CREG
- FEBELIEC
- Greenpeace and Inter-Environnement Wallonie
- FEBEG
- ENGIE Electrabel

In addition, 3 responses were received that were designated as confidential. These responses have been answered with dedicated confidential reports.

All non-confidential contributions received are appended to this report. These reactions, together with this consultation report, are available on ELIA's website.

### 3. Instructions for reading this document

This consultation report is structured as follows:

- Section 1 contains the introductory context,
- Section 2 gives a brief overview of the responses received,
- Section 3 contains instructions for reading this document,
- Section 4 discusses the general comments received during the public consultation and the answers on these comments,
- Section 5 discusses the comments received during the public consultation regarding input data and the answers on these comments,
- Section 6 discusses the comments received during the public consultation regarding the methodology and the answers on these comments,
- Section 7 gives an overview of the proposed sensitivities,
- Section 8 contains the next steps,
- Section 9 contains the list of annexes of the consultation report.

This consultation report is not a ‘stand-alone’ document, but should be read together with the proposal submitted for consultation, the reactions received from the market participants (annexed to this document).

Section 4, 5 and 6 of the document are structured as follows with additional information on the content below.

**[A] Subject/Article/Title**

| Stakeholder | Comment  |
|-------------|----------|
| <b>B</b>    | <b>C</b> |

**[D] Justification**

- A. Subject matter covered by the various responses received.
- B. Indication of the party that has introduced the comment.
- C. This document contains an overview of the main, but also specific comments on the document submitted for consultation.
  - In doing so, an attempt was made to list/consolidate all comments received and to argue whether or not they should be taken into account.
  - In order to maintain authenticity, the comments have been copied as much as possible in this document. However, the comments have sometimes been shortened and uniform terms are utilized to make them easier to read.
  - For clarification purposes, it is recommended to always consider the original comment of the stakeholder concerned, as included in the appendix to this report.
- D. This part contains ELIA’s arguments discussed and agreed within the CdC as to why a comment was or was not included in the final proposal. However, this column does not contain the final text. For this purpose, the final proposal must be consulted.

## 4. General comments received

This section provides an overview of the general reactions and concerns of market players that ELIA received to the document submitted for consultation.

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| <p>CREG</p> | <p>4. De CREG meent dat de intentie van Elia om uitgebreider te consulteren dan bij de Elia-studie van Juni 2019, een positieve evolutie is.</p> <p>5. De intentie om zo veel als mogelijk de door ACER goedgekeurde methodologie voor een ERAA te volgen, wordt eveneens ondersteund door de CREG.</p> <p>6. Gezien de vorige studie gebruikt werd als basis om de noodzaak van de invoering van een capaciteitsvergoedingsmechanisme (CRM) te motiveren bij de aanmelding bij de Europese Commissie in december 2019 en, volgens de CREG, dus de functie van een nationale toereikendheidsanalyse vervult, zoals bedoeld in artikel 24 van de Europese Elektriciteitsverordening (EU)2019/943, meent de CREG dat de consultatie zo breed mogelijk georganiseerd dient te worden op alle aspecten van de toekomstige analyse. Het voorbehoud dat Elia maakt, waarbij geen enkele garantie geboden wordt dat de methodologische aspecten daadwerkelijk geïmplementeerd worden, is volgens de CREG onaanvaardbaar.</p> <p>7. De CREG meent dat het belangrijk is op te merken dat het eenmalige korte overleg tussen de CREG en Elia niet geleid heeft tot een eensgezind standpunt over de verschillende aspecten die ter consultatie worden voorgelegd.</p> <p>8. De CREG verwijst naar haar studie (F)1957 van 11 juli 2019 waarin zij tal van opmerkingen had op de hypothesen en methodologie die Elia gebruikte bij de studie van juni 2019. Hoewel een aantal van deze opmerkingen behandeld lijken te worden in de huidige consultatie, meent de CREG dat de studie (F)1957 nog steeds opmerkingen bevat die ook ten aanzien van de komende bevoorradingszekerheidsstudie blijven gelden.</p> <p>9. Hoewel de titel van de raadpleging van Elia inzake de raadpleging laat vermoeden dat de raadpleging alle aspecten betreft (“...over de methodologie, de basisgegevens en -scenario’s voor de studie”), stelt de CREG vast dat de inleiding van de nota “Public consultation on the methodology” bepaalt dat de raadpleging over de methodologie zich beperkt tot de wijzigingen in de methodologie. Verder in dezelfde nota wordt dan weer aangegeven dat opmerkingen op de methodologie, die werd gebruikt bij de vorige studie, welkom zijn. De CREG betreurt deze tegenstrijdige informatie in het consultatiedocument, wat allerminst bevorderlijk is voor een efficiënte consultatie. Verder meent de CREG dat de huidige consultatie over de (wijzigende) methodologische aspecten geen reden vormen om deze aspecten als definitief en onwijzigbaar te beschouwen en uit te sluiten van consultaties in de toekomst voor de volgende bevoorradingszekerheidsstudies.</p> |

**ANSWER:**

ELIA reminds that there is no formal obligation according to the electricity law to organize a public consultation on the study. Last year a consultation was held on the data and remarks were received that the consultation should be expanded to the methodology. We have incorporated these remarks and the current public consultation is on both the data and methodology. We believed it useful to highlight the changes in methodology for the market parties, as these elements in particular need to be brought under the attention. This has not withheld the market parties to react on other elements, that were already included in last year’s methodology. Indeed, it was also clearly mentioned which pages of the previous report were describing the methodology. For the sake of clarity, in this consultation report we will address all reactions received and not only those regarding the aspects that have changed.

As for ELIA’s reservations about the feasibility of implementing important methodological changes, we believe that those are appropriate as the European methodologies were only published on 2nd October 2020 ca. 4 weeks before the start of the public consultation. In addition, there was no implementation plan from ENTSO-E known yet regarding the methodology. In the meantime this implementation plan has been published (December 2020), indicating the full implementation of the ERAA methodology by the end of 2023. The reservations remain thus valid. However, as reflected in further replies to the consultation, we are rather confident that the proposed methodological changes will all be able to be implemented for the next national study, hereby largely anticipating the implementation trajectory of ERAA.

As for the study (F)1957, ELIA refers to the position of the Member State, which has been addressed to the European Commission (<https://economie.fgov.be/fr/themes/energie/securite-dapprovisionnement/mecanisme-de-remuneration-de>). As the Federal government is the authority responsible for the security of energy supply, we take this position as latest input.

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| CREG        | 10. Gezien de onzekerheid over welke methodologie effectief realiseerbaar zal zijn en gezien de onbeschikbaarheid van de gegevens van de andere landen, meent de CREG dat het einde van de consultatieperiode, namelijk eind november 2019, te vroeg komt en dat de consultatieperiode hetzij langer had moeten duren hetzij later had moeten starten. |

**ANSWER:**

The consultation takes place at the right moment to still allow stakeholder feedback to be taken into account. ELIA already delayed its initial schedule due to the ACER decision on the ERAA methodology.

ELIA stresses that such a study takes at least 9 months to be performed, making it impossible to start the consultation process a few months ahead of the deadline (we also assume that CREG wanted to mention ‘end November 2020’ instead of 2019 in its comment).

We therefore believe that one month of consultation is a sufficient amount of time, considering the time constraints. The choice and use of methodologies are discussed within the Comité de Collaboration, which meets on a regular basis, pursuant to Article 7bis §4 of the Electricity law (see later page 11 for more details).

Regarding the data for the countries abroad, the MAF2020 (Mid-Adequacy Forecast 2020) study was not yet available at the time of the launch of this public consultation but has in the meantime been published by ENTSO-E in December

2020 and the publicly available report and dataset (for the years 2025 and 2030) can be found on ENTSOE website<sup>1</sup>. The MAF2020 from ENTSO-E contains a clear disclaimer stating that it “[...] should not be used for the purpose meant in the CEP and ERAA [...] providing the basis for national adequacy assessment”<sup>2</sup> and cannot be used as such. The assumptions for other countries will therefore start from the MAF2020 dataset complemented and updated with national studies (if available), the methodology set in the ERAA and Clean Energy Package and an economic viability assessment. Those assumptions will be also further discussed during the Comité de Collaboration with the Federal Planning Bureau and the Federal Public Service Economy and in concertation with the CREG.

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| CREG        | <p>5. METHODOLOGIE</p> <p>18. Wat betreft de methodologische aspecten die ter consultatie worden voorgelegd, geeft Elia geen enkele garantie over de toepassing ervan. De toepassing ervan wordt afhankelijk gemaakt van een “feasability assessment”. De CREG meent dat dergelijke haalbaarheidsstudie had moeten uitgevoerd worden, voorafgaand aan deze openbare raadpleging. Het voorbehoud dat Elia in haar consultatiedocument maakt, door geen enkele garantie te geven, en dus ook geen duidelijkheid te scheppen over welke methodologie zal worden toegepast, maakt de consultatie ontoereikend.</p> <p>'19. De CREG begrijpt de argumentatie van Elia niet, om zich te verschuilen achter de beperkte beschikbare tijd voor het uitvoeren van deze studie. Het wettelijk kader voor deze bevoorradingszekerheidsstudie is al meerdere jaren gekend, en de voorgestelde methodologische aanpassingen hadden op basis van de opmerkingen van de CREG op de Elia-studie van 2019, reeds verder bestudeerd kunnen worden zonder de goedgekeurde methodologie voor de ERAA van ACER af te wachten.</p> |

**ANSWER:**

We would like to remind that ELIA was very clear that it is the ambition to implement all the changes in the methodology as proposed for public consultation. The CREG surely is aware that ELIA has a track record of being pro-active and a front-runner in adequacy studies and that the previously used methodology already anticipated European methodologies (e.g. last time already with the CEP where the study was in-line with both the spirit and the modalities). Regarding the remarks of the CREG on ELIA’s previous study, we refer to the formal position on those from the FPS Economy, made in collaboration with the Federal Planning bureau<sup>3</sup>. The Ministry, responsible for the Security of Supply of the country has argued extensively why certain remarks of the CREG are not withheld by the Belgian State. It can therefore not be expected from ELIA to have anticipated these for this study. In addition, as the CREG is also aware, the ERAA methodology was being designed and approved in the course of 2021. It was therefore not known (until October 2020)

---

<sup>1</sup> [https://eepublicdownloads.entsoe.eu/clean-documents/sdc-documents/MAF/2020/MAF\\_2020\\_Executive\\_Summary.pdf](https://eepublicdownloads.entsoe.eu/clean-documents/sdc-documents/MAF/2020/MAF_2020_Executive_Summary.pdf)

<sup>2</sup> <https://www.entsoe.eu/outlooks/midterm/#disclaimer>

<sup>3</sup> <https://economie.fgov.be/sites/default/files/Files/Energy/Mecanisme-remuneration-capacite-Note-E2-02-10-2019.pdf>



which elements and choices would be retained for the ERAA. Even if we are here dealing with a national resource adequacy assessment (and not the ERAA), ELIA will try to maximally ensure the consistency with the target ERAA methodology (even if some of the elements are not yet known given the implementation plan that ENTSO-E has proposed, which comes along with the ERAA methodology and runs until 2023).

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | <p>Febeliec would like to thank Elia for this consultation on the methodology and input data for the adequacy and flexibility study to be conducted by end of June 2021.</p> <p>Febeliec appreciates that Elia will finally conduct a consultation on the methodology, yet still regrets that Elia has chosen not to involve the stakeholders in the development of this methodology, other than the stakeholders imposed by the law (FPS Economy and Federal Planning Bureau, plus coordination with CREG). Febeliec also regrets that Elia does not seem to have taken into account the comments made by Febeliec during consultation on the previous study on the methodology, which were discarded by Elia as not being relevant (as the consultation on the adequacy and flexibility study of 2019 only covered the input data).</p> <p>Febeliec will provide comments on the methodology and the newly proposed changes as well as the proposed excel file by Elia. Febeliec will furthermore also provide comments on sensitivities which according to Febeliec should be covered by this new A&amp;F study. Febeliec also wants to refer to its comments made during the workshop in which Elia presented this consultation and hopes that Elia will at least take all its comments into account in order to improve the study</p> <p>Febeliec has some questions about the follow-up from Elia on this consultation. As Elia remarks that this is a voluntary initiative by Elia in order to elaborate a robust study and to collect the input from market parties (which Febeliec is not convinced, as it is of the impression that at least the consultation on the input data is not voluntary), Febeliec wonders what, if any, will be the framework in which Elia will take into account the answers received on this consultation. In the past, Febeliec has too many times seen that almost no input whatsoever in (formally imposed) consultations lead to modifications of the original proposals and wonders what will thus be the approach by Elia in this consultation. Febeliec also refers to its above-mentioned remark on the lack of involvement of stakeholders during the development of the methodology. Febeliec also wonders what has been the topic and outcome of the four collaboration meetings (with FPS Economy and the Federal Planning Bureau) and bilateral concertation meeting (with the CREG) referred to in the consultation documents and regrets that no transparency is given.</p> <p>Febeliec also takes note from the remark from Elia that it will to the maximum extent include the provisions of the now formally adopted European Resource Adequacy Assessment (ERAA) methodology into account, yet remains after this consultation still in doubt about which aspects of this methodology will or not be applied. Febeliec would like to see an exhaustive overview of which elements were taken on board and which were discarded, and especially for the latter a</p> |

|  |   |
|--|---|
|  | <p>clear justification. Febeliec also wonders to which extent the (at the same approved) methodologies for Value of Lost Load (VoLL), CoNE (Cost of New Entrant) and the Reliability Standard (RS) will also be taken into account, as also these can have a fundamental impact in the analysis! Febeliec is amongst others surprised to see that there seems to be no impact on the LOLE criterion, despite the decision on these methodologies, implying that the current Belgian standard imposed by the Electricity Law is not in line with European legislation and regulatory decisions, with major impact on the outcome of this analysis.</p> <p>On the proposed “improvements”, Febeliec has a wide range of comments, which are listed below. Febeliec insists that also many other improvements can definitely be made to the methodology applied by Elia for the A&amp;F Study 2019, on top of the “improvements” proposed by Elia itself. In this context, Febeliec wants a.o. to refer to Study (F)19557 of 11/07/2019 of the CREG, which Febeliec fully supports and considers an essential document when discussing possible improvements to the Elia methodology. Febeliec insists that all comments by the CREG should be taken into account for this A&amp;F Study 2021 or otherwise a complete and exhaustive argumentation should be given in case Elia would consider not to incorporate them in the current A&amp;F Study.</p> |
|--|---|

**ANSWER:**

It is exactly the intention of ELIA to involve a larger group of stakeholders than those foreseen by law via this public consultation and the interactions during the Task Force meetings. Indeed, the Electricity law does not include an obligation to consult the market players. Nevertheless, ELIA chose to do so, which shows a commitment to take into account the comments received. As always, ELIA will answer all received comments and a rationale why to take or not to take them into account. This report precisely intends to answer comments made by market players. However, it is the responsibility of ELIA to determine which remarks are relevant and should be taken into account, in collaboration with the Comité de Collaboration (CdC). During the whole process, ELIA has shown an effort of transparency towards the actors involved.

As for the methodology to be developed with market parties, we refer to the call for input that was launched already in Spring 2020 to get input on the flexibility methodology of the market parties. Except from the FPB, we have not received any remarks. Starting the works on the adequacy methodology, while the ACER methodology was not yet final seemed however premature.

Regarding the reliability standard, we refer to the answer provided to a similar question of the CREG. To date there is no other legally determined reliability standard than the one included in the Federal Electricity Law. As long as there is no other legally determined reliability standard, which remains a final competence of the Member State, ELIA cannot be expected to use any other standard than the one legally set in Belgian law.

Regarding the functioning of the Comité de Collaboration (CdC), ELIA refers to Article 7bis §4 of the Electricity law. FPS Economy, CREG, Federal Planning Bureau and ELIA are participating to the meetings. There are being held on a regular basis, depending on the developments of the study. The agenda includes discussions related to:

- Methodological choices;
- Reference scenario data (Belgium and foreign countries);

- Sensitivities;
- Sharing of information given by the Federal Planning Bureau, the FPS (potentially stemming from the Cabinet of the minister or from contacts with the Regions);
- Discussion on the content of the study as well as the public consultation report.

Over the last months, the Comité de Collaboration (CdC) met on several occasions to discuss the public consultation.

- 01/10/2020 CdC n°1 – Kickoff meeting including governance & way of working, planning and first discussions on data and methodology
- 13/10/2020 CdC n°2 – Methodology & detailed elements on reference scenario
- 19/10/2020 CdC n°3 – Presentation of the Economic Viability Assessment (EVA) methodology by Prof. Boudt
- 28/10/2020 Concertation n°1 – Concertation with CREG on the outcome of the CdC meetings
- 28/10/2020 CdC n°4 – Meeting after the Concertation meeting with CREG
- 16/12/2020 CdC n°5 - Presentation of the comments received during the public consultation
- 21/01/2021 CdC n°6 - Discussion on the answers to the different comments received during the public consultation
- 04/02/2021 Concertation n°2 (cancelled by the CREG) – Concertation with CREG to discuss the outcome of the answers agreed within the CDC which was replaced by written comments by the CREG
- 12/02/2021 CdC n°7 – Last alignment prior to the publication of the present report discussing CREG remarks.

ELIA will foresee a clear overview of which aspects of the European methodology have been applied in the final national study.

Just like the request to take into account all previous CREG remarks, we assumed that FEBELIEC would have been informed on the reaction from the Member State regarding these observations. If not, we provide the link to the note via this answer and trust that Feblic understands that ELIA respects the position of the Member State, as responsible entity for security of supply to follow this position. <https://economie.fgov.be/sites/default/files/Files/Energy/Mecanisme-remuneration-capacite-Note-E2-02-10-2019.pdf>

| STAKEHOLDER                                 | FEEDBACK RECEIVED   |
|---|---|
| Greenpeace and Inter-Environnement Wallonie | <p>The implementation of the ERAA methodology, as published by ACER on 2 October 2020 is seen as voluntary by Elia:</p> <p>“Given that this national study on adequacy and flexibility will be published around six months before the European assessment, and knowing that this first European assessment will not include all the methodical changes described in the methodology, it is obvious that the national study is not required to be fully compliant with the recently adopted European methodology.”</p> <p>In our opinion, however, the EMR art. 24(1) requires that the National Resource Adequacy Assessment follows the recently published ERAA methodology. Elia is not clear on how ERAA will be precisely implemented in its National report: “Elia intends, to a maximum extent possible and feasible, to adapt its methodology already in order to be maximally in line with the future European Resource Adequacy Assessment.”</p> |

**ANSWER:**

As there is not yet an ERAA that will be performed/published according to the ERAA-methodology (the first one is going to be published end of 2021), indeed the NRAA that should be based on the ERAA cannot be expected to already integrate all these elements. We recall that there is an implementation plan foreseen up to 2023 by ENTSO-E to implement all methodological aspects from the ERAA-methodology, hence some elements of the methodology will not be included in the ERAA 2021 and some choices which were left open in the ERAA methodology are still to be made. Via this consultation we have made it clear to the market parties which methodological changes we will try to implement proactively already and in the final report we will clearly indicate which ones have indeed been taken into account. We stress that it is clearly our ambition to include as many changes as possible, and as such largely anticipate the implementation plan as published for the ERAA.

**SENSITIVITIES**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>   |
|--------------------|--|
| FEBELIEC           | In general, Febeliec wants to insist that next to the central scenario, it is also very important to investigate a range of sensitivities and other scenarios, in order to guarantee to have a robust understanding of the adequacy implications of many of the data and parameters in the proposed spreadsheet. It is adamant to grasp to what extent some of these parameters could have a major impact on the outcome of the study. Febeliec provides a preliminary and non-exhaustive list of interesting sensitivities at the end of this document.       |
| FEBELIEC           | Febeliec insists that Elia assesses a wide range of sensitivities on its study, in order to ensure that stakeholders and decision makers get a clear view on the impact of certain design choices or policy decisions. Febeliec provides a non-exhaustive preliminary list of sensitivities that should at least be looked into. However, as discussions evolve, also during workshops on the A&F Study and other adequacy assessments, it is clear that additional useful sensitivities might arise in the future that should also be included in this study. |

**ANSWER:**

ELIA thanks FEBELIEC for the suggestions. ELIA fully agrees that given the timeframe of this study and the aim of it, sensitivities are to be considered. This is also the reason why we asked the different market parties to provide us with suggestions. As last time (where a large amount of sensitivities were performed), we will follow a similar approach. Concerning additional sensitivities (if those emerge after this public consultation), those will be discussed within the CdC but also keeping in mind what is feasible in terms of simulation work and timing. A list based on the comments received during this public consultation are provided at the end of this document. Such list is to be interpreted as 'minimum' sensitivities to be simulated as other might emerge after discussions within the CdC.

**FINAL REPORT**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>  |
|--------------------|---|
| CREG               | 59. De CREG meent dat de reacties op de raadpleging, samen met een raadplegingsverslag waarin de reactie van Elia is opgenomen, geïntegreerd moeten worden in het finaal rapport. |

|             |   |
|-------------|---|
| <p>CREG</p> | <p>60. In het kader van de Elia-studie van 2019, heeft de CREG vastgesteld dat de gepubliceerde studie vooral eindresultaten en conclusies bevatte, maar onvoldoende gedetailleerde individuele simulatieresultaten om bepaalde verificaties te kunnen uitvoeren. De analyse die de CREG maakte inzake het belang van de beschouwde klimaatjaren, kon enkel uitgevoerd worden nadat Elia gedetailleerde resultaten van de simulaties beschikbaar stelde aan de CREG. De CREG meent dat naast de publicatie van de studie, die vanzelfsprekend niet alle detailresultaten van elke simulatie kan bevatten, Elia ook op haar website in elektronisch gedetailleerde resultaten van elke simulatie voor elk scenario/sensitiviteitsanalyse ter beschikking moet stellen.</p> <p>61. Elia moet in ieder geval minstens de data publiceren die opgelijst staan in artikel 11 van de ERAA methodologie die ACER op 2 oktober 2020 gepubliceerd heeft (“Methodology for the European resource adequacy assessment”).</p> |
|-------------|---|

**ANSWER:**

For sake of transparency, this report containing all the received feedbacks from the market parties together with all the answers given by ELIA will be made available on the ELIA website. This consultation report alone is already more than 100 pages. Annexing this report to the final Adequacy and Flexibility study report (with most probably already around 100-200 pages) will make it unreadable and unprintable. Therefore, this consultation report will be available besides the final Adequacy and Flexibility study.

Regarding Article 11 of the Methodology for the European resource adequacy assessment, which applies to ENTSO-E for the ERAA and provides for transparency requirements, ELIA will examine what data from this national study can be provided to the stakeholders in order to facilitate the comprehension of the final results. It is ELIA’s intention to always act towards a better understanding of the results which cannot happen through a massive pack of billions of raw data. Therefore, ELIA will examine which relevant data and in what form those can be provided and this will be discussed within the CdC.

## 5. Comments received on input data

This section provides an overview of the reactions and concerns of market players that ELIA received to the document submitted for consultation regarding the input data.

### GENERAL COMMENTS

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| CREG        | <p>11. Het basisscenario of “central scenario” dat door Elia voorgesteld wordt houdt rekening met het laatste NEKP (Nationaal Energie- en Klimaatplan, NECP : Engelstalige afkorting) voor België en de NEKP’s/MAF studie voor de overige landen. Het centrale scenario kan beschouwd worden als een “current/stated policies”-scenario (zie slide 14 van de presentatie ter consultatie).</p> <p>12. De CREG merkt vooreerst op dat de data van het MAF (Mid-term Adequacy Forecast) nog niet beschikbaar zijn op het moment van de consultatie, wat de openbare raadpleging van Elia onvolledig maakt. In de Excel wordt aangegeven dat de data voor de andere landen gebaseerd zal worden op :</p> <ul style="list-style-type: none"> <li>- MAF 2020</li> <li>- PLEF Generation adequacy study</li> <li>- Ten-year Network Development Plan 2020</li> <li>- Latest available market information</li> </ul> <p>Het is vooreerst niet duidelijk welke data Elia zal gebruiken in geval van verschillen tussen de data van de diverse geciteerde bronnen. Op het moment van de consultatie is er evenmin duidelijkheid welke data het MAF 2020 zal gebruiken.</p> |
| CREG        | <p>13. Verder stelt de CREG vast dat Elia voortelt om voor de A&amp;F studie 2022-2032 de “current/stated policies” te gebruiken, terwijl in de Elia-studie van juni 2019 het basisscenario het “WAM scenario” (“with additional measures”) en niet het WEM (“with existing measures”) gekozen werd. Dit lijkt op het eerste zicht een minder ambitieus scenario dan in de vorige Elia-studie. De CREG meent dat de keuze van dit scenario onvoldoende gemotiveerd werd. De CREG is van mening dat hoe dan ook de impact van de coronacrisis op de elektriciteitsvraag moet meegenomen worden, ongeacht een WAM of WEM scenario.</p>  |
| CREG        | <p>14. De CREG beschouwt de bevoorradingszekerheidsstudie 2022-2032 als een nationale toereikendheidsbeoordeling in de zin van artikel 24 van de Elektriciteitsverordening (EU)2019/943. Deze nationale beoordeling kan rekening houden met bijkomende gevoeligheden ten opzichte van het referentiescenario (MAF 2020 volgens Elia) en daarbij :</p> <ul style="list-style-type: none"> <li>a) uitgaan van veronderstellingen, rekening houdend met de specifieke kenmerken van de nationale vraag naar en het nationale aanbod van elektriciteit;</li> <li>b) gebruikmaken van aanvullende instrumenten en recente gegevens die aanvullend zijn welke het ENTSB voor elektriciteit gebruikt voor de Europese beoordeling van de toereikendheid van de elektriciteitsvoorziening.</li> </ul> <p>De CREG stelt vast dat, gezien de onbeschikbaarheid van de data voor het referentiescenario, er ook geen duidelijkheid gegeven wordt over welke punten deze nationale toereikendheidsbeoordeling afwijkt van het referentiescenario.</p>   |

**ANSWER:**

Regarding the timing of the public consultation, ELIA stresses that the consultation takes place at the right moment to still allow stakeholder inputs to be taken into account. ELIA already delayed its initial schedule due to the ACER decision on the ERAA methodology. ELIA stresses that such a study takes at least 9 months to be performed, making it impossible to start the consultation process a few months ahead of the publication deadline. We believe that one month of consultation is a sufficient amount of time, considering the time constraints.

Concerning the reference scenario, ELIA is using the “WAM scenario” (with additional measure) as the reference scenario, except for the electric vehicles and heat pump penetration for the period 2020-2025. For this period indeed, the “WEM scenario” (with existing measures) is proposed to better fit the most recent evolution observed regarding electric vehicles and heat pumps – and as agreed within the CdC. However, with several new measures and ambitions announced (a.o. new sales of company cars only electric from 2026), a higher electrification rate can be expected for the second period covered by this study. Therefore, the “WAM scenario” is the reference scenario after 2025.

Regarding the reference scenario construction and the deviation from the latest European adequacy study (referred here to the “MAF2020”), it is worth noting that:

- The MAF is not an ERAA study as it does not comply yet with all elements of the ERAA methodology/CEP. We refer to the disclaimer that was also inserted by ENTSO-E in the MAF2020 which is summarized by: *“The results should not be interpreted nor utilized under the new legal framework of the Clean Energy Package, in other words, the MAF 2020 results should not be interpreted as being results under the European Resource Adequacy Assessment”<sup>4</sup>*;
- While ELIA will ensure to maximally build on the most recent data for all countries collected within the MAF2020, deviations can occur as the time of the data collection for the MAF2020 (beginning of 2020) and the delivery of this study differ. In addition, there might be updated information regarding country data;
- The MAF2020 data/study only included 2 horizons while this study will analyze additional ones.

ELIA will therefore detail the key assumptions taken for other countries and highlight deviations from the MAF2020 (for the concerned years) based on more recent information or elements available.

## 5.1 Generation

### 5.1.1 Individually modelled thermal generation

**DATA GRANULARITY**

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | On the sheet 1.1 on the individually modelled thermal production, Febeliec understands that the granularity of the overview is on complete years. Will Elia apply a more refined granularity for certain categories of thermal units, in particular nuclear units as a formal calendar has been |

<sup>4</sup> <https://www.entsoe.eu/outlooks/midterm/#disclaimer>

|  |   |
|--|---|
|  | foreseen that does not coincide with calendar years. Febeliec also wants to refer here to its comments on sensitivities to investigate, a.o. with respect to the nuclear phase-out. |
|--|---|

**ANSWER:**

For the granularity of the closure dates, ELIA does take into account the exact expected decommissioning dates for the thermal power plants in its adequacy assessments, as mentioned on the sheet 1.1 (cf. “official closure dates taken into account”). Hence if the closure happens within a simulated year, the exact date is taken into account. The table submitted to public consultation only contained one cell for each year for each unit for Belgium in order to ease readability. In addition, ELIA would like to remind (as indicated in the consultation documents) that the simulated years are performed from September Y to August Y+1 (in order to keep winters within the same simulation period).

**MARKET PARTIES INFORMATION ON OTHER THERMAL UNITS**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>  |
|--------------------|---|
| ENGIE Electrabel   | Vilvoorde: Electrabel would like to highlight that there is no guarantee that the existing capacity of 255 MW, will remain available on the market at the 2025 horizon due to the technical lifetime of the GT.   |
| ENGIE Electrabel   | If the Flemish authorities were to stop granting certificates to electricity production from biomass, Rodenhuize will be in operation only when Knippegroen is in planned maintenance. It will therefore have a limited added value for the security of supply of Belgium, given the multiple operating constraints.  |
| ENGIE Electrabel   | Turbojets: the availability of assets will gradually decrease. For this reason, we also recommend Elia to consider that a part of the turbojets’ parc will leave the market due to obsolescence in the coming years.  |
| ENGIE Electrabel   | Nuclear Units: Electrabel agrees that REMIT publications constitute an accurate source of information for the best estimates of the availability of its nuclear fleet over the period 2022-2023. REMIT publications however do not reflect potential risks on the availability which likelihood is considered as below 50%.<br><br>In view of REMIT’s regular updates and potential new risks on the availability, Electrabel encourages ELIA to update the information available shortly before the time of publication of its study (around June 2021). |

**ANSWER:**

ELIA thanks ENGIE Electrabel for his feedback and will take that information into account when performing the EVA. Concerning the biomass certificates, the Flemish authorities have confirmed that the green certificates for Rodenhuize will stop in 2023 and hence Rodenhuize will be taken out of the market as from 2023.

