Report on the public consultation regarding the scenarios for the 10-year Federal Development Plans Electricity and Hydrogen

Task Force Multi-Energy Scenarios

fluxys elia

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1. Introduction

Fluxys and Elia started a process in March 2025 aiming at building energy scenarios to be used to prepare their upcoming 10-year Federal Development Plans for electricity and hydrogen for the next 10 year period. Three public workshops were organised to gather input from the stakeholders as a preparation to the report submitted to public consultation from 18 July to 12 September. The timeline of the scenario creation is illustrated in the figure below.

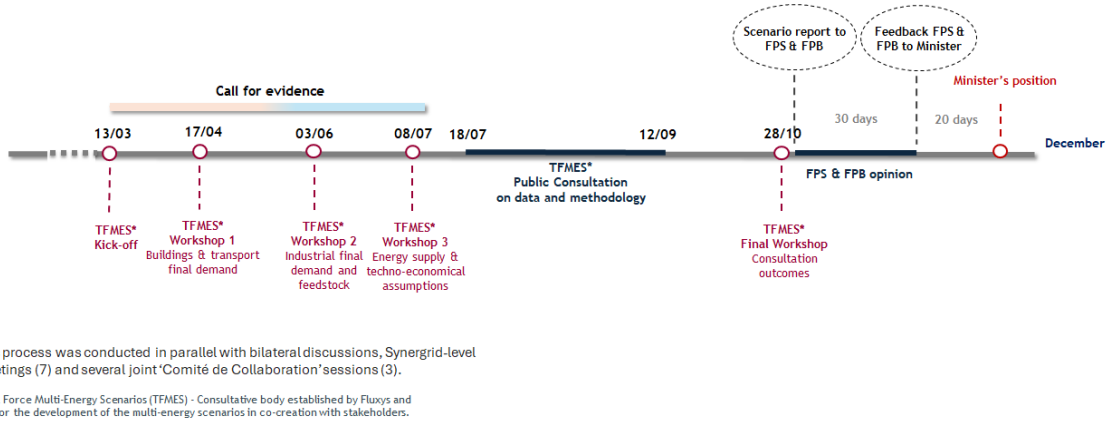


Figure 1-1 - Timeline scenario creation (2025)

This consultation was conducted according to Article 10, §1 and Article 29, §1 of the Royal Decree of May 12, 2024[1], on the procedure for the development, approval, and publication of the hydrogen transmission network development plan and the electricity transmission network development plan.

The purpose of this consultation was to collect feedback from current or future users of the electricity or hydrogen transmission networks, distribution network operators, the CREG, and relevant regional authorities, as well as other interested organisations (e.g. NGOs, academic institutions, research bodies, etc.) regarding the storylines proposed, the data put forward, potential sensitivities and the methodologies consulted upon.

This report consolidates the non-confidential feedbacks received during the consultation and presents Elia's and Fluxys' responses to the comments and suggestions. Confidential feedback will be handled bilaterally with the respective stakeholders.

We would like to take the opportunity to express our sincere gratitude towards all stakeholders who helped shape the present scenarios by participating in the workshops,

[1] 12 MAI 2024. - Arrêté royal portant la procédure d'élaboration, d'approbation et de publication du plan de développement du réseau de transport d'hydrogène et du plan de développement du réseau de transport électricité Moniteur belge

provided input in bilateral exchanges and who participated in the present public consultation.

An overview of the content of this report was presented in a final workshop of the Task Force Multi-Energy Scenarios on October 28th and will be sent to the authorities as well as published on the Fluxys and Elia's websites.

2. Documents submitted to consultation

As part of this public consultation[2], several documents were submitted on the 18th of July 2025.

Documents:

- A general document detailing the context, methodologies, key assumptions, proposed scenario assumptions and values but also general questions.
- An Excel file containing detailed quantitative inputs and assumptions per sector for each scenario.
- A document describing several key elements of the modelling approach to be used in the national development plan for electricity.