Concerning turbojets and other thermal units, those will be part of the EVA in which extension costs will be considered. However, given the information provided through this public consultation on the risks related to several units, sensitivities excluding those units from possible extensions will be performed (see section 7 – sensitivity without thermal at risk)

Concerning REMIT, the latest possible update will be taken into account (a few months before the publication) but given that the simulations that need to be performed take several months, it is impossible for ELIA to take the REMIT information right before publication. In addition, as done in previous adequacy reports, the availability of nuclear will



also be checked and analyzed with the past observations/forecasts to determine sensitivities on the availability to be taken into account in the different scenarios.

### **SENSITIVITY - NUCLEAR**

| <b>STAKEHOLDER</b>                         | <b>FEEDBACK RECEIVED</b>  |
|--|---|
| CREG                                       | 15. Gezien de mogelijkheid van een nucleaire verlenging die in het regeerakkoord werd voorzien, stelt de CREG voor dat ELIA zich bij de regering informeert of dit ook als een alternatief scenario moet gesimuleerd worden.  |
| FEBELIEC                                   | Febeliec insists on the inclusion of a sensitivity with the extension of 2GW nuclear capacity in Belgium, as this is also an option considered in the federal governmental declaration  |
| Greenpeace & Inter-Environnement-Wal-lonie | Our proposal:<br>a. There is no need for a 2 GW nuclear sensitivity in the 2021 study.<br>b. If Elia would however develop such a 2 GW nuclear sensitivity, it should follow the same methodology as in the 2019 Adequacy & Flexibility study. This is explained in more detail in BOX6 of the 2019 study.  |
| ENGIE Electrabel                           | In its agreement of September 2020, the federal government reaffirms its policy to phase out nuclear power in Belgium by 2025. The agreement also leaves room to consider an extension of up to 2GW if uncertainties regarding the country's security of supply persist at the end of 2021. Being a responsible operator, Electrabel works in strict compliance with the law. As for a possible LTO of 2 GW as from 2025, as explained at several occasions by Electrabel, an extension is only possible when certain legal, financial and technical constraints are taken into account, which require a decision by the end of 2020 at the latest. |

### **ANSWER:**

ELIA thanks the market parties for their comments on a possible sensitivity on nuclear extension in Belgium.

If such sensitivity were to be simulated, it would be done taking into account forced outage rates but also unexpected events that can happen as the forced outage were calculated removing such kind of events (based on historical realized availability data).

Following CREG's advice, the question was raised to the minister, who indicated that such sensitivity would be contrary to the governmental agreements.

Therefore, no sensitivity on the nuclear extension in Belgium is foreseen at this stage.

## **5.1.2 Combined Heat and Power CIPU and non CIPU thermal units**

### **GAS CHP**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>   |
|--------------------|--|
| ENGIE Electrabel   | CHP's: the availability of assets will strongly depend on contract extensions and actual demand of steam by industrial clients. For this reason, we recommend to Elia to consider that a part of the CHP parc will no longer be in the market in the coming years. |

|          |   |
|----------|---|
| FEBELIEC | Febeliec also wonders to what extent future thermal generation is taken into account, in particular for example policy-based new CHP units, as no units with a commissioning date after 2023 seem to be considered at all by Elia (although Febeliec as well as Elia are aware of several industrial projects in varying states of advancement, which however over the course of the next decade should come to fruition with firm investment decisions sometime in the near future, at least for several of them). Furthermore, Febeliec has no comments on the specific units presented, but reiterates a longstanding comment on the lack of transparency on the announced (temporary) closure of power plants in Belgium. |
|----------|---|

**ANSWER:**

Regarding the remarks on CHP generation installed capacity for the coming years, ELIA understands that there are a lot of uncertainties on the existing and new capacities given that:

- Those are very linked to the industrial steam demand for some clients and contracts extension discussions;
- New projects will depend on future industrial needs and some additional projects may arise in the future.

As reconfirmed by the authorities, for the central scenario, ELIA is following the official announcements concerning CIPU units known today and official information from FPS on policies. The transparency on the announced (temporary) closure of power plants in Belgium does not fall under ELIA’s responsibility.

For CHP and other gas fired units, ELIA relies on the PISA database (ELIA internal database containing all units of the Belgian system (CIPU and non-CIPU) reported and updated by the DSOs on a regular basis) as there is no detailed reporting of the regions on the matter. The known projects with a status “acquired”, “reserved capacity” and “under construction” are taken into account to estimate the installed capacity for the coming years. For CHP this typically shows an overestimation of the capacity in the short term, hence it can be seen as an optimistic forecast for the first horizons of this study. Indeed, not all “acquired” & “reserved capacity” are commissioned in due time. Such reasoning is applied both for CIPU and non-CIPU units as the information contained in the PISA database includes also capacities reported by DSOs. The information for future years are cross-checked yearly with the regions during summer with the DG Energy (FPS Economy) in the framework of the strategic reserve volume evaluation. For this study, the competent authorities have confirmed that such approach is the right one for this study.

As a reminder, the existing CHP units being mentioned as “at risk by the owner” will be assessed under the Economic Viability Assessment (see later in this report) or via sensitivities (see section 7 – sensitivity with no thermal at risk). The same holds for new capacities. In addition, as it will be mentioned later in this report (and based on other comments received regarding sensitivities), additional CHP capacity will be also considered as sensitivity.

**Gas CHP non-CIPU**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>  |
|--------------------|---|
| FEBELIEC           | Moreover, Febeliec is very surprised to see that for gas CHP non-CIPU no increases at all are expected over more than a full decade, which seems rather strange in light of e.g. existing or discussed incentive schemes or tariff regimes for small (shared) cogeneration facilities as well as ambitious governmental declarations and targets towards 2035. Moreover, Febeliec also wonders whether several industrial investment projects are taken into account also from the side of generation, as Febeliec does not see much new generation capacity at industrial location |

|  |   |
|--|---|
|  | <p>included in the data, either profiled or individually modelled thermal production (see comment above on sheet 1.1 also, except for Borealis Kallo and Indaver E-wood). Febeliec thus wonders whether Elia considers that no additional capacity will be installed at all over an entire decade and if so, Febeliec insists that Elia than makes a very clear assessment on the drivers for the increase in total electricity demand, split over all individual segments (in particular for example industrial demand increases without any increases in local production) in order to warrant this assumption (see also below). Febeliec also wonders why the gas non-CHP non-CIPU and other categories that have been applied before by Elia have disappeared from the analysis and would like to know whether Elia has integrated these categories in other categories, considered them under a different segment in this spreadsheet, simply removed (and for which reason) or forgotten.</p> |
|--|---|

**ANSWER:**

Concerning the gas CHP non-CIPU, ELIA relies on the PISA database as there is no reporting of the regions on the exact amount of CHP capacity in each region. The known projects with a status “acquired”, “reserved capacity” and “under construction” are taken into account to estimate the installed capacity. Only the known projects are taken into account in the reference scenario. This already accounts for around +100 MW in the coming 2 years (+170 MW if compared to the capacity installed end of 2019). For the horizon analyzed in this study (2022-32), no additional projects are known which leads to a stable installed capacity in CHP non-CIPU for the entire horizon (2022-32). In addition, +50 MW of new CIPU CHP are considered to be installed in the coming 2 years and are also taken into account for the whole horizon analyzed in this study. Such approach was also confirmed by the authorities and - as also stated in the above replies - sensitivities will be performed with more or less capacities as suggested by different stakeholders (see below for more details).

ELIA would like also to point out that the gas-non-CIPU installed capacities were included in the documents submitted to public consultation under the sheet “1.2 Renewable and non-CIPU” on line 15, hence ELIA does not understand the comment on why those have ‘disappeared’ from the analysis.

Concerning the link between the total electricity demand and CHP capacity it was confirmed by the Federal Planning Bureau that the evolution of the macro-economic indicators do not take additional industrial plants or clusters into account.

**SENSITIVITY - CHP**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>   |
|--------------------|--|
| FEBELIEC           | <p>Febeliec also insists, as already discussed above, that Elia includes sensitivities on new generation capacity in Belgium not linked to the instauration or not of a capacity remuneration mechanism, in particular for example new CHPs (or other policy or industrial demand driven assets), for which Elia post-2023 does not foresee any additional units (yet presumably increase total electricity demand in Belgium based on new industrial demand units because of the very high growth rate of total Belgian electricity demand over the next decade).</p> |
| COGEN Vlaanderen   | <p>[...]COGEN Vlaanderen suggest that in the adequacy and flexibility study includes a sensitivity of <b>+1000 MWe of cogeneration</b> is made :</p> <ul style="list-style-type: none"> <li>• If we take into account that natural gas allocated is heat exceeds 1 MWhi of gas per MWh of heat (displacement of heat from a condensation boiler or steam boiler) and we see that the</li> </ul>  |

|                  |  |
|------------------|--|
|                  | <p>marginal cost of the electricity produced will be equal or lower than the value of natural gas. Here again, we can assume that cogenerations will bid at lower levels into the day ahead market as additional value is created through reduction on grid costs (local generation at least avoiding the coverage of grid losses)</p> <ul style="list-style-type: none"> <li>• Due to heat buffering and possibility to reduce power, these 1000 MW of cogeneration can be seen as flexible.</li> </ul>   |
| COGEN Vlaanderen | <p>[...] The input data linked to individually monitored, gas driven CHP (CIPU) shows 970 MWe, not taking into account Zandvliet power. A large part of this installed power is up for renewal (technically and contractually) during the next 10 year. Also in the non-CIPU segment, a large part of the cogeneration units will have to renew the cooperation with the heat consumer and make investments to continue operations. As mentioned on input data file, the technical potential for the CHP's is not at risk (heat demand remains present) but the loss of support mechanism might introduce a switch to a "heat only" solution, i.e. investments in gas boilers, stopping the CHP-installation.</p> <p>COGEN Vlaanderen suggests that impact (versus the central scenario) of <b>losing 1000 MW of installed cogeneration</b> capacity in Belgium is studied</p> |

**ANSWER:**

ELIA thanks FEBELIEC and COGEN Vlaanderen for the suggestion of sensitivities with new or reduced CHP generation and the detailed and argued feedback regarding the reasons to consider such sensitivities. Other comments were also provided (although not specifically suggesting sensitivities) by ENGIE Electrabel where it was stated that several CHP units might be at risk due to contract extension discussions or changes in the industrial process.

Both sensitivities (increase of the CHP capacity of 1000 MW and decrease of the CHP capacity 1000 MW) will be taken into account in the study following the suggested reasoning (see section 7 – sensitivity on CHP capacity). For more details on installed capacities, evolution in the reference scenario, etc, ELIA refers to the answers provided in the comments above.

**5.1.3 Renewable energy sources**

**WIND, SOLAR & NECP OBJECTIVES**

| <b>STAKEHOLDER</b>        | <b>FEEDBACK RECEIVED</b>   |
|---------------------------|--|
| Belgian Offshore Platform | <p>The assumptions on the evolution of offshore wind generation capacity in Belgium currently foreseen in this study are: 2.253 MW until 2027 and 4.000MW as of 2028. These generation capacity assumptions towards 2030 for offshore wind in Belgium are to be addressed as conservative as:</p> <ul style="list-style-type: none"> <li>- In the governmental agreement of the new federal government mentions that 2.2GW of additional offshore wind capacity is decided upon and additional capacity on top of that will be investigated both in Belgium as in the framework of the Northern Seas Energy Cooperation;</li> <li>- Elia is developing additional offshore connection capacity of 2.1GW in the MOGII project;</li> <li>- Elia is conducting offshore integration studies for a total offshore wind capacity of 4.4GW;</li> </ul> <p>For consistency reasons, we propose at least 4.4GW of offshore wind capacity should be considered by 2028 at the latest.</p> |

|   |  |
|---|--|
| <p>Greenpeace &amp; Inter-Environnement-Wal-lonie</p> | <p>1.2. The objectives for renewable capacities for Belgium as mentioned in sheet 1.2. are based on the 2019 NECP. This is however not compatible with the objective set by the federal government to align the Belgian policy with the -55% EU GHG emissions reduction by 2030. The 2019 NECP figures thus need to be updated.</p> <p>We propose to use the objective set out in the federal government agreement as a basis for the reference/central scenario, and not the outdated 2019 NECP.</p> <p style="padding-left: 40px;">➔ For offshore wind, the reference scenario should include the objective of 4.4 GW (and not 4 GW) by 2028, with a first phase of 700 MW to be finished in 2026.</p> <p>The significant contribution of offshore wind to adequacy, as explained in Study 1734 of the CREG, should be taken into account.</p>   |
| <p>FEPEG</p>  | <p>The PNEC objectives as defined for the 2030 horizon could induce a boost at the end of the decade only with a less favorable impact for the year 2025. In this respect, it should also be noted that the 2020 objectives have not been reached.</p> <p>The objectives are ambitious, especially for onshore wind and biomass, but the NIMBY-effect - and in particular the delaying effects of the appeal procedures - should unfortunately not be underestimated.</p> <p>It should furthermore be noted that, for the offshore wind growth ambitions, the execution of these projects will also depend on the timely execution of the Ventilus project. Experience has taught the sector that such large-scale projects will face the necessary challenges before they can be realized, the fierce opposition from both the local residents as from the communes against the Boucle du Hainaut is a good illustration of this.</p> |

**ANSWER:**

Concerning the National Energy and Climate Plan (NECP) for Belgium taken into account in order to define the central scenario (WAM scenario from the NECP), this is the latest known/agreed ambition at Belgian level until 2030 which is considered by Belgium to be in-line with the European targets (at the time of the NECP elaboration). ELIA understands that there are reasons that could lead to an increase or a decrease of the proposed values in the NECP (NIMBY effect, increased ambition following the EU increased targets ...). The CdC confirms that those values are the latest known values and are to be used for this study as central scenario, if no other official information is to be known. Note that there are also discussions at Belgian level (and European level) concerning the RRF (Recovery and Resilience Facility)<sup>5</sup> and additional support that could be given to certain technologies or policies, although the final plan is still being constructed and discussed and will not be ready by the time simulations for this study needs to be performed. In addition, given that there are reasons to believe that the future installed capacities will be higher/lower than in the NECP WAM proposed scenario, the best approach is to perform sensitivities around the NECP WAM scenario.

Regarding wind offshore and the governmental ambitions, the question was raised to the minister, who refers to 4.4 GW of installed offshore capacity as from 2028. The reference scenario will therefore be adapted accordingly for 2028. Reaching this potential already in 2025 seems difficult given the needed realization of the underlying grid investments required to evacuate the additional offshore capacity. The sensitivities with different installed offshore capacities are discussed below.

---

<sup>5</sup> [https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility\\_en](https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en)

**SENSITIVITY - HIGH/LOW RES**

| STAKEHOLDER                               | FEEDBACK RECEIVED   |
|---|---|
| Belgian Offshore Platform                 | Suggestions for sensitivities<br>As the central scenario is based on conservative RES ambitions, a high RES scenario is much desirable to be included considering the following assumptions for offshore wind:<br>- 2022 and 2023: 2.262MW<br>- 2025: 4.4GW<br>- 2030: 6GW  |
| Greenpeace & Inter-Environnement-Wallonie | We propose to add a high-renewable sensitivity (High-RES) with ambitious but realistic objectives for solar and wind energy. The proposed scenario below is an update of the 2016 Our Energy Future scenario of Greenpeace, BBL and IEW. We also add for informational purposes the High-RES scenario of [Energyville 2020] ( <i>see original document for the figure of the share of RES in Belgium</i> ).<br><br>For offshore wind, the High-RES sensitivity should speed up the deployment of the 4.4 GW by the end of 2025 instead of 2028, as mentioned in the federal government agreement. |
| FEBEG                                     | One sensitivity where the PNEC ambitions are not realized and/or grid developments are not timely realized (in particular regarding market response/storage/RES developments).  |

**ANSWER:**

ELIA takes note of the proposals for high-RES sensitivity, as well as the proposal for a low-RES sensitivity, combined with lower market response and storage. Such sensitivities will be performed as mentioned in the chapter 7 of this report.

Regarding offshore wind capacity, the authorities reached out to Elia requesting that a 4.4.GW of offshore wind should be used as the reference scenario as of 2028 and asking also for a sensitivity for the same capacity in 2026 already. This high-RES sensitivity will be performed. As of offshore wind in 2030, ELIA wonders if 6 GW in the Belgian EEZ is realistic already for 2030 given the current marine spatial plan of Belgium, Belgian ambitions and the grid investments required to accommodate those capacities. Such sensitivity could be foreseen for 2032 as being indicative for an upcoming increase of the wind offshore in Belgium post 2030 for instance..

**EXISTING INSTALLED CAPACITIES DATA**

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | On sheet 1.2 on renewable production and non-CIPU units, Febeliec has at this point no specific remarks on the proposed PV and wind capacity (onshore/offshore). Febeliec however wonders to what extent previous comments (e.g. on the input data consultation for the Strategic Reserve 2021-2022) on the (extreme) divergence between Elia databases on installed capacity and governmental official numbers (with discrepancies of over 350 MW, with governments underestimating apparently installed and operational capacity) have been resolved and are taken into account in the provided numbers. In particular if the future values are based on governmental forecasts and ambitions, it is important to guarantee that the starting values for the assessment are not |

|  |  |
|--|--|
|  | below real installed capacity as this could have a severe impact over a longer decade when expected growth rates are applied to extrapolate future installed capacity. |
|--|--|

**ANSWER:**

For today’s installed capacity, and depending on the type of generation, either the values from the regions, or the values from the PISA database (ELIA internal database containing all units of the Belgian system (CIPU and non-CIPU) reported and updated by the DSOs on a regular basis) are used:

- For Biofuel & Waste we believe the installed capacity data of the regions to be an underestimation as they are based on a computation where running hours are involved, whereas the PISA database has reported nominal capacities. Hence, ELIA uses higher values than those reported by the regions. For the future evolution, such as done for the other RES capacities, the basis are the expected policies on the matter – see also next comment “Biomass & Waste” for more details;
- For CHP and other gas-fired units, ELIA relies on the PISA database as there is no reporting of the regions on the matter. The known projects with a status “acquired”, “reserved capacity” and “under construction” are taken into account to estimate the installed capacity for the coming winters. For CHP this typically shows an overestimation of the capacity for the first years of this study. Indeed, not all acquired & reserved capacity is commissioned in due time. More detailed information and comments on CHP capacity are available in the dedicated section of this consultation report;
- For wind and PV capacity, ELIA will update the 2020 numbers based on the latest known information at the end of 2020 (not yet known at the time of this public consultation). ELIA will also update the numbers of other capacities if available (awaiting the latest reporting from DSOs on this matter).

**BIOMASS & WASTE**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>  |
|--------------------|---|
| FEBELIEC           | With regard to the biomass and waste categories, Febeliec notices that Elia has opted to apply a flat level for the period 2020-2032. Febeliec wonders whether such assumption is realistic and wants Elia to provide more background for this assumption. Is this based on a detailed analysis by Elia, based on governmental declarations and national/regional plans or just a flat approach as this point has not been investigated at all? During the consultation on the input data for the Strategic Reserve for winter 2021-2022, Elia still had foreseen a steep decline, which has now disappeared, however without any clarity and transparency on the underlying assumptions and changes since that consultation. |

**ANSWER:**

For biomass and waste, the future evolution proposed will be based on the NECP of Belgium with the following reasoning:

- The NECP of Belgium foresees a decrease of the biomass capacity;
- The authorities confirmed that the NECP targets for biomass are the best available forecasts for biomass;
- The Flemish authorities have confirmed that Rodenhuize’s green certificates would end in 2023.

We therefore no longer applied a decrease on the non-CIPU biomass units but will consider biomass CIPU units as part of the EVA (if the total installed capacity (non-CIPU and CIPU) is above the proposed values in the NECP). For instance, as indicated by ENGIE Electrabel during this public consultation, large units such as Rodenhuize are at risk



if the green certificate mechanisms would no longer be prolonged/valid for such kind of units. Indeed this was also confirmed by the Flemish authorities and hence Rodenhuize will be taken out of the market as from 2023.

As the decrease foreseen by 2030 in NECP values for biomass is larger than the decrease corresponding to the closure of Rodenhuize unit only, there are still other biomass CIPU units that should be considered as “at risk”. As mentioned above, the corresponding installed capacity at risk (calculated in order to reach the decrease foreseen in NECP values) will be part of the Economic Viability Assessment. Note also that the non-CIPU biomass capacity was already increased by 50 MW between the known installed capacity end of 2019 and 2020. Such increase still needs to be confirmed by the most recent reportings from DSOs on 2020 data and the data will be updated for this study (if received on time).

The different approach between this study (which is a prospective study including economic viability assessments and several sensitivities) and a calibration report such as the strategic reserve volume report can be explained by the fact that fewer scenarios are simulated and no economic viability of generation are considered in a calibration report. ELIA regrets that this point was not explained better in the consultation documents and will ensure that it will be better framed in the next public consultations.

### 5.1.4 Storage

#### NECP AMBITIONS

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | Last but not least, Elia states that “the evolution of total capacity for other storage facilities is assumed to reach the 2030 target from Energy Pact”. While Febeliec has in consultations regarding every adequacy assessment by Elia always expressed its reserves regarding the quantitative base of the values provided in the Belgian NECP (which has in the mean time received a wide range of comments by the European Commission, strengthening Febeliec’s reticence to blindly apply these values instead of a thorough bottom-up analysis), an issue which has not yet been resolved apparently even in this consultation, Febeliec can under no circumstance accept that Elia, after seemingly applying a strong growth rate for storage in the period up to 2030, for the period post 2030 estimates this value to be constant. Even though it could be argued by some that such estimates far out in the future might be less relevant in any case, according to Febeliec this yet again shows clearly the intrinsic flaws of the approach currently applied by Elia. Febeliec strongly regrets that even though these comments have been made so many times on various consultations, Elia has still not elaborated a sound quantitative model for this assessment. Febeliec finds this lack of action from Elia rather strange and in any case not up to standards. |
| FEBEG       | Regarding battery and market response capacity:<br>FEBEG observes very optimistic assumptions on the evolution of batteries and market response capacity. FEBEG understands that these assumptions are based on expressed political ambitions that are translated in the PNEC. However, at this stage, there are no guarantees that these ambitions will materialize, in particular in absence of a regulatory and/or economic framework to stimulate the development of these capacities. This is especially true for the storage capacity, given the limited penetration of the different technologies at this stage.   |



|                  |   |
|------------------|---|
|                  | FEBEG believes that this capacity increase could actually only materialize when an appropriate regulatory and/or economic framework – such as for example a capacity remuneration mechanism - would be implemented in Belgium at that horizon. Therefore, the considered assumptions related to storage and market response should be reviewed: only the capacity that would be developed based on existing market conditions should be used as input in the modelling. |
| ENGIE Electrabel | On the potential of storage: the potential of storage, in line with the NCEP, is very ambitious according to Electrabel and as highlighted by Elia in the Task Force ‘Strategic Reserve” held on 30th November 2020 for the coming years. It is unlikely that this capacity would enter the market in the current market circumstances and with the current regulatory framework, without additional visibility on their business case in the coming years.             |

**ANSWER:**

ELIA reminds for the sake of clarity that the total storage capacity for 2030 is based on the 2030 targets from the Energy Pact, which is different from the NECP, as the latest does not include ambitions regarding storage capacity. This is why the Energy Pact is used as reference for the 2030 target for the total capacity of other storage facilities. Such approach was confirmed by the competent authorities for this study. ELIA is not responsible for the elaboration nor the content of the NECP. Such a discussion should take place in another forum. ELIA considers in collaboration with the FPS, Federal Planning Bureau and in concertation with the CREG, the most up-to-date values/ambitions for Belgium regarding the different technologies. The proposed values for future storage in this consultation were also checked with the competent authorities and were confirmed as the most recent ambitions to be used. If FEBELIEC has comments on the NECP, on the political ambition of the regions or the federal authorities, we invite FEBELIEC to direct them to the authors of the NECP. In the meantime ELIA applies what has been agreed/approved. The NECP runs up to 2030 and to our knowledge there are no further ambitions regarding storage post 2030, hence the prudent approach to keep those values constant post 2030 (and this after considering an increase of 1600 % of the installed capacity between 2020 and 2030). Furthermore, we would like to recall the numerous positions and reactions stating that ELIA is applying ‘state-of-the-art’ models and is a front-runner in adequacy and flexibility assessments in Europe.

More concretely on the values for storage, some market parties find the evolution of storage too ambitious or unrealistic. As those ambitions set by the Belgian authorities can seem ambitious or not ambitious enough, the choice has been made to use the politically agreed targets/ambitions. This was reconfirmed by the Comité de Collaboration and the competent authorities.

In order to tackle the large uncertainties around storage, it is proposed to:

- Perform an EVA on ‘in the market’ storage capacities, hence removals or additions (if economically viable) will be applied;
- Perform sensitivities on storage evolutions given the different uncertainties pointed out by the stakeholders (see section 7).

Those sensitivities will then provide all stakeholders with relevant information on the impact of the evolution of storage capacities on the adequacy and flexibility of the system.

**PUMPED STORAGE**

|                    |                          |
|--------------------|--------------------------|
| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b> |
|--------------------|--------------------------|

|                  |  |
|------------------|--|
| FEBELIEC         | On sheet 1.3 on storage, Febeliec is surprised to see that for pumped storage no increases in reservoir volume (or even capacity) are taken into account, in light also of specific investment projects that are on-going (and not even taking into account future such projects over the next decade, as clear tariff incentives exist to incite such investments). |
| ENGIE Electrabel | Coo: There is no split of the capacity for unit. In any case, Electrabel reminds that the capacity of Coo should be limited to the value published on the ENGIE transparency website. The capacity is equal to 1.080 MW.<br>o Coo I: 3x145 MW = 435 MW<br>o Coo II: 3x215 MW = 645 MW  |

**ANSWER:**

ELIA would like to clarify that the capacity mentioned in the 1.4 Storage sheet under the naming “Pumped-storage” corresponds to the capacity of Coo but also the one of Plate-Taille. ELIA considers a total of 1.080 MW for the capacity of Coo and a total of 4\*36MW for the capacity of Plate-Taille. This amounts to 1224 MW of pumped-storage capacity, as mentioned in the document submitted to consultation.

Regarding the future pump-storage capacity in Belgium, ELIA points out that no official information on any increase has been published/approved. Indeed, it was also checked with the competent authorities which indicated that the increase of the reservoir and capacity of COO by 7.5% is not yet approved. ELIA will therefore consider the actual capacity for the central scenario.

**SMALL SCALE STORAGE ASSUMPTIONS**

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| FEBELIEC    | On other storage, Febeliec appreciates the effort done by Elia to provide better insight in its assumptions on this segment as compared to previous adequacy assessments. Febeliec has several remarks and questions towards the proposed file. For small scale storage, Elia states that “estimations are based on the assumption that each year 0.5% of the PV installations add a battery capacity of the size of the PV installation (with 3 hours of storage)” yet it remains unclear whether Elia this approach only for existing installations or also for new-build installations. Especially for the latter, also taking into account the roll-out of smart meters and tariff incentives, Febeliec considers 0,5% to be an extremely low value and asks for a detailed argumentation. Febeliec also asks for transparency on the reasoning to apply a reservoir of 3 hours of capacity. |

**ANSWER:**

ELIA takes note of FEBELIEC’s appreciation of the segmentation. Regarding the questions on small scale storage assumptions, ELIA would like to clarify that the assumptions are based on the following reasoning:

- The target for total storage (small scale, V2G and large scale) is the one included in the “Energy Pact”;
- For small scale storage, each year, it is assumed that 0.5% of the new PV installations will add a battery capacity of the size of the installation;

- The battery is assumed to be of 3 hours of storage, as this is in line with the available home batteries solutions (such as the *Tesla PowerWall* which has a 2 to 3 hours storage capacity<sup>6</sup>).

ELIA would also like to remind that to our knowledge, such installations in Belgium are currently marginal in the system and despite the efforts to incentivize such installations, it is yet unclear whether those will be massively installed in the coming years. In any case, as already stated, ELIA follows the political ambition regarding the evolution of the total storage capacity.

**LARGE SCALE STORAGE ASSUMPTIONS**

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | For large scale storage, Febeliec is surprised to see that the numerical values for capacity and reservoir volume are identical and wonders whether Elia intended to imply that all these installations will only be able to provide their maximum capacity for the period of just one hour (as opposed to small scale storage which would deliver during 3 hours), which does not seem very realistic to Febeliec. Here also Febeliec asks for more clarification and transparency on the reasoning of Elia. |

**ANSWER:**

For large-scale storage, the estimations are based on the existing (limited) capacity and known projects to ELIA. Moreover, historical ELIA measures have shown that the existing large-scale batteries in Belgium did not deliver their maximum capacity during more than 1 hour for the last 3 years.

In the latest Bloomberg’s dataset of energy storage, large scale energy storage projects are listed for all countries. This dataset includes all the already commissioned projects but also the under-construction projects and the announced projects. If one looks at the ratio between the deliverable energy (MWh) with the installed capacity (MW) for Belgium and its neighboring countries, one finds a ratio of 1.2 hours. This corresponds to a bit more than one hour duration at maximum capacity.

Lately, end 2020, the construction of a new project in Bastogne has started, with 10 MW and two hours duration. In view of these elements, ELIA will adapt the assumption towards a duration of 2 hours for large scale projects instead of the 1 hour proposed. In the future, as the amount of installations is expected to grow, a higher granularity of storage duration could be applied (such as currently done for DSM).

**VEHICLE TO GRID**

| STAKEHOLDER                               | FEEDBACK RECEIVED   |
|---|---|
| Greenpeace & Inter-Environnement-Wallonie | The potential of 2GWh storage from Vehicle-to-Grid (V2G) is an underestimation of the potential. More ambitious (and realistic) scenario’s on electrification of road transport should be used, such as the Greenpeace report of September 2020 <a href="https://www.greenpeace.org/static/planet4-belgium-stateless/2020/09/6a3a7fc4-transportroadmap_re">https://www.greenpeace.org/static/planet4-belgium-stateless/2020/09/6a3a7fc4-transportroadmap_re</a> |

<sup>6</sup> [https://www.tesla.com/fr\\_be/powerwall](https://www.tesla.com/fr_be/powerwall)

|                  |   |
|------------------|---|
|                  | port_september2020_2.pdf  |
| ENGIE Electrabel | On the potential of V2G: the volume highly depends on the number of electric vehicles in Belgium but also on the roll-out of the available technology to make them active market participants to the electricity system. Electrabel has strong doubts about this latter aspect at the 2025 horizon. |
| FEBELIEC         | On vehicle-to-grid storage, Febeliec would like to see a clear curve on the percentage that Elia is considering to react to electricity prices in each of the years, in order to see how Elia sees this evolution linked to a.o. the accelerated roll-out of smart meters in Belgium.               |

**ANSWER:**

ELIA notes that on the one hand the assumptions made for vehicle-to-grid are considered as conservative while others see them as too optimistic. In view of the feedbacks received, and in line with the political ambitions regarding storage, the assumptions made for V2G capacities seem adequate for a reference scenario. ELIA also reminds that the total installed storage capacity (small, large, V2G) is based on the political ambitions set for Belgium. Such as for the other types of storage, sensitivities can be performed to assess the impact on adequacy and flexibility.

ELIA thanks Greenpeace & Inter-Environnement-Wallonie for sharing the detailed report on the evolution of the transport sector towards 2040. ELIA would like to remind that the values are used as 'best estimates' for the future years and should not be interpreted as a technical potential. Indeed, while the potential can be high, enabling EVs to perform V2G will require several steps (non-exhaustive list):

- First, the V2G are marginal in the system today as it requires:
  - o EVs (currently the EV fleet is still marginal) but it is expected to increase;
  - o V2G charging stations (allowing bidirectional flows, from the grid to the vehicle and vice-versa);
  - o EVs which are capable of handling V2G.
- Then, in order for V2G to react to prices or reduce/increase consumption/injection, it has to be linked with:
  - o A smart meter;
  - o A communication device allowing to send/receive signals with the smart meter and steering the charge/discharge;
  - o A contract with a service provider that can steer the charging/discharging process.

Therefore the assumptions made for V2G capacities seem adequate for a reference scenario. Sensitivities could be done on the penetration of V2G, with a higher or lower rate, such as for large scale or small scale storage.

Regarding FEBELIEC’s comment on the percentage of vehicles reacting to electricity price, ELIA would like to point out that the yearly evolution of the installed capacity of V2G “in-the-market” is given in the graph of the Excel sheet. The “out-of-market” capacity is the one considered to be reacting on local signals (such as avoiding certain types of injection tariffs for prosumers or on local optimization (such as netting a household consumption) and hence not directly reacting to electricity hourly prices).

## 5.2 Demand

### 5.2.1 Total electricity demand

#### COVID IMPACT

| STAKEHOLDER                                | FEEDBACK RECEIVED   |
|--|---|
| FEBEG                                      | <p>While on one hand some might put forward that the electricity consumption could be reduced post-COVID due to reduced economic activities on one hand, the re-launch plan and the fact that the momentum could be used to accelerate the green-deal objectives with an increased rate for further electrification could on the other hand increase the peak demand and the energy consumption more than expected.</p>   |
| Greenpeace & Inter-Environnement-Wal-lonie | <p>The Electricity demand projection is based on the socio-economic parameters from the Bureau Federal du Plan, published in June 2020, thus before the start of the second lockdown. It is needed to include the impact of the coronavirus crisis. Electricity demand projections have to better fit with last year evolutions. We observe that electricity demand dropped from 88,9 TWh in 2010 to 85,7 TWh in 2019. A 10 TWh increase from 2020 to 2030 seems then highly questionable from that perspective.</p>  |
| FEBELIEC                                   | <p>On the sheet 2.1 on total electricity demand, Febeliec is very negatively surprised to see that Elia only provides historical data for 2019. As can be seen on the graph below (Figure 1: Belgian electricity demand 2000-2019 (source: Elia, received 27/05/2020)), provided by Elia in May 2020 and publicly presented by Elia, total electricity demand in Belgium was in the last decade up to 2019 in clear decline. As can be seen in the graph, the 2008 financial crisis, which was the major economic crisis in the current millennium with substantial global economic impact, shows a clear drop of more than 6TWh (or around 7% of Belgian consumption) in the wake of that crisis. A decade later, Belgian electricity demand has still not regained pre-2008 levels (with a.o. 2019 showing even a continued decrease in overall demand, reaching a level that was last seen in 2002, despite a substantial increase in Belgian GDP over that period). While the underlying reasons for this observation are beyond the scope of this consultation (e.g. impact of energy-intensity of GDP-growth, impact of energy-efficiency measures, ...), the trend can be clearly observed. Important in the light of the current covid-19 crisis, which will presumably have a much more pronounced effect on the global economy, is that it would be imprudent to not take into account such impact on Belgian electricity demand, also when looking a decade ahead and especially in the first years of the analysis.</p> <p>As presumably needs no further clarification, as of 2020 the world has entered in probably the worst global economic crisis in post-war history as a result of the Covid-19 sanitary crisis. Elia itself during the first wave in S1 2020 presenting values that dropped up to 25% at some moments, and with a second wave now also in the mean time creating additional economical damage. Moreover, it is also ever more clear from general economic reports that this sanitary crisis will continue to wreak havoc in future years, both in the level of growth (or lack thereof) as well as the starting point for the growth curve (if the crisis further severely impacts the basis of the economic tissue of the world economy). As such, Febeliec is surprised that Elia proposes following total electricity demand growth path in the spreadsheet:</p> |

|  |  |
|--|--|
|  | <p>While Febeliec is not at all convinced that the 2020 decline in total electricity demand by Elia is a correct representation of the situation (in particular if one takes into account the impact of the much less globally impacting 2009 financial crisis on total electricity demand as can be seen in the first figure), Febeliec is very surprised to see that Elia estimates that total electricity demand over the next decade spurts to never seen absolute levels (above 95 TWh), levels not even seen in the economic boom years of the beginning of the millennium (the highest level being reached in 2007, even before the financial crisis) and this despite a very strong focus on energy efficiency in ever more consumer segments. Febeliec a.o. observes that Elia estimates that in 2023 total electricity demand will be 87,5 TWh, or 1,8 TWh higher than 2019, despite the covid-19 crisis which has reduced Elia’s estimate for 2020 to 82 TWh. Febeliec wants to stress that it is surprised that Elia has not modified any of its data since the consultation on the input data for the strategic reserve 2021-2022 as in the mean time it has become clear that Belgium is hit quite hard in S2 2020 with a second wave in the Covid-19 sanitary crisis, resulting yet again in a lockdown with an impact on overall electricity demand, an element nevertheless not taken into account by Elia.</p> |
|--|--|

**ANSWER:**

The different feedbacks received from the stakeholders illustrate the uncertainty behind the potential evolution of the total electricity demand for the considered time period. The figures proposed for this study take into account the impact of macro-economic trends on the total electricity demand and are based on the latest projections of the Federal Planning Bureau from June 2020<sup>7</sup>, accounting for the COVID crisis. These projections do represent a general recession in 2020, with a progressive recovery up to 2023. This is reflected in the activity and electricity consumption. In addition, electrification of transport and heat are taken into account from the ‘WEM – With existing measures’ scenario from the latest NECP of Belgium (which is the most conservative scenario with regards electrification and hence the most conservative regarding electricity consumption).

The projection for the total electricity demand is based on 2019 as a starting point for the calculation. The historical total electricity demand will be included in the final report for information as well.

There are several reasons to argue that those numbers can be seen as optimistic:

- The numbers from Federal Planning Bureau do not take into account the possible effect of the ‘second lockdown’ in October/November 2020;
- The economic numbers are a picture of the known situation in June 2020, hence events that will happen after that date are not taken into account. It is also hard to estimate the impact of those events on the electricity consumption.

...or conservative:

- The projections for short term (2020-2025) electric vehicle penetration are based on the ‘With Existing Measures’ scenario from the NECP (hence the lowest rate of electrification from the NECP scenarios) which

---

<sup>7</sup> <https://www.plan.be/publications/publication-2017-fr-budget-economique-2021-juin-2020>

follow the most recent evolution of EV sales in Belgium. Several new measures/ambitions were announced which could lead to higher electrification rates also in the short term;

- A more recent publication of the Federal Planning Bureau in September<sup>8</sup> expects a lower decrease of the economic indicators in the short term than the one taken for this study (based on the forecast of June 2020 from the Federal Planning Bureau). Unfortunately, the granularity of the data of the publication in September was not sufficient to derive electricity consumption figures (requiring data per sector). Additional information was asked by ELIA to the Federal Planning Bureau on this publication to receive data per sector, but the Federal Planning Bureau does not plan to publish such information before the next release foreseen in the course of 2021 with an updated forecast;
- The projections for medium and long term can be still seen as conservative given the new ambition of EU targets and the revision of the TEN-E policy<sup>9</sup> which will promote the integration of new clean energy technologies and will accelerate in this way the electrification of transport and heating sectors.

In any case, it is still unclear or uncertain how the whole pandemic situation will evolve and what will be the effect on the economy and the electricity consumption on the short run. This study bases itself on the latest available/usable economic projections and policy measures. This approach was also confirmed by the Federal Planning Bureau.

Elia would also like to highlight that the projections estimated for 2020 with the new methodology and tool developed by Climact seem to be in line with the observations for this year (based on the draft values for 2020). The total electricity consumption for 2020 was around 81 TWh and represents around 82 TWh in normalized value, which is the value estimated for 2020 with the new methodology applied as from last year. This result supports the robustness of the current methodology, the underlying input data and the tool used for estimating the total electricity demand.

The total electricity consumption is an input for the 'hourly consumption model creator' which then derives the hourly consumption of Belgium and other countries to be used in the market simulation. The peak values distribution obtained will be included in the final report.

Finally, given the uncertainties, ELIA will perform a sensitivity on the electricity demand to tackle and measure the impact on the final results (see section 7). The detailed quantification of the sensitivities on the electricity demand still needs to be studied and discussed within the CdC.

## **SENSIVITIES ON COVID IMPACT**

| <b>STAKEHOLDER</b>                         | <b>FEEDBACK RECEIVED</b>   |
|--|--|
| FEBEG                                      | Proposal: one sensitivity on a post-COVID 19 relaunch/rebound effect ("high" demand).  |
| Greenpeace & Inter-Environnement-Wal-lonie | There is still large electricity saving potential in residential, tertiary and industry that could be implemented through NECP revision foreseen in the Federal Government declaration. It is then crucial to develop a low demand scenario that could help triggering those energy saving potentials. |

<sup>8</sup> [https://www.plan.be/databases/data-15-nl-economische\\_begroting\\_2021\\_september\\_2020\\_statistische\\_bijlage](https://www.plan.be/databases/data-15-nl-economische_begroting_2021_september_2020_statistische_bijlage)

<sup>9</sup> [https://ec.europa.eu/energy/topics/infrastructure/trans-european-networks-energy\\_en](https://ec.europa.eu/energy/topics/infrastructure/trans-european-networks-energy_en)

|                 |  |
|-----------------|--|
| <p>FEBELIEC</p> | <p>On total electricity demand, Febeliec refers to its above mentioned comments on the excel spreadsheet and the impact of the Covid-19 sanitary crisis, for which Febeliec deems it necessary to include several sensitivity scenarios. Febeliec reiterates that it considers it unrealistic to imagine that Covid-19 would not have any effect on Belgian electricity demand in light of the unprecedented drop in global economic activity, also in Belgium and even more so in light of the currently on-going second wave with additional impact on the economic climate and even potential future waves before the Covid-19 sanitary crisis can be fully contained and economic activity recover to pre-crisis levels. As can be seen from the above-presented Belgian electricity demand data 2000-2019 provided by Elia , electricity demand dropped very sharply in the aftermath of the 2008 financial crisis (minus 6 TWh or around 7%), which showed a less pronounced reduction in economic activity than can now already be observed by the non-ended covid-19 crisis, with a recovery afterwards that still has not reached in 2019 the pre-2008 level (still more than 3,5 TWh down compared to 2008 levels). Febeliec insists to add at least two times two new sensitivities. A first additional sensitivity set could be to take the impact of the 2008 financial crisis as a proxy (so a drop of 6TWh in overall Belgian electricity demand based on the provided demand data from Elia) and then have two variations on this, one with a V-shaped recovery (as after the financial crisis of 2008, yet also there with even a decade later still electricity demand levels that are several percent lower) and one with a much slower recovery (to mimic the impact of at least the current second wave and potential further waves of Covid-19 or other effects that could generate additional damage to the economic tissue, with increased ripple-through effects over the next decade). A second sensitivity set would then contain two similar sensitivities, but based on a much more pronounced drop in electricity demand in 2020 (e.g. -10 TWh). In any case, Febeliec urges Elia strongly to include several sensitivity analyses on overall electricity demand, at least also with smaller growth paths as currently considered, as overestimates in total electricity demand will automatically lead to overestimated needs for (flexible) capacity and thus unnecessary investments in Belgium, both for adequacy and maybe even for flexibility purposes. As already stated before, Febeliec is surprised to observe that Elia currently considers total electricity demand in Belgium over the next decade to reach unprecedented levels, which Febeliec considers completely unrealistic.</p> |
|-----------------|--|

**ANSWER:**

The different visions of the market parties on the potential evolution of total electricity demand reflect the uncertain times behind the current context. As a reminder, the estimations are based on the projections from the Federal Planning Bureau from June 2020, which takes the COVID crisis into account. In this regard, ELIA would like to point out that the estimated normalized consumption for the year 2020 appears now to be in line with the preliminary statistics. This gives ELIA confidence in the tools and input data used for the short term estimation of the consumption, despite the very uncertain situation.

In addition, while ELIA can follow some reasoning for sensitivities, the drop in 2020 is already known and corresponds to what was expected and included in the scenario dataset (based on draft consumption data) and ELIA does not consider it useful to perform sensitivities on the drop seen in 2020. However, ELIA acknowledges to further investigate several scenarios for economic recovery (if those are available). If not, simple sensitivities as suggested by FEBELIEC could be applied. In addition, an accelerated increase of consumption (as suggested by FEBEG) can also be considered.



ELIA takes note of the proposal for higher and lower total electricity demand scenarios and will further discuss with the CdC to include some of them in the final report. These sensitivities are also included in section 7.

**ELECTRIC VEHICLES AND OTHER ASSUMPTIONS**

| STAKEHOLDER      | FEEDBACK RECEIVED  |
|------------------|--|
| FEBELIEC         | Febeliec also regrets that Elia provides values on electric vehicles and electrification of heating based on the NECP (for which Febeliec also refers to previous comments on the lack of transparency on the quantitative modelling of the NECP as well as the lack of an update after the many comments from the European Commission), yet omits to provide a calculation in equivalent electricity demand. Moreover, Febeliec also wants to reiterate its comment and question on the split of the steep increase of total electricity demand by Elia over the different segments, in order to be able to see which increase Elia expects a.o. for industrial consumption, as Elia has a.o. not taken any additional CHP or other industrial installations into account after 2023. Febeliec regrets that Elia, despite numerous requests and the above comments, which have been voiced many times, has still not provided a more detailed analysis that goes beyond the blackbox approach applied for this A&F Study. |
| ENGIE Electrabel | Electrical vehicles: Regarding the electrical vehicles’ penetration in the market, Electrabel is surprised to see relatively flat projections in the coming years until 2025 taking into account the ambition of the Federal government on that topic. Electrabel would expect a bigger increase for the years 2021 to 2025.   |

**ANSWER:**

For FEBELIEC’s comments on the projections, ELIA insists that the estimations are not a black box. First, the macro-economic input data used in the tool are those published by the Federal Planning Bureau in June 2020<sup>10</sup> and the assumptions for electrification are based on the final National Energy and Climate Plan<sup>11</sup>. Secondly, the tool used has been developed by a reliable and recognized consultancy firm, which is also working with Belgian authorities on the same matter. In particular, the tool used to derive the electricity demand is based on the Belgian Calculator (BECalc) developed in 2019 and 2020 by Climact for the Federal Public Service Health, Food Chain Safety and Environment. Furthermore, the methodology and the tool were presented during several workshops<sup>12</sup>, and is summarized in a document<sup>13</sup>. For sake of transparency, ELIA published a detailed view on the number of electric vehicles and penetration of heat pumps together with a link to the details of the total electricity demand across the different sectors. The final

<sup>10</sup> [https://www.plan.be/publications/publication-2009-fr-perspectives\\_economiques\\_2020\\_2025\\_version\\_de\\_juin\\_2020](https://www.plan.be/publications/publication-2009-fr-perspectives_economiques_2020_2025_version_de_juin_2020)

<sup>11</sup> <https://climat.be/politique-climatique/belge/nationale/plan-national-energie-climat-2021-2030>

<sup>12</sup> <https://www.elia.be/en/users-group/wg-balancing/taskforce-strategic-reserve/20190919-meeting> and <https://www.elia.be/en/users-group/wg-balancing/taskforce-strategic-reserve/20200127-meeting>

<sup>13</sup> [https://www.elia.be/-/media/project/elia/elia-site/public-consultations/2020/20200603\\_total-electricity-demand-forecasting\\_en.pdf](https://www.elia.be/-/media/project/elia/elia-site/public-consultations/2020/20200603_total-electricity-demand-forecasting_en.pdf)

results of the electricity demand, and the share of this demand between sectors, have also been made available through a didactic PowerBi interface<sup>14</sup>.

Those macro-economic projections do not include additional industrial consumption (new industrial plants for instance) as confirmed by the Federal Planning Bureau..

Regarding the number of electrical vehicles for the period 2020-2025, the estimation is based on the “With Expected Measure” scenario from NECP. While ELIA is using the “WAM scenario” (With Additional Measure) as the reference scenario most of the time, the electric vehicles and heat pump penetration for the period 2020-2025 is following the “WEM scenario” in order to better fit the most recent evolutions observed. However, with several new measures and ambitions announced (a.o. new sales of company cars only electric from 2026), a higher electrification rate can be expected afterwards. Therefore, the “WAM scenario” is the reference scenario after 2025. Such approach was confirmed by the authorities.

**PEAK DEMAND**

| STAKEHOLDER      | FEEDBACK RECEIVED   |
|------------------|---|
| FEBEG            | Regarding peak demand and total electricity consumption:<br>Particular caution should be considered for the forecasts of peak demand (MW) as different plausible assumptions lead to different evolutions of this key driver.<br>While on one hand some might put forward that the electricity consumption could be reduced post-COVID due to reduced economic activities on one hand, the re-launch plan and the fact that the momentum could be used to accelerate the green-deal objectives with an increased rate for further electrification could on the other hand increase the peak demand and the energy consumption more than expected. |
| ENGIE Electrabel | Peak demand: Elia does not provide any information regarding the peak assumptions for Belgium or for the surrounding countries in the explanatory note for the Public consultation. In particular, the short-term negative effects on power consumption (annual TWh) of the COVID19 crisis do not necessarily translate in the same proportional decrease of peak demand, which is the relevant dimension to consider for assessing adequacy.   |

**ANSWER:**

ELIA agrees with FEBEG and ENGIE Electrabel on the importance of the peak demand. The total electricity consumption is an input used by the “hourly consumption model creator” which will then derives the hourly consumption of Belgium and other countries in the simulation. The tool is used to derive the hourly consumption profiles and hence the peak demand used in a second stage to generate the input data for the model. Those tools were not yet run to derive hourly consumption data and hence no peak demand values are yet available. Those data will however be included in the final report. ELIA will also pay attention to the comments raised by ENGIE Electrabel and FEBEG on the fact that

<sup>14</sup> <https://app.powerbi.com/view?r=eyJrIjoiaNTdkMzUzNmMtMGlwMy00YTJILThhZ-DAtMTc0ZTE1OTU4ZjdlIiwidCI6ImUxZDBhZDNjLTk0MmltNDkyOC05MDgyLTU5NzgxMWRkYTAWZiIsImMi-Ojh9&pageName=ReportSectionfe23cb0f5c5771a5168d>

the peak might not be affected in the same way as the total/annual consumption. For future studies and consultations, ELIA will try to have the peak demand data ready prior to the public consultation.

**NORMALIZATION OF THE TOTAL DEMAND**

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| CREG        | 16. De elektriciteitsvraag wordt “genormaliseerd”. De CREG vraagt aan Elia om te verduidelijken hoe en met welke parameters deze normalisatie gebeurt. Daarbij stelt zich ook de vraag of de parameters voor de normalisatie van de elektriciteitsvraag voldoende rekening houden met de effecten van klimaatverandering (gemiddeld hogere temperaturen en minder extreem koude winters). |

**ANSWER:**

The normalization of the yearly consumption applied by ELIA is a simple process based on the amount of Degree Days, the realized total consumption and the amount of days in a year.

The normalization is therefore a way to look at the electricity consumption while cancelling the effect of the temperature (driving a small part of the consumption). Even if for the electricity consumption in Belgium, this impact is limited, it can still result in a non-negligible correction.

A degree day is the difference between the reference temperature and the average temperature of the reference place and corresponds to 24 hours. For the calculations of degree days, ELIA relies on the Synergrid methodology and numbers. Degree days from Synergrid are mainly used by the gas sector to determine the consumption.

The normalization of an historical year is done in two steps:

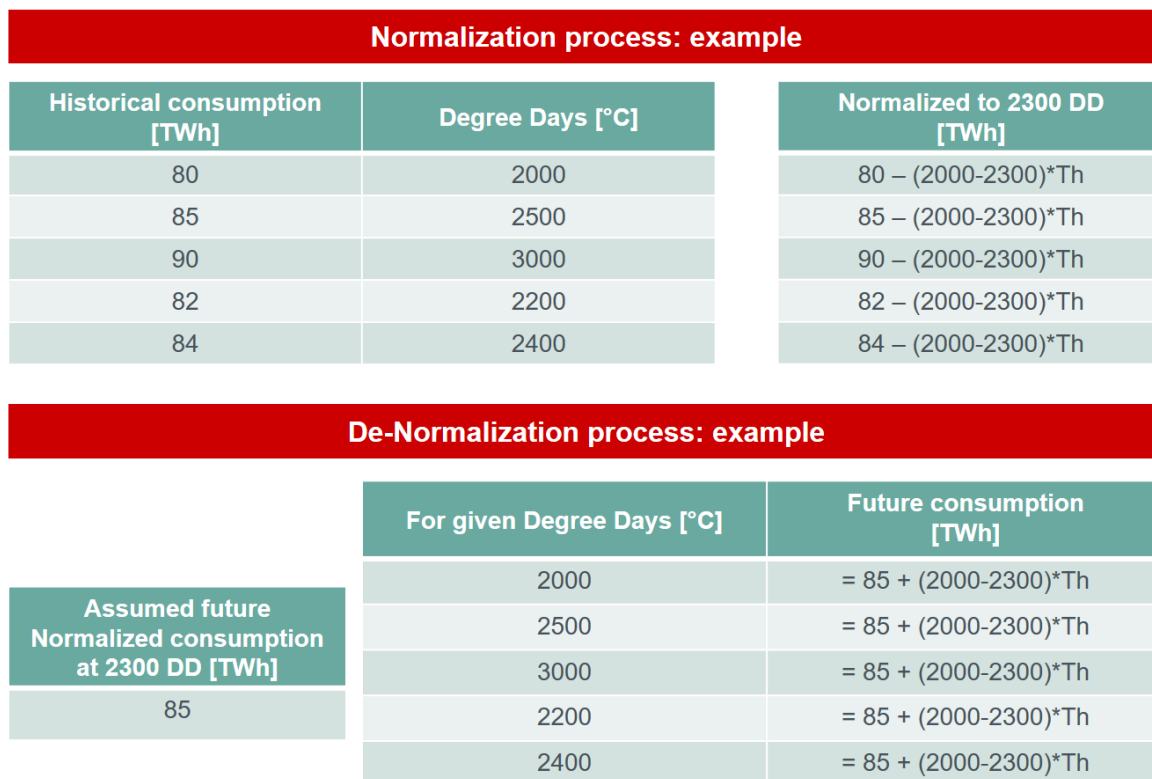
- First, the realized total consumption is normalized based on the observed amount of degree days during that year and a certain reference amount of degree days. This is made by comparing the amount of degree days of the realized year and the assumed normalized amount of degree days and applying the thermosensitivity;
- Secondly, the amount of working days and total amount of days in a year are also taken into account. For instance, all leap years will be normalized to a year of 365 days by simply removing the average consumption of 1 day.

All yearly consumption is therefore expressed for the same amount of degree days. For this purpose, ELIA is using the reference amount of degree days from Synergrid, although as it will be described below, the normalization can happen on any reference with the same final result. The normalization process allows to simply remove the effect of temperature by looking at the different consumption values assuming that the temperature (= amount of degree days) over the year was the same.

The normalized consumption serves as an input for the creation of the hourly load profiles. In order to construct hourly profiles, the estimated temperatures are also given as input for each climate year. This enables, a.o. to apply the temperature effect that has been isolated during the normalization by using the thermosensitivity inversely, which is estimated to be between 100 and 150 MW/°C for each hour in Belgium. Based on the future temperature estimated for that specific year, a number of degree days (difference between the temperatures – relative) will be calculated. Finally, the consumption can then be “de-normalized”.

This shows that the normalization can happen on any reference amount of heating degree days. Hence if it is expected that those would decrease or increase in the future, the normalized demand would decrease or increase accordingly but the future demand based on a given temperature will stay the same.

An example is given below for the normalization and de-normalization of the yearly consumption with an assumed amount of degree days.



$Th =$  assumed thermosensitivity in  $TWh/°C$

Figure 1 – (De-) normalization process

**SENSITIVITY - SMALL-CHP instead of HEAT PUMP**

| STAKEHOLDER      | FEEDBACK RECEIVED   |
|------------------|---|
| COGEN Vlaanderen | <p>[...] Based on above arguments, COGEN Vlaanderen suggests that an alternative scenario is studied linked to Power-to-Heat :</p> <ul style="list-style-type: none"> <li>• <b>Growth of Heat Pumps according to WEM scenario instead of WAM.</b></li> <li>• When moving from WAM to WEM scenario, the suggestion is to assume that the “Heat not served with heat pumps” is produced by small-CHP with 35% electrical efficiency and 100% overall efficiency. This results in a synchronous production (!) of 0,54 MWhe per MWhth of heat supplied (= 35/65). This is to be compared with 0,5 MWhe consumption (!) per MWhth of heat supplied in case air/air or air/water heat pumps would be installed.</li> <li>• Additional gain on adequacy is obtained due the fact that injection is at low tension level, thus avoiding losses linked to transport and distribution of electricity (6% ?)</li> </ul> |

|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• If we assume that the natural gas allocated to heat is 1 MWhi of gas per MWh of heat (i.e. displacement of heat from a condensation boiler) and if we assume a CHP with an overall efficiency of 100% (on LHV), the marginal cost of the electricity produced is the price of natural gas, expressed in €/MWhi. However, we can assume that cogenerations will bid at even lower levels into the day ahead market as additional value is created through reduction on grid costs (local generation is at least avoiding the tariff linked to grid losses).</li> <li>• Note that such CHP's (35% electrical efficiency) using 100 MWhi of natural gas, displaces 35 MWhe of central generation (corresponding to consumption of 70 MWhi or more natural gas) and 65 MWhi of natural gas in a condensation boiler. Primary energy savings (natural gas) are thus 35 MWhi. Versus a "heat-only" and "electricity-only" solution, this represents 35/135 = 26% reduction, supporting the objective of CO2 emissions.</li> </ul> |
|--|--|

**ANSWER:**

ELIA thanks COGEN Vlaanderen for his detailed and argued proposal for sensitivity. Considering a penetration of small-CHP that would be used for heating instead of using heat pumps is an interesting alternative sensitivity. It would lead to a lower penetration rate of heat pumps, hence influencing the total electricity demand. Such sensitivity will be done, probably within a combination of sensitivities, as many of them are interlinked (lower heat pump penetration, impact on electricity demand, etc.) – see section 7 of this report.

**5.2.2 Demand Side Response**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>   |
|--------------------|--|
| CREG               | 45. De CREG herinnert aan haar studie (F)1957 die de bevoorradingszekerheids crisis in België analyseert die optrad eind 2018. Tijdens november-december 2018 waren er nog slechts 1 tot 2 GW nucleaire capaciteit beschikbaar. Deze ex-post analyse toonde dat er op elk moment nog minstens 3,7 GW marge was vooraleer er een afschakeling zou plaatsgevonden hebben. Bovendien hebben marktpartijen op minder dan 3 maanden tijd 500 MW extra vraagbeheer ontwikkeld en 200 MW noodstroom geïnstalleerd. Dit toont het belang aan van deze twee type capaciteiten. De CREG is van mening dat deze onderschat worden in de huidige assumpties. |
| CREG               | 46. De CREG meent dat de activatieduur van vraagbeheer moet herzien worden. Deze wordt door Elia te sterk beperkt, terwijl hiervoor geen goede verklaring wordt gegeven. Momenteel is de vraag naar producten met lange activatieduur nog klein, maar indien er meer schaarste verwacht wordt voor meerdere opeenvolgende uren, dan zal de vraag naar deze producten stijgen, waardoor het aanbod zal volgen. De CREG herinnert in deze context ook aan het vroegere ICH-product waarbij industriële spelers tegen betaling kon afgeschakeld worden. In 2014-2015 werden 8u-contracten even vaak gecontracteerd als 4u en 2u contracten.         |

**ANSWER:**

As mentioned at several occasions, ELIA refers to the reaction of the Member State (FPS Economy), elaborated together with the Federal Planning bureau as reaction to CREG’s study (F)195715. This Belgian position has been send by the Member State to the European Commission, is publicly available and has been shared long-time ago with the CdC.

Market parties will understand that ELIA does not have the intention to deviate from this Member State position. As for the specific point on market response, we refer to chapter 2.3 of the Member State position, in which the position is clearly elaborated that both for national as international estimations for market response, the values should be based on the political aspirations and on the national climate and energy plans.

As for the activation duration, the data are based on the most recent study from E-Cube where such activation duration was provided. In that study, based on market inputs, the different ‘market response’ were categorized according to their activation duration. Being based on a study with market survey inputs by E-CUBE that took place later (i.e. 2017) than the 2014-15 period indicated by CREG in their comment, at this stage ELIA has no market-based evidence that the differentiated split used is no longer valid or that older information than the one from the 2017 E-cube study should provide a better basis.

**DEMAND SIDE RESPONSE CATEGORY**

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | <p>On sheet 2.2 on Demand Side Response, Febeliec would like to understand what is now according to Elia the difference between Demand Side Response and Market Response, the concept it has introduced in its previous A&amp;F Study and adequacy assessments since then. Febeliec wonders to what extent these concepts are interchangeable for Elia.</p> <p>Febeliec has noticed that Elia is now treating (non-pumped hydro) storage as a separate segment, which was previously seemingly integrated in the category Market Response (at least for small scale storage, the categorization of large scale storage and vehicle to grid storage always having remained vague).</p> <p>While Febeliec does not oppose splitting up market response in its different segments, as it greatly increases transparency, it now remains with questions regarding small scale generation, for example on sites of industrial consumers. Where does Elia treat small scale CHPs, diesel generators<sup>16</sup>, process-driven generators, emergency generators and batteries (which can also contribute to system adequacy in times of system stress), and various other types of assets that are not individually profiled by Elia yet can in a combined way have an enormous impact on overall offtake from the grid. As stated above, Febeliec does not oppose the better segmentation by Elia, yet would like to get full transparency and clarity on how Elia is defining “Demand Side Response” in order to avoid that some categories are omitted from the analysis</p> |

<sup>15</sup><https://economie.fgov.be/sites/default/files/Files/Energy/Mecanisme-remuneration-capacite-Note-E2-02-10-2019.pdf>

<sup>16</sup> Febeliec already made comments on the missing of this category in the past, as this entails a severe underestimation of existing capacity in Belgium. Already only the Febeliec members have literally hundreds of MWs of diesel generators currently installed in Belgium. By not taking these volumes into account, Elia unduly overestimates any possible adequacy concern in Belgium.

|  |  |
|--|--|
|  | and thus unduly negatively affecting Belgian system adequacy as determined by Elia in this analysis. |
|--|--|

**ANSWER:**

ELIA agrees on the importance of taking all categories into account. Elia would therefore like to clarify the points raised by Febeliec. First, ELIA adapted the naming of the category of “Market Response” to be in line with ERAA terminology, in which it is called ‘Demand Side Response’. Both are in reality covering the same things for the starting point as the historical capacity of ‘Demand Side Response’ is based on the ‘Market Response’ estimation made on a yearly basis by E-CUBE in the framework of the strategic reserve volume evaluation.