[2] Elia's website: Public Consultation on the scenarios for the 10-year Federal Investment Plans of the Electricity and Hydrogen ; Fluxys's website Public Consultation on the Scenarios and Data for the Evolution of Energy Consumption and Supply in Belgium)

3. Updates in public information since the launch of the public consultation

Since the start of the public consultation new information relevant for the creation of scenarios became available. This input was taken into account when adapting the scenarios for the present consultation. Below is a list of the main inputs additionally taken into consideration:

- FL government: Updated VEKP (18/07/2025)[3]
    - Including additional measures to reach -40% ESR objective by 2030 (previous assessment only reached -32%)
- FL government: Programmanota 2026-2030: 'Klimaatsprong voor de industrie - Transitieprogramma voor een koolstofarme en competitieve energie-intensieve industrie tegen 2050'[4] (18/07)
- Federal government: agreement on contribution to NECP[5] (21/07)
- Federal government: supports the -90% EU GHG emissions reduction target at EU level[6] (21/07)
- EU-US trade deal: 15% tariffs on most goods + 250 Bn/y energy purchase commitment[7] (27/07)
- Federal government: wants to start Tihange 1 extension negotiations[8] (19/08)
- Federal government + regional governments: consolidated NECP for Belgium (06/10)[9]
- Data was shared concerning the forthcoming study of the Federal Planning Bureau on the energy perspectives

[3] definitief VR VEKP 21-30
[4] Programmanota 2026-2030 Klimaatsprong in de Industrie
[5] La contribution finale au Plan National Energie-Climat validée par le Gouvernement fédéral ! | Jean-Luc Crucke
[6] Objectif climatique 2040 : Le gouvernement fédéral soutient la réduction de 90 % proposée par la Commission européenne | Jean-Luc Crucke
[7] Statement by the President on the deal with the United States
[8] Federale regering wil ook oudste kernreactor van Tihange langer openhouden | VRT NWS: nieuws
[9] BE_NEKP_update_2025_final_jfzfwp.pdf

4. List of stakeholders having reacted

In response to the public consultation, Fluxys and Elia received **non-confidential replies** from the following parties:

- Alfaport VOKA
- BBL Canopea
- Belgian Hydrogen Council
- Belgian Offshore Platform
- Bnewable
- BSTOR
- COGEN
- CREG
- EDORA
- ENGIE
- Essenscia
- EV Belgium
- FEBEG
- FEBELIEC
- Fevia
- Gouvernement wallon
- Karno.Energy
- negaWatt
- ODE Vlaanderen
- ORES
- TotalEnergies
- Vlaamse Nutsregulator
- Vlaamse Regering

In addition, multiple responses were received that were designated as confidential. These responses will be answered with dedicated confidential reports.

All non-confidential contributions received are available on Elia's and Fluxys's websites[10].

[10] See: Public Consultation on the scenarios for the 10-year Federal Investment Plans of the Electricity and Hydrogen; https://www.fluxys.com/en/hydrogen/empowering-you/customer-interactions/public-consultation-fluxys-elia

5. Instructions for reading this document

This consultation report is not a 'stand-alone' document but should be read together with the documents submitted for consultation.

The report is structured in the following way:

[A] **Subject**

Stakeholder	Feedback received
B	C

[D] **ANSWER**

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.
    1. In order to maintain authenticity, the comments have been copied as much as possible in this document. However, the comments have sometimes been shortened to make them easier to read.
    2. For clarification purposes, it is recommended to always consider the original comment of the concerned stakeholder, which will be published on the websites (Section 4).
D. This part contains Elia's and Fluxys's answer and argumentation, further explanation on the topic and proposed update for the topic.

6. General comments received

This section provides an overview of the general reactions and concerns of stakeholders that Fluxys and Elia received on the process of scenario creation and the documents submitted for consultation.