Then, on the specific categories, ELIA would like to remind the following points:

- Shedding and shifting capacities are considered under ‘Demand Side Response’, with an evolution based on E-CUBE study for the historical and short term trend and on Energy Pact ambitions;
- Storage and batteries are modelled separately although a part could already be double counted in the ‘Market Response’ volume. Given the limited amount of storage in the form of batteries, double counting should be limited;
- Small-scale generation (including diesels generators) are considered under the category non-CIPU other non-RES generation. Elia insists that diesel generators are not forgotten and are accounting for more than one hundred of MWs (based on the PISA database that is reported by the DSOs to Elia). Similarly to the storage, a part could be double counted in the initial ‘Market Response’ volume;
- On the emergency generators, those can be considered as out-of-market and not contributing to adequacy. Indeed, the owners usually do not seek any market revenues for those emergency generators. Moreover, emergency generators such as the ones installed in hospitals are meant to supply the hospitals in case of problems on the electrical grid. They will therefore not be used in times of (near)scarcity for adequacy concerns but rather kept for the hospital itself in case those adequacy concerns lead to a problem on the electrical grid.

**DEMAND RESPONSE GROWTH RATE AND VOLUMES**

| <b>STAKEHOLDER</b>                         | <b>FEEDBACK RECEIVED</b>  |
|--|---|
| Greenpeace & Inter-Environnement-Wal-lonie | The scenario is not ambitious enough on Demand-side Response. In the context of the Clean Energy Package, the market of DSR is broadened to all categories of consumers. Combined with a roll-out of smart metres, this could significantly increase the potential of DSR.  |
| FEBEG                                      | FEBEG observes very optimistic assumptions on the evolution of batteries and market re-sponse capacity. FEBEG understands that these assumptions are based on expressed political ambitions that are translated in the PNEC. However, at this stage, there are no guarantees that these ambitions will materialize, in particular in absence of a regulatory and/or economic framework to stimulate the development of these capacities.[...] Therefore, the considered assumptions related to storage and market response should be re-viewed: only the capacity that would be developed based on existing market conditions should be used as input in the modelling. With regards to the demand response, FEBEG recommends applying a 2% yearly increase for the base-case scenario. |

|                         |   |
|-------------------------|---|
| <p>FEBELIEC</p>         | <p>Moreover, Febeliec still regrets, as already discussed numerous times, that Elia has yet again opted to take a yearly annual increase of demand side response of only 7%, whereas the last year according to the update of a study commissioned by Elia from E-Cube shows an increase of over 20%. The increase taken into account by Elia does according to Febeliec not take into account a.o. the impact of the roll-out of smart meters or new tariff schemes as it is only looking at historical trend lines. Febeliec thus urges Elia to include at least an additional sensitivity with a higher growth rate of market response, in order to be able to assess the sensitivity of the outcome based on this input parameter and to ensure that the methodology follows the guidance given by the ERAA methodology.</p> <p>Moreover, and yet again as already stated on numerous occasions before, Febeliec would like to point out that volumes available for market/demand response are essentially determined by the (expected) occurrence of peak prices, as most of these volumes are only triggered by high prices (typically above 450-500 €/MWh). Historic figures are thus definitively not the only reliable indication of available volumes of market response, unless they are clearly linked to the effective occurrence of peak prices.</p> <p>Last but not least and in line with the comment made on storage, Febeliec is appalled that post 2030, Elia suddenly sees no increase whatsoever in Demand Side Response anymore. Even though, as for storage, it could be argued by some that such estimates far out in the future might be less relevant in any case, according to Febeliec the data set provided by Elia clearly the intrinsic flaws of the approach based on the Belgian NECP currently applied by Elia.</p> |
| <p>ENGIE Electrabel</p> | <p>Demand Side Response</p> <ul style="list-style-type: none"> <li>• Shedding capacity: Electrabel considers that applying a yearly increase of 5% for the coming years is too ambitious for the base-case scenario. While Electrabel is convinced about the role that Demand Side Response will play in the market in the coming years, we estimate that the strong increase observed in the last few years (cf. E-cube study) may not necessarily continue to materialize in the following decade – pending the full roll-out of the smart meters - as the additional DSM potential for certain types of grid users will be limited. In addition, Electrabel would like to remind that the methodology applied by E-Cube cannot ensure that the identified potential corresponds to market response only (e.g. at 150 €/MWh or more blocks could also be linked to super peakers like turbo jets or possibly OCGTs under some circumstances). In addition, the volume expected in terms of market response are highly different from ENTSO-E assumptions in their Mid-Term Adequacy Forecasts.</li> </ul> <p>Given its experience in the CWE market, Electrabel doubts that this potential would become effective, without additional support, at the 2025-30 horizon. In comparison, in France where a capacity market is in place, Electrabel observes that “only” 3 GW of DSR have been certified, in a market where the load is much more thermo-sensitive.</p> <ul style="list-style-type: none"> <li>• Shifting capacity: Electrabel considers that the figures presented are also very ambitious and would like more insight about the evolution proposed in the framework of this consultation.</li> </ul>  |
| <p>CREG</p>             | <p>47. De CREG meent eveneens dat de impact van de versnelde uitrol van digitale meters moet meegerekend worden. Elia vertoont heel wat ambitie om de consument centraal te stellen en om de flexibiliteit op lagere spanningsniveaus, onder meer van elektrische wagens, tot de</p>  |



|  |  |
|--|--|
|  | markt te laten toetreden. Dit moet consequent doorgerekend worden in de assumpties bij het analyseren van de bevoorradingszekerheid. |
|--|--|

**ANSWER:**

ELIA takes note of the different visions on the demand response growth rate in Belgium. ELIA would like to recall the following elements regarding this subject.

First, the 2030 ambitions proposed for demand-side response are in line with the Energy Pact which is the latest official information known in that respect as ELIA is always looking for the most up-to-date data. Then, the demand response growth rate applied for the shedding capacity for the short-term period in this Adequacy and Flexibility study is based on the E-CUBE 2020 market response quantification and is the one that has been agreed in the framework of the last Strategic Reserve study for winter 2021-2022, even though we recall the divergent opinions that were expressed.

Regarding the shifting capacity, ELIA refers to the Energy Pact on which the growth rate applied is based. Hence again, no other official ambitions have been communicated.

Next to the reference scenario, additional demand side response capacity can be invested in with the Economic Viability Assessment loop. In case such investments appear to be economically viable, additional volumes could hence be added.

In view of the many comments received and with the uncertainty regarding volumes, sensitivities will also be performed (see section 7 of this report – sensitivity on DSM and storage)

For the difference with the ENSTO-E MAF study, the scope is indeed different. In this Adequacy & Flexibility study, the demand side response includes all types of demand responses for Belgium, including the ones participating to the ancillary services today. In the ENSTO-E MAF study, only the market ones are considered, the MAF study does not include a flexibility assessment.

With regards to the roll out of smart meters and other initiatives on ‘Consumer centricity’ such as ‘vehicle-to-grid’, those were part of the measures set in the ‘Energy Pact’ to achieve the ambition regarding the demand response. The demand response and storage volumes assumed for future years are in-line with the ambition set in the ‘Energy Pact’ which were confirmed by the authorities as the latest ambition on the matter as to date no other better information are available. In addition, it worth highlighting the fact that Belgium is a by far one of the countries with most demand response when compared to peak load in Europe.

**SENSITIVITY**

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| FEBELIEC    | On demand side response and as argued above, Febeliec insists that Elia includes a sensitivity with a higher growth path than the currently applied 7% year-on-year, a.o. in light of the acceleration of the roll-out of smart meters, tariff incentives and other market design changes in the next few years. Febeliec is greatly convinced that a paradigm shift will occur in the near future, with ever more demand becoming price sensitive, thus greatly increasing the price elasticity of the demand curve. Febeliec has understood that Elia also sees such future, with numerous projects aimed exactly at such evolution and would it thus find very strange that no impact were to be considered by Elia . |

|       |  |
|-------|--|
| FEBEG | With regards to the demand response, FEBEG recommends applying the 5% yearly increase compared to 2019-figures for the sensitivity (and 2% for base case scenario) |
|-------|--|

**ANSWER:**

ELIA takes note that on the one hand FEBEG and ENGIE Electrabel believe the DSR evolution is too ambitious (cf. pending rollout of smart meters), while on the other hand, CREG, FEBELIEC and Greenpeace & Inter-Environnement Wallonie see it as not ambitious enough (cf. recent positive trend).

ELIA understands the reservations of both sides and therefore is hence still in favor to take 7% into account. On the one hand taking into account the opinion of the different stakeholders and considering the various efforts on smart meter roll-out, the Internet Of Energy as well as the Transfer Of Energy projects, it is believed that a growing trend will continue. On the other hand, ELIA acknowledges that despite an expected positive trend, it remains uncertain how and when this trend will unfold.

As for the Market Response volume, the methodology has been enhanced to capture block bids as well as the addition of a new NEMO (i.e. Nordpoolspot) in order to reflect the current reality and the bidding behavior of the market players. This addition contributed to a significant increase of the Market Response volume in this year’s assessment, while it cannot be accounted for that a similar, extraordinary increase could be repeated year on year.

ELIA takes note of the proposed sensitivities with a higher and lower growth rate than 7%.

**ALIGNMENT CoNE/VoLL/LoLE**

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| CREG        | <p>48. Indien het betrouwbaarheids criterium van 3 uur gebruikt wordt en dat gebaseerd is op een waarde van de verloren belasting van meer dan 23 000 €/MWh, zoals destijds berekend door het Federaal Planbureau, meent de CREG dat het volume van vrijwillig afschakelbare capaciteit in overeenstemming moet gebracht worden met de hypothesen van deze studie.</p> <p>49. Het Planbureau bevestigde in een rapport uit 2017 dat de 3u toch een goede norm was voor België, gezien een CoNE van 65.000 €/MW. Ze baseerde zich daarvoor op de eigen inschatting van de VoLL, waarbij enkel de VoLL werd beschouwd van de prijsinelastische consumenten, gedefinieerd door het Planbureau als de consumenten die een VoLL hebben die hoger is dan 15.000 €/MWh. Deze prijsinelastische VoLL is gemiddeld 23.300 €/MWh, wat inderdaad leidt tot een LoLE-norm van ongeveer 3 uur. Het is echter belangrijk om aan te geven dat de prijsinelastische VoLL enkel slaat op 11 procent van de consumenten (dat is het elektriciteitsaandeel naar volume van consumenten die volgens de auteur van de studie van het Planbureau een VoLL hebben die hoger is dan 15.000 €/MWh). De auteur van de studie van het Planbureau beschouwt in deze berekening dat de 89 procent andere consumenten prijselastisch zijn, wat betekent dat ze hun consumptie zullen stopzetten indien de elektriciteitsprijs hoger uitkomt dan hun VoLL. Dit heeft tot gevolg dat indien België deze prijsinelastisch VoLL zou hanteren om de LoLE-norm te berekenen, dit ook consequent moet doorgetrokken worden en</p> |

|  |   |
|--|---|
|  | <p>89 procent van de consumptie als prijselastisch (en dus als vraagbeheer) moet beschouwd worden. Momenteel beschouwt Elia ongeveer 10 procent van de consumenten als vraagbeheer (naar volume).</p> <p>50. Artikel 7(2)(a) van de methodologie om de betrouwbaarheidsnorm te bepalen die ACER op 2 oktober 2020 gepubliceerd heeft stelt het volgende: “The calculation of the single VOLL for RS shall exclude the following consumers: (a) price-responsive consumers, for the proportion of their offtake which is price-responsive (provided sufficiently detailed data is available); and (b)(...)”. Hieruit blijkt dat het uitsluiten uit de VoLL-berekening van het volume waarvoor consumenten reageren op de elektriciteitsprijs (prijselastische consumenten) een verplichting is. Dit prijselastische volume moet in de A&amp;F studie toegevoegd worden als vraagbeheer (‘DSR’). Dit is een verplichting die volgt uit artikel 4.3(d) van de ERAA methodologie die ACER op 2 oktober 2020 gepubliceerd heeft (“Methodology for the European resource adequacy assessment”): “The proportion of each consumer’s demand which is price-responsive, and which is excluded from calculating the single VOLL for RS pursuant to Article 7(2)(a) of the VOLL methodology, shall be included as DSR in the ERAA.”.</p> |
|--|---|

**ANSWER:**

The current reliability standard for Belgium is set in the Electricity Act and as also referred previously in this report, is the one that will be used for calculating the different adequacy indicators for Belgium.

It is worth noticing that the reliability standard set in the Electricity Act has not yet been determined following the recently adopted texts setting the methodology to calculate it. As a consequence, there are currently no VoLL, CONE nor an RS standard known adopted and following the methodologies approved on 2<sup>nd</sup> October 2020 and it would be premature to at this stage conclude on any of the building blocks leading to their determination or take partial assumptions.

### 5.3 Flexibility characteristics

| STAKEHOLDER      | FEEDBACK RECEIVED   |
|------------------|---|
| ENGIE Electrabel | Regarding “Minimum Down Time” for new and recent CCTG’s, for “Hot Start up time”, of respectively 0.5 hour and 1 hour seems very optimistic and should reasonably be set at 1 hour and 1.5 hour.  |
| BOP              | Flexibility assumptions of offshore technologies. The following assumption on flexibility are proposed by Elia : <ul style="list-style-type: none"> <li>- Ramp rate (minimum power variation in a time period) : 100% Pmax/min</li> <li>- Upward flexibility: none</li> <li>- Downward flexibility (maximum share of the installed capacity which can participate, without accounting other constraints e.g. ramp rate):                             <ul style="list-style-type: none"> <li>o Ramping flexibility: none;</li> <li>o Fast flexibility: 65% Pnom</li> </ul> </li> <li>- Slow flexibility: 65% Pnom</li> </ul> |

|          |   |
|----------|---|
|          | <p>As offshore wind parks are able to adapt their production downwards in a matter of minutes, these flexibility assumptions for offshore technologies are set rather low. In our opinion offshore wind parks can contribute to ramping flexibility too. Please revisit these assumptions. BOP is willing to further discuss these assumptions with its experts.</p>  |
| FEBELIEC | <p>On sheet 3.4 on flexibility characteristics, Febeliec regrets that due to the very limited time allowed for this consultation, it is difficult to thoroughly validate the provided data. However, Febeliec will provide some non-exhaustive and preliminary observations and remarks. Febeliec is surprised to see that for nuclear, no data is provided on flexibility, although it is known that the Belgian nuclear plants have increased in recent years their possibility for modulation. Febeliec would expect this to be taken into account (a.o. also related to a sensitivity on nuclear extension). Moreover and as already stated before, Febeliec regrets that CHP is only to be considered existing/old CHP with flexibility similar to that of old CCGTs, whereas no new CHPs are considered with potentially improvements in the flexibility characteristics of such units. For demand response, Febeliec wonders why only a CAT-4H is mentioned and not the other categories; does Elia consider all other categories of demand response not to provide any flexibility? On interconnectors, Febeliec refers to the comments made elsewhere in this document</p> |

**ANSWER:**

ELIA thanks ENGIE for the specifications on the minimum down time and hot start up time of recent CCGTs and will adapt the assumption accordingly.

ELIA explains that it did not account 100% of the nominated offshore wind power for providing slow and fast flexibility as it needs to take into account forecast error. Indeed, if a certain level of output is predicted in day-ahead, this capacity will not always be fully available in real-time following intra-day forecast updates and real-time forecast errors. The level of 65% for offshore and 88% for onshore is confirmed when analyzing the day-ahead forecast error (the capacity that is considered to be available real-time at least 99.0% of the time following a certain predicted capacity).

ELIA recognizes the ability of wind power to quickly adapt its output and agrees that not taking into account this ability in the assumptions for ramping flexibility could be considered as conservative. Nevertheless, besides the theoretic potential, there is lack of practical evidence as these wind power plants are still not participating in aFRR, although the product is fully open to all technologies as from October 2020. Elia gratefully accepted the invitation of BOP to discuss the assumptions and received further technical information which allows to improve its assumptions on the ability of offshore wind power to provide ramping flexibility:

- Elia understands from BOP that *“most offshore wind turbines and power plant controllers are capable to respond in this timeframe, when suitably automated for this purpose. However, the respond time of some of the first offshore wind parks is limited due to communication hardware and power park control limitations”*.
- BOP further specifies that *“for the current fleet of offshore wind parks, accounting for 2262 MW capacity, it is evaluated that it should be feasible to offer for about 400 MW of downward ramping flexibility within a response time of about 5 minutes, provided that the required communication signals and automated procedures are put in place (which is today not yet always the case). For the new developments in the Princess Elisabeth zone accounting for an estimated 2100 MW, it is reasonable to assume that 525 MW or 25% of the capacity could be made available for downward ramping flexibility”*.

Elia will therefore consider this capacity of 400 MW, as well as an additional 525 MW as from the decommissioning of the 2<sup>nd</sup> wave of offshore wind power, when assessing the available means for downward ramping flexibility. Elia will take into account the same constraints as with fast and slow flexibility, i.e. that the available ramping flexibility cannot exceed 65% of the nominated wind power.

On nuclear flexibility, ELIA refers to the explanations given in Section 2.8.3 in the previous adequacy and flexibility study in 2019. ELIA recognizes that nuclear units can provide downward flexibility, yet this is subject to several technical limitations e.g. only some units are flexible, and the flexibility is limited to some extent (in power, duration and frequency) and depends on the position in the fuel cycle. This makes it very difficult to take the flexibility of nuclear units into account in the analyses. However, one can indeed assume that when assessing the results of the flexibility means it is not unlikely that additional downward flexibility can be provided by the nuclear units. ELIA will elaborate this disclaimer in the study.

On FEBELIEC's comment concerning the flexibility of CHP units, ELIA already takes into account two types of individually modelled CHP units. These two categories are complemented by a third category containing the aggregated decentralized CHP units represented by means of a 'profiled' output (similar to wind and solar power). This level of detail was achieved thanks to the inputs provided by COGEN during the public consultation of the previous consultation of the adequacy and flexibility study in 2019. ELIA refers to its answer given in Section 2.9.3 of the corresponding consultation report:

*"ELIA recognizes that modelling CHP by means of generic categories is inevitable as each CHP has a specific underlying application affecting its schedule and dispatch. It does not exclude to further increase level of detail towards future versions of the study. At this point, information is not available to increase the level of detail in the modelling."*

At this point, ELIA does not possess better information to increase the level of detail. Yet, if ELIA receives new inputs from the market, for this or the next study, it will consider making also the distinction between 'existing' and 'new' CHP units.

On the comment concerning the flexibility characteristics of demand response, ELIA wants to clarify that the CAT 4H name of the category is misleading and should be corrected as it aggregates and contains all demand response : ELIA also refers to the explanations given in Section 2.9.3 of the consultation report on the adequacy and flexibility study in 2019:

*"After further analysis, it is also concluded by ELIA that the split in categories is less relevant for the flexibility study as most market response is delivered through aggregation (allowing certain flexibility to allocate flexibility to the product of choice). This simplification is implemented (but the categories are kept in the adequacy study). This results in a total share of around 40% of installed market response which can participate in fast flexibility. Furthermore, ELIA increases its assumption on share which can deliver ramping flexibility of 10% of installed market response."*

On the comment concerning the flexibility characteristics of interconnections, ELIA also refers to its answer given in Section 6.3.3.

## 5.4 Economic and technical variables

### 5.4.1 Fuel and CO2 prices

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | On sheet 3.1 on fuel and CO2 prices, Febeliec insists that Elia conducts a thorough sensitivity analyses on these parameters, as they can have an enormous impact on the outcome. Febeliec takes note that Elia takes into account the data from the World Energy Outlook 2020 (WEO2020) but asks that Elia at least performs an assessment on the data from the WEO2020 in order to ensure that these figures, as they are greatly influential for the analysis, duly take into account the latest possible information and trends, not in the least related to the Covid-19 sanitary crisis, not only on demand (as mentioned before) but also on oil, gas, coal, CO2 prices, which have all fallen to consistently lower levels, and their impact (the IEA has in its Global Energy Review 2020 already highlighted some of the impacts of the covid-19 crisis on global energy demand CO2 emissions, which clearly shows the extreme impact, far beyond the scope of a.o. the 2008 financial crisis). |

#### SENSITIVITY

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| FEBELIEC    | Febeliec also asks, as also mentioned above, to include some sensitivities on fuel and CO2 prices, as these could have a very high impact. |

#### **ANSWER:**

ELIA thanks FEBELIEC for the feedback on fuel and CO<sub>2</sub> prices. Estimating the possible evolution of those prices is indeed a difficult exercise for which the World Energy Outlook 2020 from IEA is considered as a reliable source, given that it is used by many studies and institutions.

Elia would also like to remind that the WEO 2020 was published in October 2020 (after the public report mentioned by FEBELIEC in their answer), taking into account the COVID-19 crisis and already integrating its effects in that report. For further information, we refer to the report by the IEA where some analysis and sections are dealing with the possible impact of the COVID-19. Next to the reference scenario, ELIA welcomes the proposal of FEBELIEC for sensitivities with other CO<sub>2</sub> and fuel prices. ELIA will check whether there are other public sources for fuel and CO<sub>2</sub> prices and will include them in the final report as a benchmark. In addition, as always performed in previous adequacy (&flexibility) studies, ELIA will use a higher CO<sub>2</sub> price as sensitivity, usually based on the highest CO<sub>2</sub> price from the WEO scenarios.

### 5.4.2 Investments costs

#### DEMAND RESPONSE

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| FEBELIEC    | On sheet 3.2 on investment costs, due to lack of time allowed by the consultation period, Febeliec cannot at this point provide an in-depth review of all assumptions made by Elia in this table. However, Febeliec would like to raise following preliminary comments and questions regarding to the provided data. On new demand response, Febeliec is surprised to see that FOM costs are |

|  |   |
|--|---|
|  | <p>according to Elia quadrupling when volumes increase. While Febeliec could have certain understanding for a modelling approach where one assumes that after the low hanging fruit has been activated as demand response costs could increase, Febeliec cannot follow an approach where it is assumed that the FOM costs explode to the levels provided by Elia, without a very clear understanding why this would be the case. Febeliec in this context explicitly refers a.o. to the roll-out of smart meters, which should enable a much larger share of Belgian demand to provide its flexibility without significant additional costs for those consumers (as the costs of the obligatory roll-out of smart meters is covered through other mechanisms and as such does not constitute any additional costs for consumers to use their flexibility). Febeliec strongly urges Elia to revise this section or provide much more transparency on its reasoning (the only references are made to French examples, which are not directly transposable to Belgium in any case because of too many inherent system differences, a.o. especially in low voltage grid tariffication).</p> |
|--|---|

**ANSWER:**

The proposed values for investment costs for demand response are based on several sources from the French market where such data are available. Two main different sources have been found and used. The first one is from the *Agence de l'Environnement et de la Maitrise de l'Energie*, a French public institution providing expertise in areas of the environment, energy and sustainable development. The second document ELIA refers to is a document that the *Commission de Régulation de l'Energie*, the French administrative authority for the regulation for gas and electricity has put on her website based on a document made by the French TSO (RTE) for the French capacity mechanism. Despite those sources being French, they are considered reliable and relevant.

If one would transpose the values to the Belgian context (by taking into account the fact that France has a peak demand 6 to 7 times higher than in Belgium), this would lead even to lower values in terms of capacity blocks assumed (here we assumed blocks of 500 MW with a given fixed cost). Therefore, the cost evolution proposed here for demand response can be seen as optimistic, as the investment costs for the same capacity volume would be higher than the one proposed here for this study.

In the meantime, we also found another source/study made by FTI for the Polish market 'Assessment of the impact of the Polish capacity mechanism on electricity market'<sup>17</sup> where a similar approach was used by steps of around 800 MW with several price steps. This confirms that the proposed approach for DSR based on yearly fixed costs is common practice and that such costs estimations are not available for Belgium.

**CCGT/OCGT**

| STAKEHOLDER      | FEEDBACK RECEIVED  |
|------------------|--|
| FEBEG            | In FEBEG's opinion, the figures used for the economic assumptions of capex (€/kW) for new CCGTs and OCGTs are not in line with recent evolutions on the market (in particular regarding H/HL class CCGT and OCGT). |
| ENGIE Electrabel | <u>New capacity - CCGT:</u>  |

<sup>17</sup> <https://euagenda.eu/upload/publications/untitled-108365-ea.pdf>

|  |   |
|--|---|
|  | <p>First, we understand that Elia refers here to the total capex (of which the EPC cost represents a significant part). Electrabel does not agree with the proposed total capex level as these do not take into account the recent technology developments (HL-class CCGT). The below analysis is an update of the Gas Turbine Handbook for the year 2020 for the EPC costs, which is – in our opinion – the latest public information on the topic. However, it is important to mention that this source does not yet consider the next generation HL-class CCGT plants that are in development phase and will be the reference for the coming years, for which even lower EUR/kW costs can be achieved due to their greater scale and efficiency. Electrabel refers here to an example of the next-generation HL-class CCGT plant recently announced by Edison in Presenzano, Italy, while the investment required for this plant is significant, amounting to EUR 370 million (EPC cost only).</p> <p>Therefore, taking into account these important evolutions, we recommend Elia to use, at the minimum, the GTH updated values for 2020 and integrate an error margin of minimum -15% to the reference data to capture the evolutions in the market.</p> <p><u>New capacity – OCGT:</u></p> <p>The broad range of OCGTs makes it very complex to provide average capex levels. In the case of OCGTs, the scale effect also plays an important role.</p> |
|--|---|

**ANSWER:**

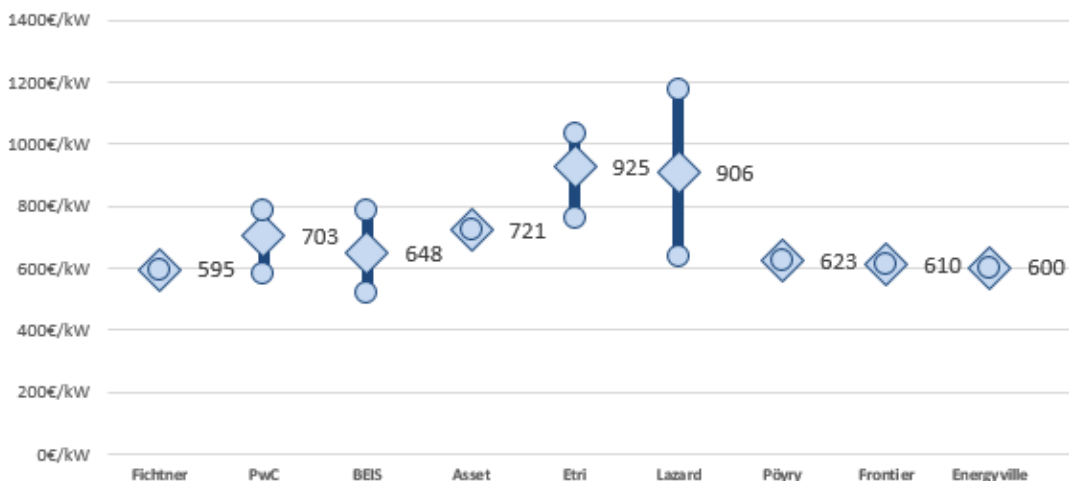
ELIA thanks FEBEG and ENGIE Electrabel for their comments on the proposed CAPEX for CCGT units.

Following feedback received during the previous year, ELIA has already decreased the CAPEX for large CCGTs from 750 eur/kW to 600 eur/kW by splitting the CAPEX for different size categories. It results that large CCGTs, given technology evolutions and costs, tend to have lower costs per kW than smaller scale ones. The CAPEX estimates are to be understood as including all costs that need to be spent to build a certain unit and not only the EPC ones. In addition, ELIA has looked into several sources to provide those estimates (including a recent report by EnergyVille<sup>18</sup> that ENGIE commissioned where 600 eur/kW was used for new CCGTs). It results that for the CCGT, 600 EUR/kW seems to be a value that is in –line with (or sometimes even below) the different studies and sources found.

---

<sup>18</sup> <https://www.energyville.be/en/news-events/energyville-introduces-additional-energy-system-scenarios-electricity-provision-belgium>





The sources included in the chart above were provided with the Excel file submitted to public consultation.

**RES**

| STAKEHOLDER               | FEEDBACK RECEIVED   |
|---------------------------|---|
| Belgian Offshore Platform | Could Elia explain in what part of the study the investment assumption for RES are used? In our understanding, assumptions on renewable capacity (including offshore wind) are policy driven. Is the economic viability also checked for RES?<br>BOP expects a further decrease of the Capex and FOM by 2030, and is willing to discuss this with Elia if required.   |
| FEBELIEC                  | Febeliec is also surprised that Elia provides data for a new unit in Coo, yet does not include any increase in pumped hydro storage whatsoever (not related to a new unit nor to an extension of the storage reservoir for existing units). On RES, Febeliec is surprised to see that Elia estimates CAPEX costs for new offshore wind to be/remain very high, as is the same for PV and onshore wind, whereas Febeliec has understood from numerous studies from many sources that those costs are expected/predicted to go down considerably. As a result, Febeliec would expect that these cost curve effects over time are taken into account by Elia, which does not at all seem to be the case (the same comment is valid in general for all technologies on this sheet, but in particular to RES and also presumably storage). Febeliec insists that Elia provides clarity on this aspect. |

**ANSWER:**

Regarding Belgian Offshore Platform’s question, ELIA would like to clarify that no economic viability assessment is performed on renewable capacity unless there are no subsidies or no support schemes known or in place, or if those are to be phased out. More specifically, for offshore wind, those capacities would not be considered in the EVA but will be set by the scenario assumptions and sensitivities.

Concerning the decrease of CAPEX and/or FOM costs, ELIA reminds that the same prices will be used for all target years of the study. Therefore, a compromise for the whole time horizon has to be found. The value for FOM and CAPEX

for RES are based on the Energy Ville study<sup>19</sup> which provided costs for 2020 and 2030 for Belgium. Those could be seen as optimistic when comparing them with other sources such as IRENA<sup>20</sup> where the total costs for installing wind onshore in Europe in 2019 amounted 1800 €/kW (proposed value for this study 1000 €/kW), PV around 1600 €/kW (proposed value for this study: 600 €/kW) and 3900 €/kW for Belgium (proposed value for this study 2300 €/kW). Similar values are obtained when looking at latest WindEurope<sup>21</sup> figures for wind onshore or offshore.

### 5.4.3 Outages

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| CREG        | <p>55. Elia stelt voor om een gemiddelde forced-outage factor per technologie te gebruiken.</p> <p>56. De CREG meent dat het in rekening brengen van ongeplande pannes dient verfijnd te worden.</p> <p>57. Vooreerst zou er rekening kunnen gehouden worden met de individuele karakteristieken van de eenheden (zoals leeftijd, historische FO-rates, etc). Gezien bevoorradingszekerheidsproblemen zich meestal in de winterperiode voordoen, zou mogelijks het gebruik van een winter- en zomer FO-rate nuttig kunnen zijn. Verder meent de CREG dat er een analyse zou moeten gebeuren van het effect van de elektriciteitsprijzen op de FO-rate. Het lijkt de CREG immers waarschijnlijk dat bij een dreigend elektriciteitstekort, en bijgevolg hogere prijzen op de elektriciteitsmarkt, de marktactoren meer preventieve maatregelen zullen nemen om een forced outage te voorkomen. Dit effect wordt nog versterkt doordat er geen prijsplafonds mogelijk zijn op de groot-handelsmarkt van elektriciteit, waardoor prijzen van 10.000 €/MWh op de day ahead markt mogelijk worden en de economische prikkel om ongeplande pannes tijdens periodes van (bijna)schaarste te vermijden veel sterker wordt.</p> <p>58. Ten slotte moet er meer transparantie komen over de impact van de FO-rate op de bevoorradingszekerheid. Eigen eenvoudige simulaties door de CREG wijzen er immers op dat de simulaties van de bevoorradingszekerheid sterk beïnvloed worden door de modellering en de assumpties rond ongeplande pannes, terwijl Elia hierover weinig transparantie geeft.</p> |
| FEBELIEC    | <p>On sheet 3.3 on (forced) outage rates, Febeliec remains surprised of the very high values for some categories (e.g. CCGT, GT, Classical). Especially with the closure of assets over time, most of them presumably the oldest assets in their respective categories, it seems strange that by removing those older assets, which are presumably also more prone to outages due to aging of the asset, the forced outage rate remains high (and higher than those applied in the past). As also already voiced during the Task Force iSR of 31/08/2020 and the consultation on the Strategic Reserve, Febeliec yet again strongly urges Elia to reconsider its current approach with a statistical quantification on historical data per category, as this approach could lead to ever increasing deviations towards the future, especially if in some categories in the future large volumes of newbuilt capacity were to be added. Febeliec suggest for example an approach where</p>  |

<sup>19</sup> [https://www.energyville.be/sites/energyville/files/downloads/2020/20200918\\_fullpresentation\\_0.pdf](https://www.energyville.be/sites/energyville/files/downloads/2020/20200918_fullpresentation_0.pdf)

<sup>20</sup> <https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019>

<sup>21</sup> <https://windeurope.org/wp-content/uploads/files/about-wind/reports/Financing-and-Investment-Trends-2019.pdf>

|  |  |
|--|--|
|  | <p>the historical data is filtered for those units that Elia deems to remain in the system, thus excluding the outages of units that have been or will be closed in the timeframe of the current analysis, as the outage rates of those units presumably is less relevant for the analysis. Alternatively, but more complex, the outage rate of the remaining and new units could be taken into account with the application for each year of an aging factor on their outage rates (which could lead to higher outages for those units in the future compared to their outage rate in the past), which Febeliec thinks could really provide additional information over the decade long scope of this analysis. In any case, Febeliec would for example like to get a better understanding on how the availability of nuclear plants is calculated, as with the expected closure agenda of these units (a limited set of discrete plants) and the (very) different performances of individual units, as well as the major impact of the difference between outages because of technical incidents or long term investment programs coming to an end and no longer negatively impacting future availability (but presumably impacting them positively), more precise and elaborated analyses and related transparency seem required. On the impact of planned outages, Febeliec would like to get a more thorough analysis of the way Elia will calculate this for years beyond the timeframe of REMIT, as the methodology presented by ENTSO-E remains a blackbox, with however potentially significant impact for Belgium.</p> |
| <p>Greenpeace &amp; Inter-Environnement-Wallonie</p> | <p>The definitions of “planned” vs “forced” outages are particularly confusing for nuclear power plants. When the operator decides to halt the reactor and do safety checks, such as in the case of the cracks in Doel 3 and Tihange 2, it can be defined as planned, whereas the reactor is not available for adequacy.</p>   |

**ANSWER:**

ELIA takes note of the feedbacks from CREG and FEBELIEC on the methodology and would like to remind several points which can have an impact on the statistical representation of the data.

First, the amount of units in the Belgian system for some categories is very limited. Hence the need to take 10 years of observations and to keep the units by category. Even though the Forced Outage rates can be influenced by ‘exceptional’ events or long lasting outages on a unit, further splitting the different categories only worsens this aspect.

Secondly, only a few new gas units have been commissioned over the last decade. Concerning decommissioning, only one 1 CCGT can be counted hence the argument stating that a large amount of units are removed from the dataset with the ‘rolling horizon’ is not valid – it actually means that the fact that 10 years are taken could be seen as optimistic according to FEBELIEC’s reasoning as 10 years ago existing units where younger (if the age would have an impact on the forced outages).

Nevertheless ELIA believes that relying on historic data aggregated per category is a more sound and robust approach. On the forced outage rate evolution over the lifetime of a unit, an interesting analysis from the CREG <sup>22</sup> (point 22, page 18/112) states that: *“For CCGT units, decreased availability can be observed for older units, mainly linked to planned unavailabilities. No increased forced outage rate can clearly be detected for CCGTs”*.

---

<sup>22</sup><https://www.creg.be/sites/default/files/assets/Publications/Studies/F1958EN.pdf>

This analysis made by the CREG seems to confirm that the age of the unit has little impact on the forced outage observed over the past year.

Furthermore, ELIA would like to mention that the categories per technology type used to calculate the forced outage rate are also used to calculate the amount of forced outage per year. The latter is also used in the methodology to determine the FRR needs in ELIA’s LFC block, approved by CREG in ELIA’s LFC block operational agreement<sup>23</sup>.

As for the comment on the price and its effect on the forced outage, ELIA does not understand how high prices would change the forced outage probability of a certain unit. First, by definition a ‘forced’ outage is not something one can predict or which is driven by prices. It is not possible to completely avoid any forced outage, the risk is always present. Secondly, arguing that planning preventive interventions just before the scarcity period will avoid any forced outages is not being precautionous as any intervention includes a risk of misintervention, that can, o. a. lead to unplanned outage that day or shortly after the intervention. Such risk is inherent to any intervention and when prices are high, no market player is willing to take those avoidable risks.

Concerning the question regarding how those are taken into account, the ANTARES model has a built-in thermal timeseries generator relying on a Markov chain. The forced outage rate is an input to this Markov chain that draws the availability timeseries.

ELIA would also like to remind that no planned outages are considered during winter in the simulations for Belgium for the whole timehorizon (besides those already known from REMIT for the first 2 simulated years). This can be seen as optimistic because some planned outages could still happen during that period. In the other hand, ELIA strives therefore that market players avoid planned outages during winter by every year asking each ARP to submit a proposed maintenance schedule. If a risk is identified, ELIA will ask to modify those.

Concerning outage on nuclear units, forced outages are calculated excluding any ‘exceptional’ event or planned maintenance such as decisions from the AFCN/FANC to close (temporarily) a unit due to inspections (e.g. cracks), sabotage, long term overhauls, planned outages, refueling... The planned outages (and ‘exceptional’ events) are taken into account by analyzing historical nuclear availability profiles and assessing the availability of the fleet during winter. Particular attention for nuclear should be paid to the fact that common failures are not to be excluded when taking into account ‘exceptional’ events. Indeed, the discovery of a suspected anomaly in one reactor can lead to the same discovery in the other ones given that those are built with similar technologies.

## 5.5 Flow-based domains

### CROSS-BORDER ASSUMPTIONS & FLOW-BASED

| STAKEHOLDER | FEEDBACK RECEIVED |
|-------------|-------------------|
|-------------|-------------------|

---

<sup>23</sup> <https://www.elia.be/en/electricity-market-and-system/system-services/keeping-the-balance>

|                         |  |
|-------------------------|--|
| <p>FEBELIEC</p>         | <p>On sheet 4.1 on flow-based domains, Febeliec wonders what will be the external constraint for Belgium in 2021 and would like to see which, if any, is the impact of a.o. the entry into service of ALEGRO and the HTLS upgrades on the Elia backbone on the flow-based domain as well as the external constraint. Moreover, Febeliec would also like to get an assessment by Elia of the impact of the switch from standard hybrid coupling to advanced hybrid coupling. The same applies to use of PSTs in capacity calculations. While Febeliec welcomes the fact that Elia will apply half the PST positions for the capacity calculation, it wonders why this is limited to only half and not extended any further as well as why this remains limited to one third for all other countries. Furthermore, as the study looks 10 years ahead, Febeliec wonders how potential projects proposed in the Elia TYNDP (Nautilus, Alegro II) are taken into account (making even abstraction of all other announced and reflected upon interconnectors within the interconnected grid that are or will be realised in the next decade). The same applies to all the enormous further grid improvement and extension projects Elia has planned on its backbone grid as well as the underlying grids in the next decade.</p> <p>Febeliec would also like to get a better understanding on what will be the impact of the extension of flow-based market coupling to the entire CORE region and the impact hereof on Belgium.</p> |
| <p>FEBELIEC</p>         | <p>Febeliec also wonders how Elia will tackle future interconnectors and other grid investments and their impact on cross-border exchanges, in Belgium (e.g. Ventilus, Boucle de Hainaut, Nautilus, Alegro 2, ...) but also in other countries (new interconnectors, phase shifters, grid reinforcements, ...). Febeliec also wants to add that it wonders how Elia will take into account all the other (software as compared to hardware) changes in the interconnected markets, such as a.o. the coupling of more zones in a flow-based approach, the continuous modifications to flow-based coupling, advanced hybrid coupling, .... which should all lead to improvements in cross-border flows (the opposite would be very strange. Febeliec regrets that all these positive evolutions, paid for by consumers, seem not really to be taken into account by Elia, not even in a study looking ten years in the future, a scope similar to the European Ten Year Network Development Plan. Febeliec suggest that this omission by Elia is duly remedied, as there is still ample time to do so until the due date of the A&amp;F Study.</p>   |
| <p>ENGIE Electrabel</p> | <p>Electrabel is surprised that PST are not used during the market coupling optimisation / allocation (cfr. Elia vision around congestion management presented end of 2019). Moreover, what does "PST selected" mean during the capacity calculation?</p>  |

**ANSWER:**

ELIA would first like to state that nor providing detailed interconnection assessments nor assessing the impact of the different flow-based market rule evolutions (SHC VS AHC ...) are within the scope of the Adequacy and Flexibility study. Nevertheless, ELIA has worked on an improved method to take into account the different evolutions planned in the cross-border capacity calculations: the CEP rule, the extension of the flow-based perimeter to CORE, the 'advanced hybrid coupling', etc. ELIA is to date the only TSO in Europe (to our knowledge) that takes those planned evolutions into account in adequacy studies.

With respect to the maximum import constraint: after the commissioning of voltage control infrastructure, which is expected by end of 2022 the limit can be increased from today's 6500MW to 7500MW. We assume that from 2024 onward no additional maximum import constraints are to be enforced.

PST's are today not expected to be used in the capacity allocation nor are there concrete plans to do so in the coming years (despite the ELIA vision around it). It is indeed Elia's vision that the market would benefit from the integration of flexible devices in the capacity allocation. However, it is deemed unlikely that this vision will already become reality within the time window under investigation in this study. During the creation of flowbased domains, the initial setpoint of a PST is determined using a nodal model in order to maximize the size of the Flow-Based domain in the expected market direction. Afterwards, a subset of these PST's (= the selected PST's) are again allowed to play a role in the welfare-optimization problem during the capacity calculation part of the process.

Finally, in regards to future infrastructure improvements ELIA bases itself on the projects approved in the latest federal development plan for Belgium and the reference grid of the TYNDP. Assessing the impact of additional interconnectors could be done as a sensitivity for the later time horizons.

**MIN RAM RULES**

| STAKEHOLDER      | FEEDBACK RECEIVED   |
|------------------|---|
| FEBELIEC         | <p>Febeliec in any case appreciates that Elia will correctly apply the minimum 70%minRAM rule following out of the Clean Energy Package, with application of action plans and derogations, but with guaranteed minimum 70%minRAM on all CNECs as of 01/01/2026.</p> <p>On cross-border capacity modelling, Febeliec insists that as of 01/01/2026 70% minRAM will be in place on all Belgian borders based on legal provisions (as all action plans will have to be concluded) and as such this minimal threshold should duly be taken into account in the assessment.</p>  |
| ENGIE Electrabel | <ul style="list-style-type: none"> <li>• minRAM in 2023 for Belgium mentions “derogation” in the presented slides on 30/10 but not in the excel sheet. However, Elia is currently only in the process to get approved a derogation for 2021. There is then no view on further derogations in 2022 and 2023. Should it still be the case, then we ask Elia how (and if) the derogation is applied in their calculation (today this is based on the level of loop flows passing through BE compared to a loop flow threshold – if <math>\Delta &gt; 0</math> then reduction of the 70%).</li> <li>• minRAM for other countries than FR,NL,DE,BE are not mentioned. However they will have an impact (derogation of action plan) – e.g. AT recently acknowledged a shift towards an Action plan (hence limited XB capacity until 2025).</li> </ul> |

**ANSWER:**

ELIA thanks FEBELIEC and Engie Electrabel for their comments regarding the implementation of the minRAM rules. In the Excel document that was provided ELIA took into account the latest available official information available to them. Should there be any major evolutions in action/derogation plans ELIA will evaluate whether an updated trajectory and/or derogation plan is opportune.

Regarding the derogation assumed for Belgium ELIA will apply the derogation on all the analysed years prior to 2025 as the derogation is based on an externality, being that loop flows on Belgian CNECs cannot be contained to an

acceptable level, which is creating an operational security risk if the CEP70 requirement would be applied. Please consult the following document<sup>24</sup> when looking for more details regarding the ground of the derogation.

### **SENSITIVITY – MIN RAM**

| <b>STAKEHOLDER</b>                         | <b>FEEDBACK RECEIVED</b>  |
|--|---|
| FEBEG                                      | One sensitivity regarding the non-achievement of the CEP rules at the 2025 horizon in order to reflect the uncertainty on capacity calculation (e.g. 50 % RAM instead of 70%) as suggested by Elia in the consultation on the CRM Demand Curve. |
| ENGIE Electrabel                           | Overall, Electrabel considers that there remains some uncertainty on whether the ambition of min RAM 70% will really be achieved by 2025. Therefore, a sensitivity should be made by Elia to tackle this risk.                                  |
| Greenpeace & Inter-Environnement-Wal-lonie | A sensitivity with a minimum Remaining Available Margin lower than 70% is not needed, as this would be in contradiction with European regulations.  |

### **ANSWER:**

ELIA thanks the market parties for their comments on a possible sensitivity regarding the Remaining Available Margin. ELIA will consider what sensitivities could be performed to highlight the risks related to reduced available cross border capacity. Indeed, as Belgium relies heavily on import capacity for its security of supply and is also expected to rely more on imports outside of winter, such sensitivity can provide additional insights for policy makers on the impact of such risk.

## **5.6 Data for other countries**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>  |
|--------------------|---|
| FEBEG              | <p>Comments and suggestions regarding Cross border exchange capacity</p> <p>FEBEG also recommends Elia to carefully model the expected available capacity in neighboring countries in the short and medium term considering changing energy policies across Europe.</p> <p>In particular, FEBEG refers to the fact that, due to Belgium’s particular situation, the availability of interconnected capacity will be heavily dependent on the situation abroad, more in particular in France and Germany. To be more precise, in case French nuclear units are less available than announced, which has been the case in the last few years, France will have to rely more on imports to ensure its security of supply, via Belgium in most cases. This will lead to higher transit flows on the Belgian network and thus heavily reduce the import possibilities for specific</p> |

<sup>24</sup> <https://www.creg.be/nl/openbare-raadplegingen/ontwerpbeslissing-2136-over-de-goedkeuringsaanvraag-van-de-nv-elia>

|                         |   |
|-------------------------|---|
|                         | <p>Belgian capacity needs and thus require more domestic capacities within the Belgian balancing zone to be available to guarantee security of supply in such cases.</p>  |
| <p>ENGIE Electrabel</p> | <p>Electrabel considers that a particular attention should be paid to the availability of capacities in foreign countries in the coming years. In particular, Electrabel refers to:</p> <ul style="list-style-type: none"> <li>- The availability of French Nuclear assets (<i>see graph in document</i>): Historical data show that variations over the winter months between announced availability (based on REMIT figures) and actual availability go up to more than -15 GW. The variations are on average at least -6 GW between the planned and actual figures over the last 4 years Data on the French CRM, in particular, reveals that the view on the reliably nuclear capacity has consistently been overestimated over the past years. At the end of a delivery year, at least 5 to 6 GW were missing compared to initial certification. Electrabel would propose therefore to consider effective availability of French nuclear in the base case, not as a sensitivity.</li> <li>- Coal phase out across Europe (in particular in Germany and in the Netherlands): given the expected reinforcement of the GHG emission reduction targets by 2030 (EC proposal = minimum -55% compared to 1990 levels), a clear risk factor to be assessed is the additional decommissioning of coal/lignite capacities to meet these targets. This example is particularly striking as it necessarily requires assumptions outside of Belgium (p.m. no more coal capacity in Belgium).</li> <li>- Particular attention should be paid to the German grid reserve (6.6 GW foreseen for Winter 2020-21) and to the question how this reserve is treated in the adequacy assessment. In principle, the reserve was allowed by the EC as a transitional measure till June 2020 and there is no information on a possible re-notification. Also, the reserve is meant to address only congestion issues in the internal German network and it should therefore not be considered in the adequacy study, where Germany is considered as a copperplate.</li> </ul> |

**ANSWER:**

ELIA thanks FEBEG and ENGIE Electrabel for the comments. ELIA agrees on the particular situation of Belgium and considers that for Belgium, the high import dependency is a relevant particularity of national electricity supply. ELIA will carefully analyze the possible sensitivities on the generation fleet abroad and will certainly include the most relevant ones.

On the French nuclear availability, ELIA thanks ENGIE Electrabel for the interesting figures provided. As also explained later in this report, ELIA considers the unavailability of the nuclear units in France as very plausible. Indeed, when looking at the track record of the last decennium in terms of nuclear availability (by RTE) and the forecasts put forward by EDF in the near future, such events are not improbable given their realization in the past years..

The available French nuclear capacity for the reference scenario will be based on the data and assumptions provided by RTE in the dataset of the Mid-Term Adequacy Forecast and will be complemented with more recent information from the market or updated national studies. ELIA will certainly look at the historical data when considering sensitivities on nuclear availability in France.

Regarding the coal phase out in Germany, ELIA will carefully treat it and look for the latest information available. Indeed, ELIA performs a data update for every study and new market information, driven by legislation (e.g. CEP), or national policies in this case, are always incorporated as soon as possible.



As for the German grid reserve, as explained later in this report, out of market capacities are considered if contracted for the different periods assessed but those are not taken into account as available for the market. It should not be forgotten that when a country has contracted out-of-market capacities, it has done so because of specific reasons and to solve a ‘problem’ in that country, such as here for German congestions. ELIA is not aware of any such contracted out-of-market capacities abroad for which the framework does foresee that they can easily be called upon for Belgian use. In this respect, ELIA also refers to the note published by the FPS Economy in October 2019<sup>25</sup>, in particular to points 2.2 and 2.4 where several reasons are given for why the German grid reserve should not be taken into account in the reference scenario.

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| FEBELIEC    | On sheet 5.1 on data for other countries, Febeliec currently has no preliminary comments, as some of the relevant reports, most notably the MAF 2020, are currently not yet available. Febeliec also want to reiterate its longstanding comment on the composition of the PLEF. As long as consumers and other market parties (other than producers and traders) are not welcome in the discussions on the generation adequacy study, Febeliec continues to insist that this report is skewed and not sufficiently taking into account other sources of flexibility than (large-scale) generation assets and as such is not necessarily a correct interpretation of reality. |

**ANSWER:**

ELIA takes note of FEBELIEC comment’s regarding the PLEF composition. This however is out of scope of this public consultation. Regarding the availability of the MAF 2020 data and the timing of this study, ELIA already delayed its initial schedule to account for the ACER decision on the ERAA methodology. ELIA stresses that such a study takes at least 9 months to be performed, making it impossible to start the consultation process a few months ahead of the publication deadline.

As mentioned in section 4 of this report, the assumptions for the countries abroad will be based on the MAF2020 (dataset complemented and updated with national studies and an economic viability assessment. The MAF2020 from ENTSO-E is based on the latest National Energy and Climate Plans (NECPs) for the different countries. The MAF2020 dataset was not yet available at the time of the launch of this public consultation but has in the meantime been published by ENTSO-E in December 2020 and the publicly available report and dataset can be found on ENTSOE website<sup>26</sup> The assumptions for other countries will be further discussed during the Comité de Collaboration with the Federal Planning Bureau and the Federal Public Service Economy and in concertation with the CREG.

**SENSITIVITIES**

---

<sup>25</sup> <https://economie.fgov.be/sites/default/files/Files/Energy/Mecanisme-remuneration-capacite-Note-E2-02-10-2019.pdf>

<sup>26</sup> [https://eepublicdownloads.entsoe.eu/clean-documents/sdc-documents/MAF/2020/MAF\\_2020\\_Executive\\_Summary.pdf](https://eepublicdownloads.entsoe.eu/clean-documents/sdc-documents/MAF/2020/MAF_2020_Executive_Summary.pdf)

| STAKEHOLDER                               | FEEDBACK RECEIVED  |
|---|--|
| Greenpeace & Inter-Environnement-Wallonie | A sensitivity with low availability of nuclear energy in France is in contradiction with the fact that there is already a CRM implemented in France. If Elia thinks that this is not sufficient, it should explain why the French CRM is not sufficient to guarantee Adequacy, given the unreliability of French nuclear reactors.   |
| FEBEG                                     | One sensitivity considering decreased foreign capacity availability should certainly be included as different exogenous elements could materialize such as reduced nuclear availability (we refer, amongst other, to decreased French nuclear availability and reduced nuclear availability in CH), additional gas closures abroad due to economic reasons, coal phase-out acceleration such as Germany and the Netherlands), ...  |
| FEBELIEC                                  | As already stated before, and as also seems to follow from European legislation, regulatory documents, decisions and communications, HiLo (high impact low probability) analyses like Elia performed in the past seem to have at least to be modified in order to be in line with aforementioned legislation, regulatory documents, decisions and communications.  |
| FEBELIEC                                  | Febeliec also insists that any sensitivities are in line with the aforementioned legislation, regulatory documents, decisions and communications, in particular the ERAA methodology. This implies that sensitivities can only be added on a national level in a NRAA and not cover elements in other countries (which have to be covered by those countries in their NRAAs), especially in case such countries have their own capacity remuneration schemes (in the market or out of the market). Febeliec in this case thinks a.o. on French nuclear availability, which Elia has always considered explicitly in its own assessment, but which is not in line with ERAA (and in any case omits the fact that France has an operational CRM in place). The same applies for all other national scenarios on mothballing or decommissioning of assets in other countries (such as previously used low gas scenarios, where Febeliec always indicated it considers also high gas scenarios to be relevant), as these are to be covered by those countries (many of which have functional capacity remuneration mechanisms, in or out of the market). |

**ANSWER:**

For the adequacy results, sensitivities on the generation fleet abroad will be performed. ELIA will further develop such scenarios for different countries (uncertainty on French nuclear availability, coal phase-outs across Europe ...) such as done in the MAF2019 or in other national/regional adequacy studies (RTE, PLEF ...).

In particular, as already stated above, ELIA considers the unavailability of the nuclear units in France as very plausible. Indeed, when looking at the track record of the last decennium in terms of nuclear availability (by RTE) and the forecasts put forward by EDF in the near future, such events are not improbable given their realization in the past years (this is also pointed out by ENGIE in this public consultation). Not only have they already materialized in the past, but also in the future the risk remains present as identified recently in the scenarios and sensitivities implemented in the "Bilan Prévisionnel 2019" from RTE (French adequacy assessment).

The Belgian State shared this view, as stated in the comments and supplementary information from the Belgian State as a reply to the European Commission's decision of 21.09.2020<sup>27</sup> (p.6 and following) on the nuclear availability in France is performed in order for the Belgian authorities to cover themselves against lower nuclear availabilities. Regarding French or other country assumptions, the expected capacities for every of them are taken into account.

Regarding the legislation, ELIA would like to recall that according to the Electricity Regulation, national resource adequacy assessments may take into account additional sensitivities on the particularities of national electricity demand and supply. This is not further detailed in the Electricity Regulation. ELIA considers that for Belgium, exactly the high import dependency is such a relevant particularity of national electricity supply. Not only in terms of market functioning, but also in terms of energy being imported and import dependency during tight moments, the Belgian electricity supply cannot be considered without a particular focus on import. Indeed, negative evolutions in surrounding markets compared to the base case and out of control of the Belgian authorities, create uncertainties as to whether the generation capacity on which Belgium 'relies' from neighbouring countries will actually be available. We believe this particular element about the Belgian electricity supply is exactly within the scope of Article 24.1 of the Electricity Regulation. If this would not be the case, the Belgian State would be confronted with a paradox in which on the one hand, Belgium, more than many countries and in line with European ambitions, has invested significantly in interconnection capacity<sup>28</sup>, maximally pursuing electricity market integration, but at the same time making Belgium more exposed to events and evolutions in surrounding markets, and on the other hand, Belgium would not be able to account for this specific context when aiming to guarantee its security of supply.

---

<sup>27</sup> <https://economie.fgov.be/sites/default/files/Files/Energy/capacity-remuneration-mechanism-20201022-SA-54915-BE-answer.pdf>

<sup>28</sup> Beginning of 2019 the first interconnection (1000MW) with the UK was taken into service (NEMO-link), in November 2020 the first interconnection (1000MW) with Germany will be into service (Allegro), furthermore existing interconnection capacity with the Netherlands (Brabo & Zandvliet-Rilland & Massenhove-Van Eyck) and France (Aubange-Moulain, Lonny-Gramme) are being optimized. For the further future, several additional interconnection projects are being investigated. All of this is listed in the TSO's approved Federal Development plan.

## 6. Comments received on methodology

### 6.1 Target years

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| FEBELIEC    | On the target years to be assessed, Febeliec is surprised that Elia will only assess 2022, 2023, 2025, 2028 and 2032 and not every year within in the period 2022-2032. In any case, Febeliec is very surprised that 2024 is not included, as this is not so far in the future and will in any case have to be covered in other adequacy assessments (e.g. strategic reserve) and could provide valuable additional information in light of other measures (e.g. possible introduction of a scarcity pricing mechanism, Y-1 auction of a possible Belgian CRM, ...). Febeliec is also surprised that 2026 is not covered, as it would be the first year without nuclear plants if the current nuclear phase-out calendar is applied. |

#### ANSWER:

ELIA thanks FEBELIEC for the suggestions. However ELIA needs to focus on the most impacting years in order to elaborate the study on time. Regarding the year 2026, ELIA recalls that it would correspond to the period from September 2026 to August 2027. While the last exploitation license for nuclear units in Belgium is planned to expire by 1<sup>st</sup> December 2025, a simulation of the year 2025 would already cover a winter without nuclear in Belgium.

With regards to 2024, ELIA will add, as suggested, that horizon in the assessment.

### 6.2 Climate years

| STAKEHOLDER               | FEEDBACK RECEIVED   |
|---------------------------|---|
| Belgian Offshore Platform | <p>BOP supports the evolutions of historic climate years towards the use of predicted climate years for the timeframe of the study.</p> <p>To provide some more conform in the use of the 200 synthetic climate years, it would be interesting to have some idea on the difference with the historic climate years, f.i. temperature distributions, (offshore) wind distribution.</p> <p>Considering the translation from weather variables to generation variables, more transparency would be welcomed. Regarding offshore wind:</p> <ul style="list-style-type: none"> <li>- What location will be selected as reference for wind speeds?</li> <li>- What power curve assumptions will be used to translate wind profiles into power production profiles?</li> <li>- Will there be any differentiation for the existing parks and the new offshore wind parks to account for advancements in technology?</li> </ul> <p>The Danish Technical University developed time-series for the Elia 4.4GW offshore integration study, considering the geographical locations of the wind parks as well as wind park specific power curves. Will this study build further on the DTU time series? If not, how do the time series compare to each other?</p> |

|                         |  |
|-------------------------|--|
|                         | <p>Furthermore to build some confidence in these synthetic climate years and the translation towards generation variables, we suggest to also provide the time-series and related power distribution.</p>  |
| <p>FEBEG</p>            | <p>Regarding the climate years:</p> <p>FEBEG is in the opinion that adequacy assessments should consider a relevant and wide range of historical climate years. The question on how to integrate the possible consequences of the global warming on security of supply and the selection of representative climate years should be consistent and aligned among European countries. FEBEG would like to remind that the adequacy studies should properly assess the situation of more extreme events like cold winters.</p> <p>The recently adopted ERAA methodology indicates that the future PECD should reflect evolutions of the climate conditions although the final implementation choice by ENTSO-E (as 3 options are left) will be only known in the coming years.</p> <p>Awaiting the final implementation choice by ENTSO-E, FEBEG supports Elia in considering the ERAA methodology to the extent possible but insists on a coordinated approach at European level. ELIA's proposed way forward to implement option 1 through the use of 200 synthetic climate years can be an interesting approach since this is based on the approach that the French TSO (RTE) has used since several years in its national adequacy assessment. Using an approach which has already been used and can benefit of practical experience brings undoubtedly added value. However, a clear disclaimer should be made by Elia in the report regarding to the implementation trajectory on this aspect of the ERAA methodology which has not started yet.</p> <p>In addition, FEBEG recommends comparing the obtained results with the previous methodology, possibly through a sensitivity.</p> |
| <p>ENGIE Electrabel</p> | <p>Electrabel welcomes the efforts of Elia to align, to the extent possible to the ERAA requirements but is in the opinion that a coordinated approach among European countries is preferred, especially when it comes to the consideration of the relevant climate years and the possible impact of global warming on the adequacy situation which is to be looked at regional level.</p> <p>In principle, Electrabel can follow the reasoning of Elia to comply with option 1 of the ERAA methodology (i.e. rely on a best forecast of future climate projection) and the implementation of the '200 synthetic climate years' used by the French TSO (RTE). However, a few clarifications are needed before applying them in the adequacy study:</p> <ul style="list-style-type: none"> <li>• Could Elia clarify if 200 synthetic climate years are computed for all European countries, or only for Belgium? Weather-related uncertainties should consistently be modelled across European countries.</li> <li>• RES production profiles not only depend on climate but also location of PV and wind. Is that taken into account in the model?</li> </ul> <p>Electrabel suggests to test the new model based on historical climate years and historical scenarios in order for market parties understand the magnitude of the impact of this change of methodology on the adequacy situation.</p> <p>In addition, Electrabel suggests to further develop the alternative approaches, as soon as possible, should the implementation of the '200 synthetic climate years' used by the French TSO (RTE) not be possible in due time.</p>  |

|  |   |
|--|---|
|  | In any case, Electrabel also suggests to include a sensitivity with a sufficiently broad ranges of years (at least 34 years as performed in the previous adequacy study) to integrate the risks linked to more extreme climate conditions, which actually matters when assessing the adequacy situation of a country. |
|--|---|

**ANSWER:**

ELIA thanks Belgian Offshore Platform, FEBEG and ENGIE Electrabel for their support to implement option 1 from ERAA methodology, although indeed, the final implementation choice by ENTSO-E will be only known in the coming years (as 3 options are left).