6.1 Scenario creation process

6.1.1 Comments on the process of scenario creation

Scenario creation process

Stakeholder	Feedback received
Vlaamse Nutsregulator	Elia geeft aan dat de scenario's worden opgemaakt in nauwe afstemming met de distributienetbeheerders en Synergrid. De Vlaamse Nutsregulator verwelkomt deze afstemming en wijst erop dat het de nood aan coherente assumpties met de scenario's van de distributienetbeheerders opnam als voorwaarde voor de toekomst bij zijn beslissing over het vorige investeringsplan voor het plaatselijk vervoernet van elektriciteit in het Vlaamse gewest *[Footnote: https://www.vlaamsenutsregulator.be/nl/document/besl-2023-31]:* "het investeringsplan dient te steunen op assumpties waarover werd afgestemd met de elektriciteitsdistributienetbeheerders, zodat deze assumpties coherent zijn met deze waarop de investeringsplannen van de elektriciteitsdistributienetbeheerders steunen." Dergelijke afstemming op vlak van scenario's is noodzakelijk om de verschillende elektriciteitsnetten op een coherente manier verder te ontwikkelen. De Vlaamse Nutsregulator moedigt Elia dan ook aan om hier verder werk van te maken. Voor een aantal aspecten zijn de distributienetbeheerders bij uitstek de referentie vanuit de kennis van hun net en de erop geconnecteerde netgebruikers. In het bijzonder lijkt het de Vlaamse Nutsregulator zeker ook zinvol om de distributienetbeheerders actief te betrekken bij de verdere evolutie van het proces rond "lokale redistributie". Fluvius bijvoorbeeld beschikt over een digitale twin van haar distributienet en is hierdoor in staat om voor een aantal types van verbruik (bv. elektrische voertuigen, warmtepompen) en productie (bv. zonnepanelen) zeer gericht te strooien. Dit vertaalt zich ook naar een gerichtere aanpak hogerop in het net, in eerste insttntie de

	koppelpunten met het Elia-net. Door hiervan gebruik te maken kan de lokale redistributie ook voor het Elia net zo gericht mogelijk gebeuren voor deze types van verbruik en productie.
EV Belgium	On behalf of EV Belgium, we would like to sincerely thank Elia and Fluxys for the excellent and exceptionally thorough preparation of this public consultation. It's good to see the complex challenges surrounding the energy transition being addressed with such depth and detail. The scenarios and underlying data presented provide a robust foundation for the discussion on the future development of the Belgian energy grid and the transition to a sustainable energy landscape. The open and transparent approach to this consultation, which allows various stakeholders to share their insights, is commendable. [...] The analysis in the consultation documents is an excellent basis for the necessary political decisions that must follow. The transition requires a coordinated approach, and it is essential that the government backs these forecasts with clear and decisive supporting policy measures to prepare the infrastructure and the economy for the future. **<u>Conclusion</u>** The scenarios and analyses that Elia and Fluxys have presented in this consultation are an impressive piece of work and a strong foundation for the future. The focus in both the ELEC and BASE scenarios (but also in the MOL scenario) on the electrification of mobility demonstrates foresight. Based on the insights presented and the points we have raised, we are convinced that, with the right political support, Belgium is ready for the mobility transition. [...] In conclusion, we would like to again thank Elia and Fluxys once more for this crucial and in-depth consultation, which provides an indispensable foundation for Belgium's future energy strategy. Our contribution aims to refine these projections by providing a more detailed insight into the accelerated adoption of electric mobility, encompassing both passenger vehicles and freight transport.
Essenscia	The transparent **co-creation** of future energy scenarios is much appreciated. We also believe in the usefulness of aligning scenarios between Elia and Fluxys.