First, ELIA would like to mention that if the choice for option 1 was still being studied regarding feasibility and data availability at the time of the launch of this public consultation, ELIA can now confirm the implementation of option 1 and the use of the best forecast of future climate projection as climate database for this Adequacy & Flexibility study 2022-2032.

Regarding the computation of the data, ELIA would like to clarify how the data are computed. The climatic database contains data such as temperatures, precipitation, wind speed, solar radiation, etc. for thousands of points in Europe (the location is taken into account). This data comes from MeteoFrance. An aggregation (from thousands of points in Europe to country level) is then performed for each country included in the model of this Adequacy & Flexibility study. This means that several locations per country are used to finally generate one set of data per country (load factors).

In order to give more insight on the approach of MeteoFrance, more details on the approach can be found in the annexes from MeteoFrance, as assumed competent climate experts. The annexes from MeteoFrance are made of several documents

- A user guide from MeteoFrance “Utiliser les simulations à climat constant” which gives an comprehensive overview of the key aspects of the methodology of MeteoFrance;
- A technical document from MeteoFrance “DSM-CS-ENR-SCenClim2014\_T2m\_V1-1” which explains how the temperature is calibrated;
- A technical document from MeteoFrance “DSM-CS-DC-ENR\_ScenClim2014\_T2m\_Stations-V1-1” which explains how the interpolation to constant climate 2025 is done;
- In a similar vein as the “User guide”, a presentation from MeteoFrance “ Simulations à climat constant : conception et utilisations” is also made available. This slides deck covers the most important points related to the climatic database of MeteoFrance;

The first document from MeteoFrance, the “user guide”, covers important topics such as the explanation of what a “constant climate simulation” is, the hypothesis used, the representativeness of the data, the difference between climatic simulations and historical data, how to interpret the results, etc. The “user guide” makes it possible for meteorological experts to provide precise answers to the technical questions that stakeholders ask themselves. The reader will notice the effort of the experts to avoid overly theoretical descriptions that would only be accessible to climate experts, similarly to the transparency ELIA has always aimed for. Next to the “user guide”, interested readers will find even more details in the other two technical documents.

ELIA has studied the possibility to re-use the translation (e.g. from wind speed to wind turbine generation factors) done by the French TSO RTE and it can be now confirmed that it will be used for this Adequacy and Flexibility study. More

information on the modelling of Wind and Solar generation done by RTE can be found in the document from RTE in annex called “Representation of the effects of climate on the electrical system: modelling Wind and Solar generation”. It explains how the climatic data are converted into energetic data. Another document from RTE called « Groupe de travail « référentiel climatique » - Représentation des effets du climat sur le système électrique - Document de cadrage n°2 : la modélisation de la production éolienne et solaire » is available online<sup>29</sup>. Those are detailed, comprehensive and transparent documents on the modeling of wind and solar production and the conversion from climatic data to energetic data such as done by RTE. These documents from the French TSO RTE emphasize the reliability and the robustness of the data ELIA has opted for.

The actual available capacity will finally be calculated by ELIA by multiplying the load factors computed for each country for each simulated hours with the installed capacity considered for this country for the corresponding timeframe.

Regarding the remarks on sensitivities on climate data methodology, ELIA does not consider it as an option. ELIA has opted for option 1 from the ERAA methodology with the best forecast of future climate projection (which is also the target solution chosen by ENTSO-E to be adopted in the coming years). Constructing several different grid models with different methodologies would lead to confusing information and the study would lose interest.

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| CREG        | <p>32. De CREG wenst vooreerst het belang te onderstrepen van de klimaatjaren die gebruikt worden voor het uitvoeren van een bevoorradingszekerheidsstudie.</p> <p>De analyse van de CREG van de Elia studie van juni 2019 toont aan dat de klimaatjaren die worden in rekening gebracht in de Monte-Carlo trekkingen heel determinerend zijn op de resultaten. Op basis van niet-gepubliceerde gegevens die de CREG van Elia verkreeg kon worden aangetoond (zie nota CREG (Z)20502 dat meer dan 78% van de LoLE uren in het 2025-basis-scenario, die gebruikt worden om een gemiddelde LoLE te berekenen, afkomstig zijn van de 2 strenge winter in het begin van de klimaatdatabase (1984-85 en 1986-87) (Ter illustratie zie hieronder de verdeling van de LoLE uren per klimaatjaar).</p> <p>De CREG meende dat het in rekening brengen van 34 klimaatjaren, elk met een zelfde gewicht, geen rekening hield met de effecten van de klimaatverandering en dat een meer wetenschappelijke benadering nodig was. De studie “Winter is leaving”, uitgevoerd door klimaatexperten van de VUB<sup>3</sup>, toonde onder meer aan dat de kans op extreem strenge winters in België en de buurlanden daalt ten gevolge van de klimaatverandering.</p> |
| CREG        | <p>33. De door ACER goedgekeurde methodologie laat voor het centrale scenario 3 opties toe :</p> <ul style="list-style-type: none"> <li>i. rely on a best forecast of future climate projection;</li> <li>ii. weight climate years to reflect their likelihood of occurrence (taking future climate projection into account); or</li> <li>iii. rely at most on the 30 most recent historical climatic years included in the PECD.</li> </ul>  |

<sup>29</sup> [https://www.concerte.fr/system/files/document\\_travail/GT%20Base%20climatique%20-%20cadrage%20don-nees%20climatiques%20-%20vdiff2.pdf](https://www.concerte.fr/system/files/document_travail/GT%20Base%20climatique%20-%20cadrage%20don-nees%20climatiques%20-%20vdiff2.pdf)

|             |   |
|-------------|---|
|             | <p>'34. Bij het gebruik van historische klimaatjaren (optie 3), zoals ook gebeurde bij de Elia-studie van juni 2019, mogen maximaal de 30 meest recente klimaatjaren gebruikt worden. Deze optie kan zonder extra werk door Elia, rechtstreeks, toegepast worden. Alle andere omstandigheden constant gehouden, zou deze methode het toereikendheidsprobleem dat Elia in juni 2019 vaststelde voor België drastisch verminderen en mogelijks zelfs elimineren.</p> <p>'35. Elia stelt dat optie 1 de “meest geprefereerde” optie is. De CREG meent dat de opsomming van de verschillende opties geen hiërarchie inhoudt en dat optie 1 niet beter of slechter beschouwd kan worden dan elk van de andere opties.</p>  |
| <p>CREG</p> | <p>36. Tijdens een samenwerkingsvergadering stelde Elia dat de derde optie, waarbij de klimaatdatabase beperkt wordt tot 30 historische klimaatjaren “statically not sound” was. De CREG meent dat de uitbreiding tot 34 klimaatjaren, dus 4 extra klimaatjaren, waarbij twee extreem strenge winters, zeker niet als meer representatief voor de toekomstige klimaatjaren kan beschouwd worden dan het gebruik van 30 historische klimaatjaren. Het in rekening brengen van twee extreem strenge winters, lijkt eerder een ontkenning van de klimaatverandering in te houden.</p> <p>De door Elia voorgestelde optie om 200 synthetische klimaatjaren te gebruiken, zoals door RTE gebruikt op basis van simulaties van MétéoFrance, biedt onvoldoende zekerheid inzake de representativiteit van deze klimaatjaren. Het is onduidelijk of de effecten van de klimaatverandering voldoende en correct werden meegenomen in deze simulaties. Werd het model uitgetest op historische data om de klimaatjaren van de laatste 5 jaar te voorspellen en wat zijn de bevindingen hieromtrent?</p> <p>'37. De CREG meent dat de voorgestelde optie niet alleen wellicht complex is en veel inspanningen van Elia zal vergen binnen een beperkte tijd, maar dat de resultaten van dergelijke benadering niet verifieerbaar zullen zijn. Met andere woorden, de voorgestelde methode komt neer op een “blackbox”. De CREG wil met betrekking tot dit punt verwijzen naar hetgeen in de sector inquiry van de Europese Commissie** (4) staat over de al dan niet neutrale positie die een TSO inneemt binnen deze discussie., De kans bestaat dat Elia net zoals in 2019 een risico-averse positie zal innemen.</p> <p>** (4) 4 Zie punten 539 en 546 van het eindverslag van de Europese Commissie over CRM's (eigen onderlijning):</p> <p>(539) An important aspect in central buyer mechanisms – as in other volume-based mechanisms – is the need for a central body to estimate the required amount and type of generation capacity to attain the desired level of system reliability. While this minimises risks of insufficient provision of generation capacity, it risks leading to excess capacity if risk-averse central authorities set the targets for generation capacity at unnecessary high levels. This risk exists to some extent in every capacity mechanism type, however, and should be mitigated by links to a thorough and transparent adequacy assessment, and appropriate oversight of regulators or independent experts to verify the parameters set by governments and TSOs.</p> <p>(546) Some inefficiency may be unavoidable in any central buyer design, for example due to the complexity of carefully assessing all the design features, the dependence on central judgements by risk averse decision makers – though this can be reduced by including a role for the regulator</p> |



|  |  |
|--|--|
|  | <p>or independent experts in the process – and the need to centrally determine the required flexibility characteristics of capacity providers through the design of the capacity product.</p> <p><a href="https://ec.europa.eu/energy/sites/ener/files/documents/swd_2016_385_f1_other_staff_working_paper_en_v3_p1_87000_1.pdf">https://ec.europa.eu/energy/sites/ener/files/documents/swd_2016_385_f1_other_staff_working_paper_en_v3_p1_87000_1.pdf</a></p> |
|--|--|

**ANSWER:**

First and foremost we'd like to point out that ELIA cannot be accused for being "conservative". The followed methodology and used data are transparent and the result of public consultation. The models and methodology is state-of-the art and ELIA has been and is a front-runner in adequacy and flexibility studies and is pro-actively improving the methodology year after year, including additional features. Such statements, which are not being supported by any evidence are misplaced and not appreciated. This study is prepared in cooperation with the "Comité de Collaboration" which brings together the administration, independent experts and the regulator.

As for the proposed option, this will indeed require more work than simply reducing the set of climate years. The amount of work is however not the appropriate decisional driver to choose and implement the methodology for such important studies. It is believed that the 200CY approach is the best one among those proposed in the methodology to include the aspects of climate change (and is also the target solution chosen by ENTSO-E in the coming years). To address the remarks on the "black-box", we provide additional written feedback from MeteoFrance in annex, which are competent climate experts to the methodology proposed.

The annexes from MeteoFrance are made of several documents which will cover the technical questions:

- A user guide from MeteoFrance "Utiliser les simulations à climat constant" which gives an comprehensive overview of the key aspects of the methodology of MeteoFrance;
- A technical document from MeteoFrance "DSM-CS-ENR-SCenClim2014\_T2m\_V1-1" which explains how is the temperature calibrated;
- A technical document from MeteoFrance "DSM-CS-DC-ENR\_ScenClim2014\_T2m\_Stations-V1-1" which explains how the interpolation to constant climat 2025 is done;
- In a similar vein as the "User guide", a presentation from MeteoFrance " Simulations à climat constant : conception et utilisations" is also made available. This slides deck covers the most important points related to the climatic database of MeteoFrance;

In addition, ELIA never made a selection of climate years in the past. The methodology applied to date by ELIA always made use of the full climate database put at disposal and used by ENTSO-E (and used by ENTSO-E), which indeed grew as more historical years became available.

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>   |
|--------------------|--|
| CREG               | <p>38. Voor de CREG kan het gebruik van de 200 synthetische klimaatjaren opgesteld door een buitenlandse TSO enkel aanvaard worden nadat hierover in detail is geconsulteerd en nadat het uitgevoerde rekenwerk door onafhankelijke klimaatexperten geverifieerd werd. De CREG zal daartoe een initiatief nemen</p> <p>39. Gezien het belang van de klimaatjaren (zoals hierboven beschreven) op de resultaten van een toereikendheidsanalyse, meent de CREG dat er voorlopig beter kan gewerkt worden met</p> |

|  |  |
|--|--|
|  | <p>een zuivere en onbetwistbare aanpak, namelijk dat er maximaal 30 jaar in de tijd wordt teruggaan. Voor de A&amp;F studie van 2021 die de periode van 2022 tot 2032 simuleert, impliceert dit voor de CREG een klimaatdatabank die niet verder teruggaat dan 1992. Dit is conform met optie 3 (zie supra).</p> |
|--|--|

**ANSWER:**

The CREG is obviously free to take any initiative. We would however welcome to be involved, or at least informed of the approach, which was not the case in CREG's previously ordered climate study from the VUB. An open approach, such as ELIA has initiated for the economic viability assessment study with academics would be a much more constructive approach and can only improve understanding and results. We thus look forward to being involved in the CREG's initiative. From ELIA's side, as mentioned in the previous question, we will request and share transparently the input we receive from the climate experts, i.c. MeteoFrance. The argumentation on the choice of the option is equally included in the previous questions.

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | <p>On the climate years proposal by Elia, Febeliec most strongly does not agree with the proposal by Elia. Febeliec does not understand why Elia has opted to remove the current approach with historic climate years (albeit adapted to reflect the ERAA methodology and thus limited to the 30 most recent years), as this approach has never been contested by any stakeholder (other than the representativeness of certain climate years far in the past, an element now clearly solved by the ERAA methodology by putting a maximum limit of 30 historic years). Febeliec is even more surprised that Elia wants to replace an existing and well-known and understandable approach, as said never contested by any stakeholder, with a novel and untested black box approach, for which Elia itself states that “several steps are required before simulations can be performed and there is no guarantee that this can be implemented in time before the publication of the study. In case the intended implementation shows not to be feasible, alternative approaches will be investigated and proposed”. For such an important analysis as the two-yearly A&amp;F study, Febeliec insists that the risk of a blackbox approach which might even not be implementable on time is not taken at all. Febeliec however can support that such approach is investigated in-depth in order to see whether this could be done for the next A&amp;F Study in 2024, also building on additional experience with this model from RTE and MeteoFrance. Moreover, art. 4 (f) i. of the ERAA methodology stipulates that the central reference scenario shall rely on a best forecast of future climate projection. However, the proposed blackbox of RTE and MeteoFrance does not guarantee this, as it is required to determine several parameters to compose the 200 synthetic climate years. Febeliec questions thus whether the proposed approach is compliant with ERAA. While it is a blackbox and thus unclear how the parameters impact each other, the model of RTE and MeteoFrance also clearly implicates the necessity to make assumptions and scenarios. Elia already shows in its document that based on the different IPCC scenarios (of which only two are selected, but many more exist), the range of outcomes is quite extreme in 2100, but also already in the period 2025-2030. Febeliec can only observe that Elia seems to propose to apply one scenario (RCP8.5) for 2025 and two scenarios (RCP8.5 and RCP4.5, where for the latter it remains strange how with only RCP8.5 in 2025 one would all of a sudden end up in RCP4.5 five years later) for 2030, without providing any justification for this choice nor an overview of the impact, implications or even the underlying assumptions and models. Moreover, Elia also clearly</p> |

|  |   |
|--|---|
|  | <p>indicates the very complex and computationally intensive process to translate these weather variables into generation variables (which seems less to be an issue for the already applied method based on historic climate years, as this has always been conducted by Elia without any apparent problem). For Febeliec, the cumulation of the above-mentioned elements, referred to from the document and presentations from Elia, clearly shows that it would be unwise and imprudent to apply this new approach in the upcoming A&amp;F study, as the risk of (unwanted or unintended) errors with potentially enormous impact is too great, especially in such an essential assessment as that of Belgian electricity adequacy in the next decade. Febeliec however reiterates its support to investigate and assess the merits of this approach for future A&amp;F studies thoroughly before applying it, as has been done for many other topics (e.g. demand side response), with full transparency and in close cooperation with all stakeholders.</p> |
|--|---|

**ANSWER:**

For sake of clarity, ELIA never made a selection of climate years in the past. The methodology applied to date by Elia always made use of the full climate database put at disposal and used by ENTSO-e, which indeed grew as more historical years became available. Some stakeholders suggested to create a subselection of climate years.

ELIA aims to comply with ERAA Article 4 (f) in order to reflect the evolution of climate conditions. A creation of a subselection of climate years does not seem robust, nor statistically the most appropriate approach to ELIA. However, ELIA does agree that effects of climate change should be duly taken into account and that climate experts are the best suited advisors on how to implement this. ELIA believes the use of a best forecast for future climate years is a robust solution for future (option 1).

As previously mentioned in this document, ELIA would like to mention that if the choice for option 1 was still being studied regarding feasibility and data availability at the time of the launch of this public consultation, ELIA can now confirm the implementation of option 1 and the use of the best forecast of future climate projection as climate database for this Adequacy & Flexibility study 2022-2032..

This will indeed require more work than simply reducing the set of climate years. The amount of work is however not the appropriate decisional driver to choose and implement the methodology for such important studies. It is believed that the 200CY approach is the best one among those proposed in the ERAA methodology to include the aspects of climate change.

To address the remarks on the "black-box", attachments detailing several aspects of the methodology are provided in annex of this document.

Regarding the RCP scenarios, ELIA first points out that the difference between these scenarios (in terms of average temperature) is not that large for 2025. Moreover, the selected RCP scenarios to create the '2025 climate' scenario is the warmest of all scenarios (more information can also be found in annex). ELIA proposed the available climate scenario for 2025 because this is within the time window the study will be investigating. ELIA agrees that if one were to look at horizons further in the future (beyond the time horizon of the study) it would be more relevant to analyze diverging climate scenarios. However, averaging out multiple scenarios would lead to a loss of critical scenario information (high RES, cold spells, etc.). ELIA also refers to MeteoFrance's annexes on the RCP scenario.

| STAKEHOLDER                               | FEEDBACK RECEIVED   |
|---|---|
| Greenpeace & Inter-Environnement-Wallonie | <p>Elia proposes to follow the first option of the ERAA methodology, using the methodology of RTE:</p> <p>There is however no firm commitment to apply the RTE methodology:</p> <p>“there is no guarantee that this can be implemented in time before the publication of the study. In case the intended implementation shows not to be feasible, alternative approaches will be investigated and proposed”</p> <p>Our comments:</p> <ul style="list-style-type: none"> <li>● As demonstrated in Study 2064 of the CREG and the VUB study “Winter is Leaving”, there is a major impact of the climate years methodology on the outcome of the Adequacy calculations. It is therefore imperative that the 2021 Adequacy &amp; Flexibility study is very transparent on these calculations.</li> <li>● As such, it is positive to implement option 1 of the ERAA methodology, because the future trend in climate change might have a fundamental impact on the Adequacy calculations.</li> <li>● However, if this would not be feasible, it must be made clear what the alternative methodology will be, which is now excluded from this consultation. An alternative approach will be “proposed”, but will there be a consultation on this?</li> <li>● In addition, the RTE methodology is a black box. How will this methodology be made transparent?</li> </ul> <p>We propose that, whatever methodology is followed, a detailed data set is made available which makes it possible to evaluate e.g. what climate years are responsible for how many LOLE hours, similar to the graph below and calculated by Elia on request of the CREG, but regrettably not included in the 2019 Adequacy &amp; Flexibility study.</p> |

**ANSWER:**

ELIA thanks Greenpeace & Inter-Environnement-Wallonie for the support towards the implementation of option 1 of the ERAA methodology. As previously mentioned in this document, ELIA would like to mention that if the choice for option 1 was still being studied regarding feasibility and data availability at the time of the launch of this public consultation, ELIA can now confirm the implementation of option 1 and the use of the best forecast of future climate projection as climate database for this Adequacy & Flexibility study 2022-2032.

To address the remarks on the "black-box", attachments detailing several aspects of the methodology are provided in annex of this document.

ELIA will pay particular attention to the distribution of LOLE amongst climate years when providing more details on the analysis. As mentioned page 13 of this report, it is ELIA’s intention to always act towards a better understanding of the results which cannot happen through a massive pack of billions of raw data. Therefore, ELIA will examine which relevant data and in what form those can be provided and this will be discussed within the CdC.

### 6.3 Flexibility

### 6.3.1 Balancing reserves

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| CREG        | <p>30. Landen met een reactieve netbeheerder, zoals België, waarbij de netbeheerder de marktspelers zoveel mogelijk aanspoort om het onevenwicht op te lossen en zelf een reactieve houding inneemt, hebben doorgaans gedurende de overgrote meerderheid van de tijd nog veel beschikbare reserves. Uit een analyse van de CREG blijkt dat de laatste jaren meer dan 80% van de FRR-reserve beschikbaar was gedurende 99% van de tijd. Het meerekenen van balancing reserves kan dus een significante impact hebben op de gemiddelde LoLE en EENS.</p> <p>31. Artikel 4.6(g).ii van de door ACER goedgekeurde ERAA methodologie stelt dat enkel als balancing reserves niet kunnen gemodelleerd worden, de FCR en FRR niet meegerekend moeten worden om afschakeling te vermijden. De CREG verwacht van Elia dat ze de balancing reserves modelleert, in het bijzonder de FRR-reserves, en deze op gepaste wijze mee in beschouwing neemt in de A&amp;F studie om zo LoLE-uren te vermijden, zoals dat in een reële situatie ook het geval zal zijn.</p> |
| FEBELIEC    | <p>On balancing reserves, Febeliec would also most strongly reiterate its longstanding position that in case of acute adequacy concerns and the risk of curtailment, these reserves should and will also be used (as the joint position of BRPs will become imbalanced and reserves will be activated to correct this imbalance) and should as such be considered in the adequacy analysis, as omitting their impact would again by definition artificially create an additional adequacy concern. In any case, Febeliec wants to stress that even though there might be some correlation between adequacy and possible imbalances, this correlation is far from perfect and and as such at least that difference should be considered in any adequacy assessment.</p>   |
| FEBELIEC    | <p>FEBELIEC is surprised that Elia has no longer provided a sheet on balancing volumes and their impact on available flexibility for the market. Febeliec asks that this topic be treated at least in the report, but would have liked to see here an indication on how Elia intended to treat this topic from a methodological perspective, as in previous assessments a lot of discussions were held on this topic. Moreover, Febeliec has understood that Elia is intending to greatly alter its market design in the near and medium future (and thus in the scope of this A&amp;F study), with potentially significant impact of the reservation of balancing capacity.</p>   |

#### ANSWER:

In line with Article 157 of the SOGL, ELIA always needs to dispose of sufficient reserve capacity to cover the dimensioning incident and at least 99% of the expected LFC block imbalances. Despite that this capacity can be used in practice for adequacy purposes (any adequacy issue will finally result in an LFC block imbalance), accounting this as such in the dimensioning will start from the premise that ELIA should not cover its dimensioning incident during periods with scarcity. This would be unacceptable.

By approach proposed by ELIA is also compliant with the ERAA-guidelines :

- The full article specifies “unless the modelling framework described in paragraph 1(g) is able to model the use of balancing reserves in relation to unforeseen imbalances, FCR and/or FRR (or a part of these balancing reserves) may be deducted from the available capacity resources in the ED, ...”

- Paragraph 1(g) specifies that “Unless the modelling framework allows for a proper characterisation of unforeseen imbalances, the ED shall rely on a “perfect foresight” principle: [...]”

Hence, as ELIA’s model is a perfect forecast model, and does not allow a proper characterisation of unforeseen imbalances, ELIA may deduct the full FCR and FRR from the available capacity resources, as proposed in the methodology.

ELIA clarifies that the sheet with reserve capacity projections was not published in the previous adequacy and flexibility study of 2019 as the methodology modelled only the flexibility and not reserve needs in ANTARES. Projections on FRR were therefore out of scope of the study. As reserve projections become again relevant following the above-mentioned ERAA-guidelines, ELIA will provide in the report the requested values as well as the explanations on how the FCR / aFRR / mFRR needs projections are determined. The projections will be based on the analyses from the latest offshore integration study<sup>30</sup> and aFRR dimensioning study<sup>31</sup>. Concerning the modelling in ANTARES, ELIA reminds that full FRR needs need to be deducted from the assets modelled in ANTARES. Indeed, even if ELIA is able to count on reserve sharing or non-contracted balancing energy bids to reduce its balancing capacity to be procured, this capacity still needs to be considered ‘firm’, i.e. availability is guaranteed.

### 6.3.2 Market design and scarcity pricing

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| CREG        | 54. De CREG meent dat de bevoorradingszekerheidsstudie rekening moet houden met alle bestaande en toekomstige ontwikkelingen in het marktdesign die nu reeds in voorbereiding zijn, waaronder ook de sinds 1 januari 2020 gewijzigde alpha-component en de invoering van een scarcity pricing waartoe de CREG zich verbonden heeft. Dit is een verplichting die volgt uit artikel 23.5(e) van Verordening 2019/943.   |
| FEBELIEC    | On flexibility and balancing reserves, Febeliec refers to its many previous comments on these topics, most of which have still not been tackled, as well as the above-mentioned comments. Febeliec will suffice at this point to indicate that it has not seen how Elia will treat on the one hand the introduction of a scarcity pricing mechanism in Belgium, if that were the case (with the issue still under discussion and a decision not yet taken), and on the other hand the impact of the many changes in the balancing market in future years. Indeed, while the former could have a very large impact on the balancing market (e.g. imbalance price through the omega-solution proposed by Elia or even larger if taking into account the proposals from CORE from the UCL) and thus revenues for market parties and thus act as an additional investment signal, the latter should also have an impact on both the balancing price and revenues as well as the flexibility needs for Belgium |

**ANSWER:**

---

<sup>30</sup> [https://www.elia.be/en/public-consultation/20200608\\_public-consultation-on-the-integration-of-additional-offshore-capacity](https://www.elia.be/en/public-consultation/20200608_public-consultation-on-the-integration-of-additional-offshore-capacity)

<sup>31</sup> [https://www.elia.be/en/public-consultation/20200602\\_public-consultation-on-the-methodology-for-the-dimensioning-of-the-afrr-needs](https://www.elia.be/en/public-consultation/20200602_public-consultation-on-the-methodology-for-the-dimensioning-of-the-afrr-needs)

Regarding scarcity pricing, ELIA would like to point out that no implementation decision has yet been taken. It is therefore unclear at this stage if a scarcity pricing mechanism – let alone which scarcity pricing mechanism – will be integrated into the market design.

Moreover, any scarcity pricing mechanism is believed to provide incentives especially towards flexible capacity to be available when needed according to system conditions. This is also in line with the views expressed by ELIA in its adequacy and flexibility study of 2019 where it is pointed out that as such – when adequate – enough flexibility is assumed to be installed in the Belgian system. It is rather a matter of ensuring that (market) mechanisms are in place that incentivize BRPs to ensure the availability of flexibility at the right moments.

In order to stimulate new investments, the price signal would also have to propagate back towards relevant investment signals. While the back propagation of prices into forward prices is not yet conclusively demonstrated according to academic literature, one may even wonder to what extent it would particularly hold for price spikes. Furthermore, the existence of backward propagation of prices may not be sufficient, as according to Newbery (2020): “the problem is not that there are no futures and forward markets, only that their tenor is not matched to that needed to reassure financiers lending at an acceptable cost of capital.”<sup>32</sup> Therefore, ELIA concludes – as do market parties – that a scarcity pricing mechanism is not believed to provide a credible revenue stream to underpin new investments and improve adequacy.

Market participants have also raised skeptical voices on the effects of scarcity pricing as investment signal and/or whether such mechanism is to be foreseen for Belgium. This further emphasizes that it is not too evidently considered when modelling the Belgian market:

- Febeg for instance, in its reaction to the public consultation on ELIA’s scarcity pricing report, puts it as follows: *“Scarcity pricing might have an added value and bring an additional source of income for short term flexibility in some circumstances. However, this source of income remains very risky and hard to predict; it does not bring the long-term visibility required for the substantial investment decisions that should be taken now in Belgium.”*
- Also FEBELIEC argues: *“Febeliec at this point remains unconvinced that any scarcity pricing mechanism should be implemented at all in Belgium, as it is not at all convinced that this would lead to a better system adequacy at an efficient system cost!”*

Regarding balancing market design modifications in general : these do not substantially impact the flexibility needs (driven by forecast errors of renewable generation, demand and forced outages), it does impact the reserve needs. Indeed, the better BRPs maintain their portfolio in balance, the less residual imbalances are to be covered by the TSO, which is for this reason one of the main dimensioning criteria of reserve dimensioning. Note that recent balancing market improvements (such as the current alpha-component) are already considered in the reference case of ELIA’s system integration study on a 2<sup>nd</sup> wave of offshore wind power. In such scenario these mechanisms help to maintain same balancing quality as today, even when facing increasing variable renewables and therefore higher flexibility needs. Therefore, these balancing market aspects are also taken into account in the FRR reserve projections in this flexibility study. As explained, new mechanisms, as for instance currently being discussed in the framework of the

---

<sup>32</sup> Newbery D. (2020). Capacity Remuneration Mechanisms or Energy-Only Markets? The case of Belgium’s market reform plan.



integration of the 2<sup>nd</sup> wave of offshore can further increase the BRP’s ability to balance their portfolio, the residual LFC block imbalances and the reserve capacity requirements.

### 6.3.3 Balancing energy exchange platforms

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBELIEC    | Last but not least, with the rapid approach of the European platforms for balancing, most notably MARI and PICASSO, with Belgian participation expected in the following years, Febeliec would like to get a real grasp on the impact hereof for Belgium, including on adequacy (as there could be an impact on the availability of flexibility for the market instead of being reserved by Elia for balancing purposes). |
| FEBELIEC    | Indeed, through European balancing platforms and collaboration (MARI, PICASSO, IGCC, ...), overall balancing (reserve) needs in Europe should decrease and flexibility in Belgium reserved for the balancing timeframe (and thus according to Elia’s methodology not participating to adequacy) should also decrease.   |

**ANSWER:**

ELIA does not see the relevance of balancing platforms for the adequacy simulations (as these are based on perfect day-ahead market calculations and therefore not taking into account the balancing time frame) nor for the flexibility / FRR needs as these are determined by predictions errors, LFC block imbalances and outages, which are not impacted. ELIA refers to its previous answers that all FRR needs have to be taken into account in adequacy simulations, even if part is delivered by non-contracted balancing energy bids (e.g. by means of balancing platforms) or reserve sharing.

ELIA however does expect a contribution to the flexibility means as these European balancing platforms will facilitate the access of ELIA to flexibility in form of available regulation capacity. This will be subject to availability of ATC in the balancing timeframe and the availability of the service abroad. These availabilities are expected to be low during scarcity periods. Specific attention will be directed to this topic in the analyses, making estimations on the potential contribution on the flexibility means.



## 6.4 EVA

### 6.4.1 Metric

#### CALIBRATION of WACC and HURDLE PREMIUM

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| CREG        | <p>De CREG stelt vast dat Elia de mediaan-benadering voor de inschatting van de inkomsten (zoals toegepast inde Elia-studie van juni 2019) wenst te verlaten. De CREG meende dat de mediaan-benadering aanleiding gaf tot een grote onderschatting van de marktinkomsten. De huidige voorgestelde methodologie om de economische leefbaarheid te evalueren, is een verbetering ten opzichte van de arbitraire keuze om de mediaan van de inkomsten te gebruiken.</p> <p>De CREG meent evenwel dat er nog een aantal onduidelijkheden blijven bestaan over hoe de voorgestelde methodologie effectief zal worden toegepast door Elia en hoe de WACC en de hurdle rate zullen gekalibreerd worden.</p>   |
| CREG        | <p>De door Elia voorgestelde methodologie beperkt zich tot een kwalitatieve beschrijving van een aantal principes, maar zonder enig kwantitatieve evaluatie. De CREG meent dat de consultatie van Elia op dit punt te kort schiet (of te vroeg komt). Zonder enige kwantitatieve voorstellen in de raadplegingsdocumenten, kunnen marktspelers niet adequaat en grondig reageren.</p> <p>Elia stelt voor om een WACC van 7% te gebruiken. De specific hurdle premium zal hieraan toegevoegd worden. Het is de CREG niet duidelijk uit de informatie die ter consultatie voorligt, hoe deze WACC van 7% werd bepaald door Elia. In ieder geval moet vermeden worden dat bepaalde risico's dubbel ingedekt worden en of het toevoegen van een specific hurdle premium geen dubbeltelling inhoudt van het risico.</p> |
| FEBELIEC    | <p>Another element that Febeliec wonders about is the very high WACC rate (7%) referred to, as with an almost zero risk free rate and a high leverage in combination with evermore abundant financial credit possibilities, this according to Febeliec leads to evermore extreme return on equity results. Febeliec requests clearly that next to the WACC also assumptions are shown on rate of return on equity, as it is wondering which rate of return on equity is implied by the modelling. Based on this data, Febeliec and other stakeholders will then get a better view on the real implicit profitability for investors and will be able to better grasp how much, if any, the expected real return of investors is.</p>  |
| FEBELIEC    | <p>On the Economic Viability Assessment (EVA), Febeliec, as well as other stakeholders, has already in the past opposed the approach taken by Elia to apply a metric based on the median of simulated revenues for one year. Febeliec refers to its many comments on this topic in previous consultations, none of which have been taken into account, but also explicitly wants to refer to the ERAA methodology, which clearly stipulates that the expected (and not median) revenues have to be taken into account.</p>   |

#### **ANSWER:**

ELIA takes note of CREG’s support for the proposed methodology, which is based on the expected (average) revenues and not on the median revenues, as FEBELIEC seems to suggest. The aim of this public consultation was to give market players the opportunity to provide input on the methodological changes, as well as on the specific risks with an

impact on the hurdle premium as identified by ELIA. In addition, as part of the public consultation, ELIA also specifically asked for the input from market players on the order of magnitude of an adequate hurdle premium, which would be used as input for the final calibration. ELIA wishes to remind that for the purpose of this methodology, ELIA is collaborating with a finance professor specialized in this matter in order to ensure that the resulting methodology is well-rooted in academic literature and in line with overall finance principles.

The WACC is calculated in accordance with the principles of the ACER-approved methodology for the VOLL, CONE and RS calculation, taking into account publicly available data from energy market players in Europe. With regard to the interaction between the WACC and the hurdle premium, the purpose is indeed to avoid double counting of risks as is already warranted as described in the draft methodology consulted upon. Upon review of the initially proposed calculation, ELIA identified a technical calculation error to be corrected resulting in a reduced value of the WACC. This updated value amounts to 5.5%. This value is based on the following constituting elements, benchmarked against the Fichtner study “Cost of Capacity for Calibration of the Belgian Capacity Remuneration Mechanism (CRM)” and confirmed by prof. Boudt as reasonable values to use:

- Risk-free rate : 0.47% ;
- Country premium: 0.36% ;
- Equity premium: 6.1%<sup>33</sup> ;
- Equity beta: 1.02;
- Gearing: 40%,
- Cost of debt: 4%;
- Tax rate: 25%
- Inflation rate: 1.60%

**Link with ERAA**

|                  |   |
|------------------|---|
| ENGIE Electrabel | Electrabel welcomes the efforts of Elia to align, to the extent possible to the ERAA requirements but is in the opinion that a coordinated approach among European countries is also preferred.   |
| ENGIE Electrabel | ERAA considers a reference scenario with and without approved CRM. Will Elia also perform this exercise?  |
| CREG             | Ten slotte wenst de CREG te benadrukken dat de wijze waarop met risico wordt omgegaan in de A&F studie consequent doorgetrokken moet worden in de berekening van de CoNE en dus ook van de betrouwbaarheidsnorm. Deze vraag voor een logisch consistente aanpak is overigens een expliciete verplichting uit artikel 6 van de door ACER goedgekeurde ERAA-methodologie. |

As to ENGIE’s comment on a coordinated approach on the European level, ELIA has indeed aligned its proposed methodology with the ERAA requirements in the absence of such a coordinated approach among European countries. Indeed, the first ERAA assessment will only be published end of 2021 and the EVA methodology will follow an implementation plan over multiple years. Obviously, if a common approach would become available for the next adequacy assessment, it is ELIA’s intention to align as far as possible with such a European approach.

<sup>33</sup> As to the equity risk premium, the ACER-approved methodology states that reference can be made to widely used and recognized sources. Elia has applied the equity risk premium of 6.1% in the Fichtner study on “Cost of Capacity for Calibration of the Belgian Capacity Remuneration Mechanism (CRM)”, which was set based on data from reputable and recognized sources (such as Damodaran and the BERC report).

In line with ERAA, the proposed methodology can be applied in both a reference scenario with and without approved CRM.

With regard to the CREG comment on the consistent approach regarding risk between the calculation of CONE and ERAA, ELIA would like to note that Article 6, 9 (a) (iii) of the ACER-approved methodology, to which CREG refers, states the following:

*“For target years (after the considered target year) for which hedging products are expected to be unavailable or unable to fulfil the hedging needs of the capacity resources:*

*(...) a market-conform and transparent increase in the WACC for these target years may be used to account for this price risk; the principles underlying the WACC increase shall be consistent with the WACC calculation guidelines from the CONE methodology.”*

ELIA has indeed applied the non-binding guidelines for the WACC calculation of the CONE methodology when calculating the WACC in the Economic Viability Assessment. However, ELIA does not read in the ERAA methodology that the method used in ERAA should be fully extended to the CONE calculation. On the contrary, Article 5(11) seems to explicitly exclude the WACC from the requirement to use identical parameters in ERAA and CONE calculations:

*“For the technologies used in ERAA which are also reference technologies for CONE or CORP, the economic and technical data used for ERAA (**except for WACC**) shall be identical to the latest available best estimate used in the most recent CONE and CORP calculations pursuant to the CONE and RS methodologies.”*

ELIA would also like to point out that the task to determine the CONE is currently not assigned to ELIA. However, to the extent that the reasoning underlying the EVA approach and the WACC, or specific elements thereof, would also be applicable in the context of the CONE determination, it may be useful to adopt them. However, ELIA wants to point out that considerations relating to CONE have a different scope and do not, for example, fully correspond to the context and assumptions of the simulation set-up applicable to the EVA in this adequacy and flexibility study.

**Investment decision-making process and risk-aversion**

|              |   |
|--------------|---|
| <p>FEPEG</p> | <p>FEPEG would like to underline the complexity of the assessment of economic viability and of investment decisions. Given the costs and time-horizons involved in the development of new assets or refurbishment of existing assets in electricity markets, investment decisions are complex and taken with extreme care. They are usually relying on a broad range of models, scenarios and criteria. However, a common thread in economic and financial valuation is that the more uncertain a revenue is, the more heavily it is discounted in any assessment of future revenues.</p>   |
| <p>FEPEG</p> | <p>The development of new assets in electricity markets require large upfront costs and cover long payback periods (&gt;20 years) beyond the liquidity horizon of forward markets, which is &lt; 3 years). Investors clearly need a solid business case to approve such a financial commitment. The standard industry practice is to consider a set of market scenarios and to evaluate the distribution of revenues and costs over the economic lifetime of the asset considered (e.g. CCGT covers approximately 20-25 years). Such an analysis aims to compute a distribution of expected gross margins over this lifetime. Depending on whether these margins are covering the fixed and investment costs, a new investment can be approved. This is also the case for investments to be performed on existing assets.</p> <p>Integral parts of such an analysis are (i) expected prices and revenues on the electricity markets, based on market fundamental; (ii) the likely consequences of policy decisions (e.g. the energy transition); and (iii) the impact of the market design.</p> |

|          |   |
|----------|---|
| FEPEG    | Such analysis also includes the possibility of price spikes. However, given the uncertainty and infrequency of such price spikes, they are heavily discounted in any such assessment.   |
| FEPEG    | Metric for economic viability assessment FEPEG understands that the hurdle premium is used to accommodate the limitations of the model proposed by Elia, and not an additional risk premium taken by investors. For this reason, it is difficult to properly assess the proposed percentage.  |
| FEBELIEC | Febeliec also wants to reiterate its many comments on the risk averseness that Elia is always citing and applying for investors in generation capacity (or presumably also other flexibility assets, although this does not always seem to be treated by Elia in the same way as for many other assets flexibility can be referred to as secondary use of assets that have been built for other purposes, in particular in case of demand side response, where the biggest chunk of investment is related to the demand part and not the demand response part), which is considered to be a key element of the EVA by Elia, while all other actors in the system, including BRPs, suppliers, consumers etc, all seem to be extreme risk takers and not risk averse at all. Febeliec opposes such view, as it is clear that also these actors will make economically rational decisions, including hedging of costs via forward markets (e.g. for suppliers and consumers, to avoid to be exposed to greatly varying costs with locked-in revenues from long term sales contracts) or avoidance of high penalties (e.g. BRPs to avoid being exposed to extreme imbalance tariffs and costs). These aspects will clearly also have an impact on the decisions of market actors and are (or should be) taken into account by investors in new capacity. In this light, it remains extremely strange that Elia (as well as the academic studies they refer to) seem to be blind for revenues from a.o. forward markets. |
| FEBELIEC | Furthermore, it remains strange that Elia, despite many comments from stakeholders, still does not look into portfolio effects. Indeed, while assets individually might be confronted with certain negative effects, the combination of different assets can create on the one hand higher pooling effects but also and more importantly synergetic effects (e.g. in case of combinations of different assets classes that complement each other). Febeliec regrets that this is still not taken into account.  |

ELIA would like to thank FEPEG for providing us with further insights in the decision-making process for investments in the energy market. ELIA agrees with FEPEG and acknowledges that an investment decision is highly complex, driven by a large number of uncertainties and parameters. Therefore, simulating such a complex decision-making process unavoidably introduces some shortcuts, simplifications and therefore uncertainties. However, the proposed methodology aims to capture these uncertainties through a number of risk parameters, such as the “model & policy risk”, which should cover the impact of different models and scenarios while only one such scenario is calculated for the performed EVA, as well as the risk parameter “revenue distribution and loss aversion” that among others covers the impact of price spikes.

ELIA believes that the proposed methodology for the economic viability check has many similarities with the real-life approach as described by FEPEG, i.e. the economic viability of a capacity is assessed by comparing the internal rate of return (taking into account the inframarginal rents, the fixed costs and the investment costs) with the hurdle rate. However, the EVA methodology is of course subject to the limitations of the modelling set-up, as well as the require-

ments imposed by the ACER-approved ERAA methodology. As to the scenario choice, article 3 of this ERAA methodology provides for a detailed description of the reference scenario on which the EVA is to be applied (e.g. in line with the national objectives, targets, projections,... included in the NECPs). Hence, in light of this ERAA-methodology, it is not a feasible solution to consider a set of market or policy scenarios and to consider the distribution of simulated revenues over these different scenarios to simulate the EVA. However, the impact of the scenario choice on an investment decision is captured via the parameter “model risk” that is part of the hurdle premium calibration.

In the updated methodology for the economic viability check, a capacity is considered as viable in the Belgian electricity market if the average simulated internal rate of return (average is taken over a number of random draws from several Monte Carlo years in function of climate years and forced outages) exceeds the hurdle rate. Price spikes can heavily impact this average simulated internal rate of return. However, investor’s risk aversion towards these price spikes is covered through the risk parameter “revenue distribution and loss aversion”.

In line with the ERAA methodology, ELIA applies an increase of the WACC to cover for the price risk of investors during the time horizon beyond the forward markets. This price risk is driven by several risk parameters, such as the “revenue distribution and loss aversion” (e.g. the higher the risk on negative returns, the higher the price risk and thus the hurdle premium), as well as the model risk and policy risk (the less robust the simulated inframarginal rents are to different scenarios and policy choices, the higher the price risk and thus the proposed hurdle premium). Where part of the top-up of the WACC can be explained by the applied modelling set-up, another part is explained to accommodate for the limitations of the standard CAPM model that does not fully account for the particular statistical distribution of revenues in the energy market.

FEBELIEC seems to challenge the hypothesis of a risk-averse investor. However, risk aversion is commonly accepted as an assumption for a rational investor in many economic studies and academic works. In addition, the increase of the WACC to account for the price risk is in line with the ACER-approved ERAA. Hedging will be taken into account in the updated methodology (see answer in section 6.4.2), but in the current market, revenues cannot be hedged for more than 3 years (with already low liquidity on the Y+3 forward market) which falls significantly short in view of the tenor of investments.

FEBELIEC suggests to take into account portfolio effect in the economic viability assessment, but in line with ERAA, the economic viability check is performed at the level of the capacity resource (i.e. “capacity resource” means any generation, storage or DSR asset which may bring resource adequacy benefit).

### 6.4.2 Forward markets

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| CREG        | <p>24. De CREG wenst te benadrukken dat de rol van langetermijnmarkten (forward markets) moet meegerekend worden. De CREG heeft dit meer in detail uitgelegd in een document dat naar Elia en andere aanwezigen gestuurd is (zie bijlage bij onderhavige nota).</p> <p>25. Het directe gevolg van het meerekenen van forward markets in de ‘economic viability analysis’ is dat er moet gerekend worden met de verwachte waarde van de gesimuleerde resultaten ten gevolge van de verschillende historische klimaatjaren en de verschillende onverwachte pannes. Indien de gesimuleerde resultaten een gelijke waarschijnlijkheid hebben, dan komt dit neer op het nemen van het gemiddelde.</p> |

|          |   |
|----------|---|
| FEBELIEC | In this light, it remains extremely strange that Elia (as well as the academic studies they refer to) seem to be blind for revenues from a.o. forward markets.  |
| FEBELIEC | On the use of forward prices, Febeliec insists that in line with the ERAA methodology these existing prices are incorporated as much as possible and in any case are used at least as a sanity check of the model, as these prices indicate a real willingness of market parties to sell and buy energy in those timeframes and as such provide very valuable information.  |
| FEBELIEC | On the additional revenues, Febeliec, as already mentioned several times, most strongly insists that next to the revenues of ancillary services also revenues from forward markets are taken into account, because even though these might not be so easy to estimate, it is clear that discarding such revenues of course leads to an underestimate of overall revenues and thus to a negative EVA and an artificial but undue higher need for additional revenue streams. |

**ANSWER:**

**Preliminary remarks**

To start with, ELIA understands from CREG’s feedback that the latter supports the contours of the updated EVA methodology based on which a capacity is economically viable if the expected internal rate of return (IRR), calculated by taking the average of simulated inframarginal rents into account) exceeds a predefined hurdle rate (consisting of an industry-wide WACC and the hurdle premium).

However, CREG is of the opinion that within those contours hedging opportunities on the forward markets are not fully reflected in the proposed methodology. According to CREG, producers in general hedge 1/3 of their output three years ahead, 1/3 two years ahead and 1/3 one year ahead and these hedging opportunities significantly reduce volatility in expected inframarginal rents.

CREG builds on the hypothesis of perfect price propagation based on which the forward price captures all variability on expected inframarginal rents on spot markets driven by forced outages and climate years. In CREG’s opinion, these so-called “class B variables” are stable over the investment horizon and known by the investor at the moment of the investment decision (year 0), given that the probability of, for instance, cold spells, wind and solar patterns or outages do not significantly change over the lifetime of the asset.

Therefore, CREG concludes that the remaining variability on inframarginal rents to be expected by investors is only driven by the so-called “class A variables”, for instance CO<sub>2</sub> and gas prices, which are not known by the investor at the investment decision.

**Forward markets offer the most interesting risk management strategies for assets covering baseload and mid-merit**

The current hedging opportunities available on the Belgian forward market in particular seem to provide possibilities contributing to risk management strategies for assets covering baseload and mid-merit (shoulder) needs such as e.g. nuclear and CCGT.

However, for peak and super-peak capacities (e.g. OCGT, turbojets, DSR), characterized by high variable costs above the average spot price, hedging through available standard products is difficult. In addition, only limited hedging opportunities are provided by balancing servicing capacity reservation markets (e.g. aFRR, mFRR). Also, more advanced techniques such as delta hedging have limited added value for assets whose marginal cost is significantly above the forward prices of the available forward products on the market.

Therefore, the proposed EVA methodology should include sufficiently the effect of risk management strategies towards price volatility and price spikes, in particular for baseload capacities.

**The ACER-approved ERAA requirements and their implementation impose a strict modelling set-up, in which the EVA, as well as the impact of hedging, is to be integrated**

Article 3 of ERAA provides for a detailed description of the baseline data that define the central reference scenarios on which the EVA should be performed. Such baseline data stems from the national projected demand, supply and grid outlooks and is to be consistent with existing and planned national policies. As a consequence, TSOs do not have the possibility to define the reference scenarios themselves.

Next, article 4 of ERAA imposes that resource adequacy is assessed through a model respecting the economic dispatch (ED) principles. In ELIA's case, this is a perfect foresight model, which is ERAA compliant. In the resource adequacy assessment, two sources of uncertainty should be represented, being the availability of capacity and interconnection (outside/to the synchronous European zone) resources (modelled based on random unplanned outage patterns) and uncertainty due to climate variables, represented by different Monte Carlo samples. As a result of this ED model, a distribution of hourly prices is obtained, of which the variability is driven by the uncertain parameters “unplanned outages” and “climate variables”, as defined in ERAA. Article 4 of ERAA does not provide for additional sources of uncertainty to be accounted for in the economic dispatch model. Where the ERAA does allow to complement the central reference scenario with other sensitivities to assess the robustness of the results, it does not foresee for a weighting of these different scenarios to obtain a scenario-weighted result in the EVA analysis. This means that the EVA is conducted on a single scenario, whereas investors consider multiple scenarios in their assessment, similar to how CREG describes the class B variables. As a consequence, this effect is to be addressed differently in the EVA approach.

Finally, article 6 of ERAA defines the main principles for the methodology of the economic viability assessment, including the impact of hedging and risk management strategies. Taking the output of the ED model, i.e. the distribution of simulated hourly prices, as a starting point, a capacity is considered viable if its revenues are higher than its costs. Article 6 (9) provides for a very detailed definition of revenues that should be taken into account in this EVA analysis, already accounting for the impact of hedging on price risk of investors. Fully in line with this article, the proposed EVA methodology by ELIA building on the study of prof. Boudt increases the WACC for investors with a hurdle premium to account for the price risk during the years for which no hedging products are available. In Belgium, no forward markets are available further than 3Y ahead and one should be prudent to rely on forward prices in view of the potentially limited liquidity of some products.

As a conclusion, ELIA's proposed EVA methodology is fully in line with the *mandatory* ERAA requirements<sup>34</sup>, using the average of simulated wholesale spot market revenues as a starting point in the economic viability check and increasing the WACC with a risk premium to account for additional price risk in the absence of forward markets.

However, in light of the *optional* article 6(15) of the ERAA, allowing to further refine the EVA to consider the effects of risk management towards price volatility and price spikes, ELIA has sought for a way to further integrate CREG's feedback on hedging in the methodology, in collaboration with Professor Boudt, as also reflected in the study report (see annex).

**The calibration of the hurdle premium for baseload capacities takes into account the risk-mitigating impact of forward hedging on class B variables (unplanned outages and climate variables)**

---

<sup>34</sup> In accordance with article 6(19) of the ERAA the EVA will be further refined/described in the coming years through several steps, so it is impossible today to know what choices will be made to model this.



ELIA understands that CREG distinguishes two types of variables, being the class B variables (such as unplanned outages and climate conditions) and the class A variables (such as fuel price risk and CO<sub>2</sub> price risk). ELIA repeats its analysis above that, in line with ERAA, only unplanned outages and climate conditions (class B variables for CREG) can be taken into account as uncertainties in the reference scenario.

Based on the modelling set-up imposed by ERAA, the variability on the distribution of the simulated hourly prices on the wholesale market is therefore driven by these uncertainties from unplanned outages and climate variables (“class B variables” according to CREG). Given the hedging possibilities on the forward market for baseload capacities, and given the lower variability that is empirically observed in these forward markets, ELIA agrees with CREG to apply a lower hurdle premium for “revenue distribution and loss aversion” for this type of capacities (a more detailed description is included in the qualitative risk assessment per technology in the updated report of Professor Boudt – see annex) than compared to a situation where no forward hedging opportunity would be considered.

However, in its note CREG assumes that the forward prices for a certain delivery period can be calculated as the average of the simulated hourly prices for the same delivery period. In other words, CREG thus seems to take a perfect price propagation of spot prices, including the propagation of unfrequent but very high price spikes, towards forward prices for granted.

However, this theoretical link between the spot and forward price modelled by for instance Bessembinder & Lemon has been tested and has largely not been validated by the empirical literature. Indeed, its validity is conditional upon several specificities and assumptions that are not necessarily verified in practice. The robustness of the link assessed empirically between the spot price and the forward price is limited and the explanatory power of those empirical models is questionable. Authors often conclude that inefficiencies in the analyzed forward markets cannot be ruled out and point to several other drivers of the forward prices (including for example, the storage level, historic spot prices, pressure on generators to hedge versus pressure on consumers to hedge, etc.). Hence, perfect price propagation, put forward by CREG, seems to be an overly optimistic hypothesis. Note that Bessembinder & Lemmon themselves suggest that extreme price spikes in the spot market are not necessarily perfectly anticipated in the forward prices, particularly when the market has little experience with such events.

To conclude, where hedging reduces the risk for investors related to unplanned outages and climate variables (“class B” variables), the related risk is not fully covered given that forward prices, especially when modelled through a plain average of the simulated spot prices, are not likely to perfectly include (very high) spot prices. It would give a false impression of profitability to take such a strong assumption in the modelling setup.

In addition, this uncertainty is further aggravated by the limited maturity of forward markets: investors cannot hedge their asset’s output for the full economic lifetime and unavoidably need to make assumptions on the forward prices and their ability to anticipate (very high) price spikes<sup>35</sup>. It is not because market parties in rolling window take the best

---

<sup>35</sup> Given that forward prices are volatile as well and given that investors cannot hedge the output of their assets for the full economic lifetime at the moment of making the investment even investors that can hedge (part of) their capacities still face an important price risk, albeit lower compared to the price risk on spot markets. Indeed, by concluding a hedge in March 2020 for delivery period 2022, an investor would gain significantly lower revenues (around EUR/MWh 40) compared to hedging in July 2019 (around EUR/MWh 50) for the same delivery period (see e.g. graph on <https://my.elexys.be/MarketInformation/IceEndexPowerBE.aspx>).



available hedge for their portfolio, that from an investor perspective this hedge covers the risks. Translated to the modelling setup, it boils down to a necessary prudence when assuming that the average of modelled spot prices would be a correct representation of future forward prices.

Given that such a perfect relationship between spot prices and forward prices cannot be empirically demonstrated and given that the average of simulated spot prices, which is used as input for the revenues in the EVA, is by construction impacted by price spikes without any correction or adaptation, a correction related to the risk this reflects towards the investor assessment is made in the hurdle premium via the risk parameter “model and policy risk”. The updated report of Professor Boudt builds on the same reasoning.

**Given the limited modelling set-up in line with ERAA, other uncertainties such as fuel prices and CO<sub>2</sub> prices cannot directly be accounted for in the EVA**

As described before, TSOs are bound by the limited modelling set-up by ERAA, starting from a (single) reference scenario on which the EVA is applied. According to ERAA, only uncertainties on unplanned outages and climate variables are included in the resource adequacy assessment for a reference scenario.

However, ELIA fully agrees with CREG that these so-called “class A” variables are unknown to the investor at the moment the investment decision is made and thus introduce additional uncertainties and risks. Moreover, as said before, no forward prices are available for the full lifetime of the asset, so investors do not have the possibility to cover these risks.

This important risk factor, which is not covered in the resource adequacy assessment on the central reference scenario, introduces important risks for a risk-averse investor. Following the methodology put forward by professor Boudt ELIA has covered this risk in the hurdle premium via the calibration of the parameter “model and policy risk”. A more detailed description is included in the updated report of professor Boudt (see annex).

As to the additional hedging revenues, ELIA refers to the explanation above that the impact of the forward markets is taken into account in the calibration of the hurdle premium. To make further simulations on the additional revenues on the forward market is extremely complicated, as also acknowledged by FEBELIEC, and not required in view of article 6(9) of the ERAA that defines the revenues to be taken into account in the EVA.

Finally, ELIA confirms that the available forward prices will be used as a benchmark for the model output.

**6.4.3 Additional revenues**

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| FEBEG       | Ancillary services should not be taken into account in EVA as not all capacities will receive this additional revenue stream. |

|          |   |
|----------|---|
| FEBELIEC | On the revenues from ancillary services, Febeliec insists that these are taken into account based on the expected distribution over asset classes. Indeed, some ancillary services and their (considerable) revenue streams (e.g. aFRR, FCR) seem to benefit more certain segments of assets than others, thus improving their profitability considerably. A linear attribution of over-all ancillary costs of Elia as revenues to all segments indiscriminately could thus lead to unwanted and incorrect effects. |
|----------|---|

**ANSWER:**

Concerning ancillary services, as explained in the methodological document for public consultation, those will be taken into account based on historical revenue data in the EVA loop. ELIA is open to change the approach made last time (assuming the same revenue for each kW) and assume a certain differentiation between assets while keeping the same total volume of ancillaries’ revenues. ELIA however agrees with the comment of FEBEG that one should be careful when accounting for such revenues and this should take into account the fact that not all capacities can systematically win AS contracts as the overall volume of AS is limited compared to the capacity installed in Belgium.

**6.4.4 Type of capacity**

| STAKEHOLDER               | FEEDBACK RECEIVED  |
|---------------------------|--|
| Belgian Offshore Platform | <p>Could Elia explain in what part of the study the investment assumption for RES are used? In our understanding, assumptions on renewable capacity (including offshore wind) are policy driven. Is the economic viability also checked for RES?</p> <p>The non-normal distribution risk and the risk/return relationship (i.e. the downside risk) is very relevant in the context of (offshore) wind investments in investment decisions for projects with full market exposure. With the combined assumptions of (1) limited changes to the market design, (2) full market exposure, and (3) increased RES penetration; the profile risk (i.e. the inverse correlation between wind production and market prices) is likely to increase, negatively affecting the investment case for offshore wind projects with full market exposure.</p> <p>The policy risk should be looked at in the same context. A market design characterised by very volatile prices (i.e. periods of very low to even negative prices alternated with periods of price spikes) is not favourable for offshore wind energy. Without a policy aimed at price (and thus revenue) stabilisation, investments in offshore wind energy become riskier.</p> |
| CREG                      | <p>26. De CREG merkt op dat in de Economic Viability Analysis (EVA) geen rekening gehouden wordt met de mogelijkheid om productie op de site van de consument te installeren (zogenoemd “behind-the-meter”). Deze capaciteit heeft het voordeel dat er bepaalde belangrijke reducties mogelijk zijn wat betreft netwerk- en andere kosten waardoor de winstgevendheid sterk verbetert (en dus de bevoorradingszekerheid). In haar studie n°1957 heeft de CREG deze opmerking al gemaakt en verwezen naar haar studie n° 1583 die net dat aspect behandeld heeft . De CREG vraagt dat Elia met dit belangrijk type capaciteit rekening gehouden wordt in de A&amp;F studie.</p>   |
| FEBELIEC                  | <p>On the types of capacity to be monitored, Febeliec is extremely surprised that Elia states that “new CHPs can be assessed against electricity market revenues only, until it is known that</p>  |

|          |   |
|----------|---|
|          | <p>specific subsidies or policies are already in place”. For Febeliec, this approach is unacceptable as while most of these assets are built in line with policies, and as such thus are policy driven and not to be taken into account at all for an EVA in the first place, it is very clear that such assets are never built based on a business case which only looks at electricity market revenues. Rather the contrary, in most cases electricity is only the, even though sometimes very interesting, side product of a need for steam or heat, which is the primary driver for most CHPs. Discarding the value of this revenue stream for new CHPs will of course and almost by definition undermine or destroy their business case in this EVA, as compared to the reality. Febeliec can under no circumstance agree with any such wrong and unrealistic approach and insists that in the entire A&amp;F Study a sense of urgency towards realism is included through external validation and reality checks.</p>   |
| FEBELIEC | <p>On new pumped-storage facilities, Febeliec wonders whether this also includes the extension of the capacity (MW or MWh) of existing capacity, for which also specific incentive schemes have been introduced which should then of course be taken into account in any EVA.</p>   |
| FEBELIEC | <p>The same applies for “market storage facilities”, whatever specific assets Elia might mean by these (also covering home batteries, EVs, ... which up until now had always been amalgamated into a broader category of market response). On new DSR capacities, Febeliec insists to receive much more additional information, as for Febeliec it is clear that DSR is almost entirely secondary use of assets that have already been built for other purposes. The business case for the construction of these assets is based on other markets than the electricity market, and while investments are needed to allow DSR through the use of inherent flexibility in demand processes, it is clear that those investments are in most cases not extreme and in any case magnitudes smaller than those required to build the assets themselves in the first place. Especially in greenfield settings, without need for retrofitting of assets and the related costs, these elements can be taken on board in the initial design and could thus in many cases result in minor additional costs. Such elements should in any case be reflected in an EVA. Moreover and even more importantly, it is adamant that a distinction is made between demand shifting (e.g. heating and cooling) and demand reduction (e.g. in assets running at maximum capacity, where lost production can not be made up), as the impact on any EVA through opportunity costs will be completely different. As such, Febeliec suggests that at least this segmentation is applied in any EVA for DSR. ...</p> |

**ANSWER:**

As to the input received from Belgian Offshore Platform, ELIA confirms that RES capacities are considered as policy-driven in the adequacy study (in-line with the ERAA methodology), so no economic viability check is performed on these capacities. ELIA takes note of the input on the non-normal distribution risk and policy risk for RES capacities, but given that no economic viability check is performed, no hurdle rate is calculated for RES capacities.