ODE Vlaanderen	Als ODE Vlaanderen waarderen wij Elia's inspanningen om de hernieuwbare energie technologieën te integreren in de studie over bevoorradingszekerheid en systeembalans.
TotalEnergies	TotalEnergies has been informed about this public consultation quite lately in the process and we were still involved in the last stakeholder workshops, whereas several remarks and points have been addressed that are also part of this comment note. In general, as TotalEnergies, we are positive about the initiative as such. It is important to align the infrastructure for electricity and hydrogen and long term scenarios being established.
Febeliec	Febeliec welcomes the opportunity to provide input on the scenarios for the 10-Year Federal Development Plans for Electricity and Hydrogen. Febeliec also wishes to thank Elia and Fluxys for organizing the preparatory workshops, which were well-prepared, insightful, and allowed ample room for questions and constructive feedback.
ENGIE	ENGIE Belgium recognizes the potential added value of Elia Transmission Belgium and Fluxys Belgium coordinating their efforts and jointly launching a public consultation. Yet this potential will only be achieved if the process results in scenarios that are coherent, aligned with climate objectives and cost-efficient for society. In particular, the differing nature of the two development plans creates a risk of suboptimal scenarios. The electricity development plan relies on an existing and well-established transmission grid (ideally though not exclusively for renewable electricity), whereas the hydrogen development plan involves creating new transport infrastructure to carry primarily, if not exclusively, low-carbon or renewable hydrogen. In this context, the Hydrogen law requires that the (hydrogen) development plan include an analysis of the compatibility of planned investments with Belgium's climate objectives (Art 14 §2, 4°). Such a provision is does not exist in the electricity law. [...] When shaping Elia's and Fluxys's respective 10-year Federal Development Plans for electricity and hydrogen, scenarios should be designed with a clear objective of optimizing investments so as to minimize the overall cost of the transition for society. This essential focus on cost efficiency is currently missing. This is

	confirmed by the disclaimer on page 19: "[…] scenarios are not based on a global/total system cost economical optimization […]". ENGIE Belgium's recommendation is to: • Jointly develop scenarios that minimize the total infrastructure cost for both electricity and hydrogen Asses decarbonization pathways towards net zero that minimize infrastructures costs. In this context, the question to be answered is which pathway minimizes infrastructure costs: a pathway based on existing NECP policies that fall short of reaching the 2030 targets, or a pathway that meets the targets ; both pathways maintaining the net-zero objective for 2050 unchanged.
FEBEG	FEBEG believes that there indeed could be value in developing development plans for electricity and molecules together. If both plans are not coordinated, there is a risk of creating scenarios that are inefficient or unnecessarily expensive for society. The planning process should aim to minimise the total cost of infrastructure for both electricity and hydrogen, while ensuring that Belgium's climate targets are met.
Vlaamse Regering	Deze brief is een aanvulling op de technische gegevensuitwisseling die eerder plaatsvond tussen het Vlaams Energie- en Klimaatagentschap (VEKA) en Elia met betrekking tot het Vlaams Energie- en Klimaatplan (VEKP) waarvan de recentste versie werd goedgekeurd door de Vlaamse Regering op 18 juli 2025. Niet tegenstaande vormt het VEKP nu ook het centrale uitgangspunt voor deze gecoördineerde Vlaamse reactie op de voorgelegde scenario's van Elia. Het VEKP bevat namelijk de actuele en relevante beleidslijnen en –doelstellingen op het vlak van energie en klimaat, met daarin de nodige cijfermatige uitgangspunten voor 2030 aangaande de relevante thema's uit de consultatie. Het VEKA heeft samen met Vlaamse actoren kennisgenomen van de scenario's met datagedreven onderbouwing in het kader van de consultatie, met bijzondere aandacht voor de thema's die het meeste raakvlak hebben met de Vlaamse beleidsdomeinen. We stellen de systematische en gedifferentieerde aanpak van de scenario's op prijs. Bij de opmerkingen die hieronder nader worden toegelicht, dient het BASE-scenario telkens als uitgangspunt.
Belgian Hydrogen Council	In general, as BHC, we are positive about the initiative as such, i.e. the intention to align the infrastructure for electricity and hydrogen and long term scenarios being established.

ANSWER

Elia and Fluxys would like to sincerely thank all stakeholders for their constructive feedback throughout the workshops and the public consultation.

This process marks a first-of-its-kind collaboration in Belgium between the electricity and gas sectors. Both Elia and Fluxys strongly support continuing this joint effort in the future, as developing a robust and widely agreed set of scenarios is essential for quantifying and implementing the infrastructure required for both electrons and molecules.

The approach taken involved building scenarios based on stakeholder input, national ambitions, and existing policies. It is important to note that the objective of this exercise was not to optimise the different energy mixes - this is the focus of other studies, including some previously initiated by Elia and Fluxys or found in academic literature. The quantification of the needed infrastructure in each scenario (which is a time-consuming process) is the next step which will take place in 2026 as it is to be performed once the scenarios are set by the end of the year.