Concerning ‘behind-the-meter’ generation, the EVA based on market revenues is not the right approach to assess viability of such type of capacities as those are not driven by market revenues but by other means such as tariff reduction, local optimization, ... Most of those capacities (RES, batteries, ...) are ‘policy-driven’ capacities and exogenous assumptions and hence following article 6, paragraph 3 of the ERAA, may be excluded from the EVA.

Concerning CHPs, ELIA reminds FEBELIEC that the model ELIA uses simulates only the electricity market and CHPs have other revenue streams. Those revenue streams are very dependent on the industrial process that those are supporting or the heat demand they are supplying. There are therefore many different ways to operate, optimize and hence ways to calculate the additional revenue streams. In order to calculate additional revenues, one should therefore make several assumptions. In addition, as stated in article 6, paragraph 3 from the ERAA methodology, the CHPs are policy driven and exogenously set, hence they may be removed from the economic viability assessment.

ELIA will investigate further whether the study made by Fichtner<sup>36</sup> in the framework of the CRM for Belgium which proposed a methodology using a “CHP credit” could be implemented in the EVA for the CHPs at risk or for identifying additional capacities.

Regarding pumped storage, next to the actual capacity considered for the central scenario and in view of the uncertainty of certain pumped storage units, ELIA will include the increase of 7.5% in pumped storage capacity/reservoir in Coo as part of the EVA to be performed.

Regarding DSM, as indicated in the public consultation, ELIA will take DSM into account in the EVA process with the assumed costs for developing new and keeping existing capacities. With regards the initial capacity assumed in the reference scenario (which already includes new capacity) in the reference scenario, those are based on the “Energy Pact”. With regards to cost assumptions, ELIA refers to the dedicated section on CAPEX costs where this point is further elaborated.

#### 6.4.5 Multiyear – Multicountry

| STAKEHOLDER      | FEEDBACK RECEIVED   |
|------------------|---|
| CREG             | 28. Verder meent de CREG dat de <b>economische leefbaarheidsanalyse</b> niet enkel voor Belgische capaciteiten moet gebeuren maar eveneens <b>voor buitenlandse capaciteiten</b> .  |
| ENGIE Electrabel | <p>We understand that the decision to stay/leave/enter the market is taken by considering margins and costs in one reference year. In practice, however, this is an intertemporal considerations (future margins need to be taken). Electrabel would like to ask Elia to provide more information on how the investment (or disinvestment) decisions are taken.</p> <p>In particular, how will the consistency between the results between the different target years be assessed concretely, especially now that the economic viability of assets outside Belgium will be assessed? We invite Elia to provide information on the investment/Disinvestment in the neighbouring countries, to better assess the adequacy situation in Belgium.</p> |
| FEBELIEC         | Last but not least, Febeliec, as already stated in the past, does not at all understand why for this EVA every asset individually has to be profitable every single year. As already mentioned above, Febeliec sees portfolio effects, but also Febeliec is convinced that for an investor an asset has to be profitable over its lifetime and not every single year necessarily. Indeed, such  |

<sup>36</sup> <https://www.elia.be/-/media/project/elia/elia-site/public-consultations/2020/20200710public-consultation-report-ipc-fichtneren.pdf>

|                 |  |
|-----------------|--|
|                 | <p>very conservative choice (perhaps inherent to a regulated monopoly situation) is not representative for real world situations. In the most extreme case, this means assets would never be built, as the period of construction has only costs and no revenues and is as such by definition not profitable. Investors are used to live with situations where over the lifetime of an investment certain periods are more profitable than others, with certain periods also potentially having a negative profitability, as long as the overall profitability over the lifetime is sufficient to recover the costs and a profit margin. Febeliec strongly regrets that none of these aspects, despite being mentioned many times over the years by many stakeholders, have still not been taken into account at all. In any case, as the ERAA methodology has been approved, Febeliec most strongly insists that Elia align its methodology with ERAA in order to incorporate expected (with their respective probabilities) revenues instead of median revenues, as the latter by definition discard the very high potential revenues in scarcity situations and thus by definition unduly undermine the business cases for investors in the EVA by Elia, thus in turn by definition but based on wrong inputs leading to missing money and system adequacy issue. Nevertheless, Febeliec counts on the fact that Elia has stated that it will include to the maximum extent possible the provisions of the ERAA methodology and thus that, while this is a quick win, Elia will definitely modify its methodology to take this aspect into account.</p> |
| <p>FEBELIEC</p> | <p>Febeliec takes note that Elia intends to extend the EVA to other countries. Febeliec wonders what the use is of such extension, especially taking into account that a wide range of countries in Europe, including many neighbouring countries, have full-fledged CRMs or a myriad of (out of market) reserve mechanisms in place. In any case, Febeliec would like to know to which countries Elia intends to apply this extension and how countries not included in this extension will be treated. Moreover, Febeliec wants to know how Elia intends to incorporate all different elements in the considered countries (e.g. relating to revenue streams from the aforementioned CRMs and reserve schemes, but also differences in subsidy schemes, impact of tax schemes, ...). Febeliec insists that it is appalled by the lack of any concrete input or information by Elia on this very important aspect (Elia in its note only mentioning 4,5 lines without any real information).</p>  |
| <p>FEBELIEC</p> | <p>On the extension of the EVA to more target years, Febeliec wants to make a similar comment as that on the extension to other countries. Febeliec wonders how Elia intends to tackle this aspect, as yet again almost no information is provided. Febeliec is even more so in doubt to the application if more countries and more target years are combined. Last but definitely not least, Febeliec reiterates its earlier comments on the profitability of an asset over its lifetime as compared to individual years, which of course will impact the EVA over several years, while this does not even tackle the also before-mentioned additional complexity of portfolio and other synergetic effects. Febeliec regrets that Elia does not at all take such elements in consideration, which will of course negatively impact the EVA and thus have a negative impact through the skewed analysis on perceived Belgian adequacy. Febeliec also regrets that yet again for this important new topic less than 7 lines are given as information.</p>  |

**ANSWER:**

ELIA will apply the EVA on Belgium and, as mentioned in the consultation document, will also extend to its neighboring countries using the same methodology. For other countries, sensitivities on the additional revenues streams can be

performed if such data is available. Indeed while some countries have a market-wide CRM in place, those might not be approved for all countries for the whole time-horizon assessed in this study.

With regards multi-year assessments, given computational constraints, multi-year assessments with multi-year simulations will not be performed but a sanity-check and consistency check (year after year) will be performed. Such check will avoid that results are not consistent between years. It is important to note that the economic viability metric defined takes the economic lifetime into account to calculate the profitability of units.

Finally, as to FEBELIEC’s comment on the median revenues, Elia would like to repeat that the updated methodology takes into account the average simulated inframarginal rents.

### 6.4.6 Amount of Monte-Carlo years

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| CREG        | 27. In de analyse van de gedetailleerde resultaten van de A&F studie van juni 2019, heeft de CREG opgemerkt dat Elia 330 simulatiejaren gebruikt om de bevoorradingszekerheid te analyseren en dat in dezelfde studie slechts 33 simulatiejaren gebruikt worden voor de EVA. Bovendien blijkt dat het gemiddeld aantal uren schaarste in de EVA veel lager ligt dan in de analyse van de bevoorradingszekerheid. Onder meer deze twee inconsistenties zorgen ervoor dat de winstgevendheid van bestaande en nieuwe capaciteit sterk onderschat werd in de A&F studie van juni 2019. De CREG dringt er dan ook op aan dat de EVA net dezelfde simulatiejaren gebruikt als de analyse van de bevoorradingszekerheid. Dit is ook een verplichting die volgt uit artikel 7 van de door ACER goedgekeurde ERAA methodologie. |

**ANSWER:**

Concerning the amount of years simulated for the economic parameters ELIA would like to point out that, the amount of years used in the previous study was clearly mentioned in the study methodology.

Moreover, in order to get acceptable running times and feasible simulations, the adequacy simulations relaxes several economic constraints (not affecting the adequacy results) in order to ease computation and allow the calculation of the adequacy parameters requiring large amount of Monte-Carlo years. Indeed in order to get stable adequacy results, one needs to simulate a large amount of years.

For economic results (EVA, economics, etc.), several constraints are added to the simulation in order to better assess the economic dispatch of the capacities and prices. Such simulations are much more computation intensive and in order to obtain acceptable simulation times, less Monte-Carlo years are simulated. Indeed, it is very rare to find an economic dispatch study or a publication using more than a dozen of Monte Carlo years. Most economic dispatch models used in studies rely on 1 MonteCarlo year or even do not simulate every hour of the year. Increasing the amount of years to be simulated would simply make the delivery of the study impossible (or would require to reduce its scope considerably).

## 6.5 Out of market capacities

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| FEBELIEC    | On out of market capacities, Febeliec insists that not only the Belgian Strategic Reserve but also those in other countries are considered, as Europe imposes ever more solidarity mechanisms between Member States. Febeliec also insists that all capacity that is taken out of mothballing is also duly taken into account. Febeliec wants to point out that the de-mothballing of capacity should be a clear indication that the economic viability of such assets seems to be sufficient, as otherwise any such assets would have remained out of market. |

### ANSWER:

Out of market capacities are considered, if contracted for the different periods assessed but those are not taken into account as available for the market. Indeed, those reserves are contracted by countries in order to be dispatched after the market (“out of the market”). It should not be forgotten that when a country has contracted out-of-market capacities, it has done so because of specific reasons and to solve a ‘problem’ in that country. The conditions for their activation are most likely also to be arranged by very specific rules. ELIA is not aware of any such contracted out-of-market capacities abroad for which the framework does foresee that they can easily be called upon for Belgian use.

Concerning mothballed capacities, those will be taken into account in the EVA for other countries if the information and related costs are available, hence those units could come back to the market if their return would be economically viable.

## 6.6 Price limits

| STAKEHOLDER | FEEDBACK RECEIVED   |
|-------------|---|
| CREG        | <p>40. De adequacy studie moet rekening houden met het feit dat er geen effectieve prijslimieten bestaan. Het behouden van een simulatie met een price cap van 20.000 €/MWh zoals in de A&amp;F studie van 2019 is dan ook het minimum.</p> <p>'41. Elia stelt voor om de automatische price cap verhoging (+1000€/MWh indien 60% van de price cap bereikt wordt) toe te passen vanaf het volgende simulatiejaar.</p> <p>'42. De CREG wijst erop dat artikel 10 van Verordening 2019/943 ondubbelzinnig stelt dat er geen price cap mag zijn. In de praktijk zijn er wel bidding limits. ACER heeft in 2017 beslist dat deze bidding limits automatisch worden verhoogd. Deze verhoging gebeurt automatisch en dient dus onmiddellijk te gebeuren. Het voorstel van Elia houdt in dat een overschrijding van 60% van de price cap in het begin van het simulatiejaar, geen enkel gevolg heeft gedurende het betreffende simulatiejaar. Bovendien leidt deze benadering dat de price cap jaar na jaar met maximum 1000Euro/MWh verhoogd wordt, terwijl in het geval van meerdere overschrijdingen van 60% van de (verhoogde) price cap, dit volgens de ACER beslissing telkens aanleiding geeft tot een volgende automatische verhoging van de price cap binnen hetzelfde jaar.</p> <p>'43. Het voorstel van Elia is dus volgens de CREG niet conform met de ACER beslissing terzake uit 2017 noch met Verordening 2019/943. Het opheffen van price caps in Verordening 2019/943 is een belangrijke beleidskeuze die dient gerespecteerd te worden. Het zou bovendien een stap</p> |



|                 |  |
|-----------------|--|
|                 | <p>achteruit zijn ten opzichte van de A&amp;F studie van juni 2019 waar Elia een scenario simuleerde met een price cap van 20.000 €/MWh.</p> <p>'44. De CREG meent dat de A&amp;F-studie van 2021 op zijn minst een verbetering moet inhouden en zoveel mogelijk moet rekening houden met de werkelijke regels. Indien Elia de ACER beslissing uit 2017 niet correct kan implementeren, dan moet Elia minstens de simulatie uitvoeren met een price cap van 20.000 €/MWh als fall back optie.</p>  |
| <p>FEBELIEC</p> | <p>On price limits in the electricity market and as already mentioned above, Febeliec insists that for all practical means such price limits are no longer applicable as an automatic mechanism is in place where the price cap is raised if 60% of the previous price cap is reached anywhere in the CORE region. Febeliec strongly objects the proposal of Elia to apply this rule on a yearly basis, as this would mean that for the first year of such automatic occurrence, the impact in the model would only be seen one year further out and only with an increase of the price cap with 1000 €/MWh, while in reality such increase will immediately be applicable and could also happen several times consecutively over the course of one year, thus driving the price cap much sooner much higher and in effect removing its impact almost entirely. The proposal by Elia however does not integrate this aspect and is overly conservative and even incorrect and as such risks to restrict the model too much (as compared to reality) and could thus artificially and wrongfully impact the EVA very negatively. Febeliec strongly urges to remove the impact of the price cap altogether based on the cited arguments, and if Elia were not to follow such approach to at least adapt the current proposal to a more realistic model.</p> |

**ANSWER:**

ELIA would like first to remind that the proposed approach is already a major improvement compared to the previous studies, which moreover, is very complex to implement in the models. To our knowledge, nor ENTSO-E nor any other entity takes a dynamic bidding limit into account in the models used to perform adequacy studies. This major improvement has been proposed in order to better fit the limits that exist in practice. In this view, ELIA would like to remind what is written in the regulation and how this is described in the guidelines.

In the ACER decision<sup>37</sup>, the following statements can be read:

*“The harmonised maximum clearing price for Single Day-Ahead Coupling shall be +3000 EUR/MWh  
 The harmonised maximum clearing price for SDAC in accordance with Article (0), shall be amended according to the following rules:*

- a) the harmonised maximum clearing price for SDAC shall be increased by 1,000 EUR/MWh in the event that the clearing price exceeds a value of 60 percent of the harmonised maximum clearing price for SDAC in at least one market time unit in a day in an individual bidding zone or in multiple bidding zones;*
- b) the increased harmonised maximum clearing price, set according to subparagraph (a), shall apply in all bidding zones which participate in SDAC from five weeks after the day in which the event referred to therein has taken place;*

---

<sup>37</sup> [https://acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/AN-NEXES%20NEMOs%20HMMCP%20FOR%20SINGLE%20DAYAHEAD%20COUPLING%20D/An-nex%20I\\_ACER%20DA%20MAX-MIN.pdf](https://acer.europa.eu/Official_documents/Acts_of_the_Agency/AN-NEXES%20NEMOs%20HMMCP%20FOR%20SINGLE%20DAYAHEAD%20COUPLING%20D/An-nex%20I_ACER%20DA%20MAX-MIN.pdf)



- c) notwithstanding subparagraph (b), for the further application of the amendment criterion defined in subparagraph (a), the increased harmonised maximum clearing price, set according to subparagraph (a), is used from the day following the one in which the event referred to therein has taken place; and
- d) the bidding zones referred to in subparagraph (b) are only those bidding zones with cleared buy and sell volumes and those part of the SDAC (excluding market time units where the given bidding zone(s) has been decoupled)

The proposal of ELIA to set the starting bidding limit to 3000 EUR/MWh (current DA bidding limit) and to use an increase of +1000 EUR/MWh if at least one market zone in the CORE region reached 60% of the bidding limit. This is thus in line with ACER decision. In order to make it implementable in practice, ELIA proposes to apply this increase on a yearly basis. ELIA can understand that questions are raised regarding this timeframe. However, the following arguments should reassure the stakeholders that this is in line with the practical rules.

While in point c) an increase from the day following the event is mentioned, point b) states that the increase shall apply five weeks after the day of the event. In order to make this decision usable in practice, the SDAC parties translated it into an operational document<sup>38</sup>. In this document, three operational steps are detailed in case of such event, together with a target time.

| Steps | Process   | Target time                              |
|-------|---|--|
| 1     | Once the situation is detected by NEMOs, and after validation in ad-Hoc NEMO OPSCOM call, relevant communication message(s) will be sent to OPSCOMs.  | Same working day                         |
| 2     | In the next 5 weeks, impact will be analyzed (common and local) and relevant preparations will be done.<br>Relevant request for change will be sent to SDAC OPSCOM with detailed information of the change for official validation. | ASAP within next 5 weeks after detection |
| 3     | NEMO communication of the amended harmonized maximum clearing price for SDAC.   | 1 week after detection                   |

Figure 2 Chronological overview<sup>39</sup>

Once the situation is detected, the communication first will happen on the same working day. It is then needed that, within the next 5 weeks, the impact shall be analyzed. After an analysis of its impact (common and local), it will then finally implemented with an official validation. The increase of the price cap can then not be considered as applicable immediately.

Concerning the occurrence of several “60% events” within a day or a week, given the procedure, it does not seem to be taken into account. It is our understanding that those events at least within the 5 weeks changing period should not

<sup>38</sup> [http://www.nemo-committee.eu/assets/files/MRC\\_OTH\\_06%20-%20Modification%20of%20Maximum%20Clearing%20Price-5f78dd3c98a57ffbec39704689a7c7a2.pdf](http://www.nemo-committee.eu/assets/files/MRC_OTH_06%20-%20Modification%20of%20Maximum%20Clearing%20Price-5f78dd3c98a57ffbec39704689a7c7a2.pdf)

<sup>39</sup> [http://www.nemo-committee.eu/assets/files/MRC\\_OTH\\_06%20-%20Modification%20of%20Maximum%20Clearing%20Price-5f78dd3c98a57ffbec39704689a7c7a2.pdf](http://www.nemo-committee.eu/assets/files/MRC_OTH_06%20-%20Modification%20of%20Maximum%20Clearing%20Price-5f78dd3c98a57ffbec39704689a7c7a2.pdf)

trigger additional increase. If after the 5 weeks, a new 60% event (based on the updated 60%) happens, then a new round of +1000 in 5 weeks is to be assumed.

If one assumes those kinds of event are to occur usually in a short period of time, and thus within a 5 weeks period, the use of a yearly timeframe would not lead to a rejection of many 60% events and their impact on the price cap. Therefore, the improvement we propose seems an acceptable approximation, especially in view of the complexity it requires in terms of modelling.

## 6.7 Reliability standard

| STAKEHOLDER | FEEDBACK RECEIVED  |
|-------------|--|
| CREG        | <p>51. Bij gebrek aan een betrouwbaarheidsnorm die overeenkomstig 25 van de Elektriciteitsverordening (EU)2019/943 dient vastgesteld te worden, stelt Elia voor om de wettelijke betrouwbaarheidsnorm te gebruiken (art.7bis, §2 van de elektriciteitswet : LoLE&lt;=3 uur en LoLE95&lt;20uur).</p> <p>'52. ACER stelt dat de bepaling van de VoLL volgens de nieuwe methodologie moet gebeuren tegen begin januari 2021. Deze deadline is scherp maar het is zeker voor Lidstaten die een capaciteitsmechanisme hebben of willen invoeren belangrijk dat deze deadline gehaald wordt, aldus ACER. Van zodra de VoLL bepaald is, zal de CREG op basis van artikel 25(2) van Verordening 2019/943 een nieuwe betrouwbaarheidsnorm voorstellen aan de Minister voor Energie, waarvan het resultaat functie zal zijn van de eerder bepaalde VoLL en CoNE.</p> |

### ANSWER:

To date there is no other legally determined reliability standard than the one included in the Federal Electricity Law. As long as there is no other legally determined reliability standard, which remains a final competence of the Member State, ELIA cannot be expected to use any other standard than the one legally set in Belgian law.

## 6.8 Others

### SECTOR COUPLING

| STAKEHOLDER               | FEEDBACK RECEIVED   |
|---------------------------|---|
| Belgian Offshore Platform | <p>Sector-coupling and power-to-gas</p> <p>The current methodological framework does not model contributions to the adequacy and flexibility from power-to-gas and sector-coupling in general. With the rise of especially the hydrogen production facilities in the coming years, and at larger scale towards the end of the decade, we would like to encourage Elia in developing solutions to incorporate these type of technologies into the assessment, as it might have beneficial contributions to both the adequacy as the flexibility projections.</p> <p>We understand that an entire methodological overhaul to incorporate sector coupling might be challenging with the timeframe of the current study. Awaiting such a new methodological framework, modelling power-to-x as flexible demand could be considered within the current methodological framework.</p> |

|                  |   |
|------------------|---|
| ENGIE Electrabel | Electrolysers: In Electrabel’s opinion, Elia should consider that some electrolysers’ projects may be launched in the coming years, with an impact on the electricity demand. |
|------------------|---|

**ANSWER:**

ELIA thanks ENGIE Electrabel and BOP for the suggestion on the integration of electrolyzers and sector coupling. Simulating all energy sectors at once is a major challenge with the current tools and methods. Indeed, modelling all energy sectors would exponentially increase the complexity of the simulations (which are already very complex) and require a lot of additional data to be taken into account. While there are some studies and models that are simulating all energy sectors at once, those are simplifying other crucial parameters for adequacy such as the resolution of the model (less hours are simulated), the geographic coverage, the interconnection capacity calculation, the modelling of other countries, the economic parameters, the amount of monte-carlo years, etc.

The approach followed by ELIA is in line and goes beyond what is currently done at European level by ENTSO-E or other TSOs. With regards to ‘sector coupling’, the interfaces between the different sectors and the electricity system is taken into account in different ways. For instance, transport by the means of electric vehicle assumptions, heat by the means of heat pumps assumptions, gas by the means of thermal gas unit generation capacities...

In order to grasp the implications resulting from hydrogen generation from electricity into the modelling applied by ELIA, we propose to add electrolyzers as a consumption of electricity in Belgium and abroad. Sensitivities on the operating mode of those units could be also performed if deemed relevant.

**MARGIN GRANULARITY**

| <b>STAKEHOLDER</b> | <b>FEEDBACK RECEIVED</b>   |
|--------------------|--|
| FEBELIEC           | Febeliec regrets that Elia does not conduct a consultation on the methodology itself and thus wants to use this consultation to reiterate its position on the (past but maybe also current) methodological approach of increasing the margin and/or strategic reserve volume by blocks of 100MW in the iterative process for the determination of the potential required volume. For Febeliec, a finer granularity than 100MW should be used, as even the lack of 1MW under the current approach would immediately lead to a need of 100MW additionally. Applying a finer granularity would avoid sourcing unneeded volumes. Alternatively, an approach could be implemented where very marginal transgressions of the LOLE criterion do not automatically lead to an increased contracting of strategic reserve volumes, through the application of a deadband, taking into account the multiple layers of sensitivity already applied by Elia in combination with low probability, high impact scenarios, which already skew all the results towards a very conservative approach. For Febeliec, it should in any case be avoided to increase the cost for the grid users unnecessarily by following a much too conservative approach. |

**ANSWER:**

First of all, ELIA would like to highlight the ‘Adequacy and Flexibility’ does not lead to contractualization of strategic reserve volume as stated in the comment. In addition ELIA would like to mention that the present consultation includes the methodology aspects of the study as well.

Concerning the ‘sourcing of strategic reserves’, this study does not lead to any sourcing of capacity, hence we do not understand the comment raised by FEBELIEC in this context.

More concretely on the step of 100 MW to be used in this study, ELIA has already shown that the statistical convergence of the model prohibits the use of a block smaller than 100MW<sup>40</sup>. Indeed, too many parameters impact the end result, therefore using a block less than 100MW would break reproducibility of the outcome. ELIA has shown this by means of an extensive analysis, involving 5000 Monte Carlo year simulations and corresponding LOLE and P95 boxplot analysis. This result was in line with earlier European findings.

**SCARCITY EVENT**

| STAKEHOLDER      | FEEDBACK RECEIVED   |
|------------------|---|
| ENGIE Electrabel | Regional scarcity events<br><br>Given that Belgium is highly interconnected with its neighbours, scarcity is very likely to be a regional, not a national event. In practice, one can expect that Member States are net importers or net exporters during system stress. We therefore propose to differentiate between scarcity events with and without load curtailment. While the adequacy study in principle only looks at moments of load curtailment (loss of load expectation), such characterization of the scarcity event would add information on the reliable capacity sharing among Member States, and help assessing the Belgian situation even better. |

**ANSWER:**

We thank ENGIE for this very interesting analysis’ proposal. The modelling of ELIA indeed properly identifies situations/hours in which any bidding zone might not able to meet its demand locally and hence relies on imports to ensure its adequacy, ie hours in which such bidding zone “isolated” will have ENS ≠0.

The market will follow the principles of welfare maximization which also includes the minimization (avoidance) of the occurrence of Energy Non-Served (ENS) in the system. The resulting flows between bidding zone are thus allocated such that all imports are allocated maximally towards the bidding zone(s) relying on imports to ensure its adequacy. Finally a ‘scarcity situation’ is reached if the market, is as a whole, ‘scarce’. This means:

- The bidding zone(s) relying on imports present ENS (ENS ≠0 means the country is in ‘scarcity’) even after the market has allocated all the available energy towards them;
- Transmission capacity and / or available production capacity (resource) of the exporting countries is said to be ‘scarce’, i.e. it is not enough to avoid the occurrence of ENS in the system, despite the fact that the system will maximally try to avoid this.

In the previous study ELIA has provided some additional insights on simultaneous scarcity, imports during scarcity events in Belgium and the ability of other countries to provide energy during those scarcity hours. ELIA will further improve the analysis to better reflect the ‘regional’ character of scarcity events.

---

<sup>40</sup> <https://www.elia.be/en/users-group/wg-balancing/taskforce-strategic-reserve/2018-07-09-meeting>

## 7. Comments on suggestions for sensitivities

An overview of the received proposals for sensitivities is given here. However, the detailed comments and feedbacks for each sensitivity can be found in the related section of the report. This section gives a non-exhaustive list of sensitivities that will be performed with as much as possible quantified information regarding the actual stage of the study. Indeed, data and sources needed to build those sensitivities and quantify them still need to be studied and discussed within the CdC.

### Sensitivities regarding Belgium data:

- On CHP installed capacity, a sensitivity with large increase (+1000 MW) and a sensitivity large decrease (-1000MW);
- On the total electricity demand, at least a sensitivity with high demand (e.g. based on WAM scenario for EV and HP) and a sensitivity with lower electricity demand;
- On the Demand Side Response and storage capacity, one sensitivity with no new capacity (same capacity as today) and one with new storage and DSR capacity;
- On the Renewable Energy Sources capacity, a sensitivity with high RES (e.g. 1.5x growth rate for PV and wind onshore) and one with low RES (e.g. 0.5x growth rate), including the wind offshore sensitivities discussed in the comments made in this report;
- On the thermal installed capacity, one sensitivity with no thermal at risk (e.g. CHP and CCGT reported).

### Sensitivities regarding economics data:

- On CO2 prices, a sensitivity with higher prices (e.g. based on WEO – SDS scenario).

### Sensitivities regarding data abroad:

- On the nuclear availability abroad (e.g. in France and/or Switzerland);
- On lower RAM assumption for flow-based (e.g. 50% RAM);

## 8. Next steps

ELIA thanks all the market players for their participation to this public consultation. Based on the reactions received from market players and the answers given, as set out in this consultation report, ELIA will implement changes in the input data and methodology.

ELIA continues working on this study by integrating the feedbacks, discussing the specific topics within the CdC and implementing the methodology in order to carry out the analysis of the Adequacy and Flexibility needs for the 2022-2032 time horizon by June 2021. The results will be presented on 08 of March 2021 to the market parties during the ad hoc Task Force Adequacy & Flexibility study and the final report will be made available.

## 9. Attachments

The reactions ELIA received to the document submitted for consultation from the following market parties can be found in the appendix of this document:

- COGEN Vlaanderen
- Belgian Offshore Platform
- CREG
- FEBELIEC
- Greenpeace and Inter-Environnement Wallonie
- FEBEG
- ENGIE Electrabel

In attachment, the reader will also find the study from P. Boudt “*Accounting for model, policy and downside risk in the economic viability assessment of investments in electricity capacity: The hurdle rate approach*” on the Economic Viability Assessment.

Regarding the climate years and database used, several documents can also be found in attachment:

- A user guide from MeteoFrance “*Utiliser les simulations à climat constant*” which gives an comprehensive overview of the key aspects of the methodology of MeteoFrance;
- A technical document from MeteoFrance “*DSM-CS-ENR-SCenClim2014\_T2m\_V1-1*” which explains how the temperature is calibrated;
- A technical document from MeteoFrance “*DSM-CS-DC-ENR\_ScenClim2014\_T2m\_Stations-V1-1*” which explains how the interpolation to constant climate 2025 is done;
- A presentation from MeteoFrance “*Simulations à climat constant : conception et utilisations*” covering the most important points related to the climatic database of MeteoFrance.
- A document from the French TSO RTE “*Representation of the effects of climate on the electrical system: modelling Wind and Solar Generation*” explaining how the climatic data are converted into energetic data.

### Contact

#### Elia Consultations

Consultations@elia.be

#### Elia System Operator SA/NV

Boulevard de l'Empereur 20 | Keizerslaan 20 | 1000 Brussels | Belgium