Regarding the process itself, we are committed to fostering a transparent and inclusive exchange of ideas, engaging with stakeholders from diverse communities including academia, policymakers, NGOs, and others. In this spirit, the Task Force Multi-Energy Scenarios was established, enabling the co-creation of Belgium-focused scenarios for the first time through a process jointly chaired by Elia and Fluxys.

As a reminder, the co-creation process included:

- Close day-to-day collaboration between Elia and Fluxys;
- Regular exchanges with DSOs via Synergrid;
- Joint “Comité de Collaboration” with the federal regulator, plan bureau, FPS Economy, and the energy minister cabinet as part of the development plan process;
- Multiple workshops involving a broad spectrum of Belgian stakeholders (grid users, academia, public authorities, NGOs, etc.);
- Numerous bilateral discussions and exchanges with stakeholders. A special attention was given to regional authorities in order to grasp their input into the scenarios;
- A public consultation on the scenario methodology, modelling assumptions, and detailed quantitative data.

Stakeholders have expressed appreciation for this new collaborative approach and a clear interest in continuing along this path. Both Fluxys and Elia will look into how this approach could be re-iterated and improved in the future.

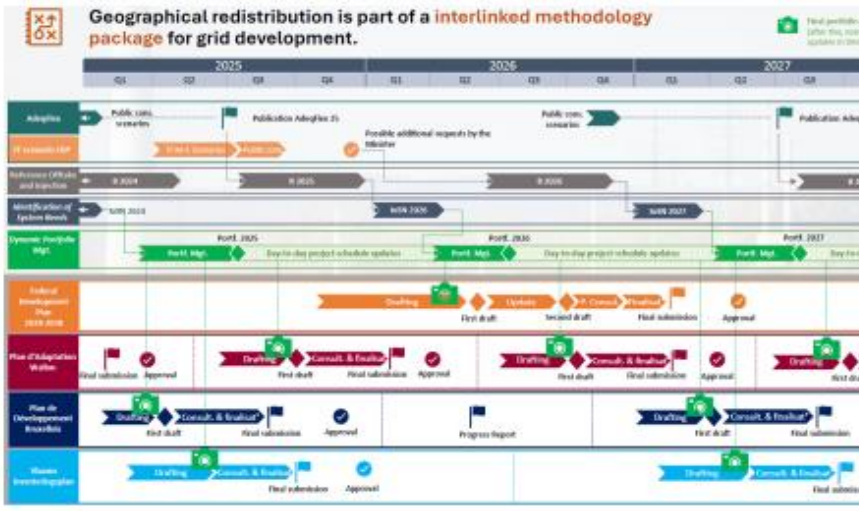
6.2 General methodology

Changes made since the public consultation:

- **Addition of an energy independence indicator**: The national development plans will include an indicator of the energy independence of Belgium. In addition, an indication of Belgium's overall energy independence (molecules and electricity) will be added to the updated scenario report.

6.2.1 Link with local grid development

Link with local grid development

Stakeholder	Feedback received
Vlaamse Nutsregulator	Bij de kick-off van de door Elia opgerichte taskforce 'Local Redistribution of Injections and Offtakes' ("LRIO") *[Footnote: https://www.elia.be/en/users-group/wg-belgian-grid/task-force-lrio/20250515-workshop]* heeft Elia de samenhang van haar methodologieën en studies samengevat in onderstaande figuur 1:  *Figuur 1 - interlinking studies en methodologieën (bron: Elia)* In dit overzicht vinden we de huidige taskforce 'Multi-Energy Scenario's' bovenaan terug onder de afkorting 'TF M-E Scenarios'. […] Uit de taskforce 'Multi-Energy Scenario's' begrijpt de Vlaamse Nutregulator dat dit traject tot doel heeft om voor een aantal te definiëren scenario's jaarlijkse verbruikshoeveelheden (TWh) te

bepalen, zoals vermeld in paragraaf 1.1 van het consultatiedocument *[Footnote: Accompanying document to the public consultation, op https://www.elia.be/-/media/project/elia/elia-site/publicconsultations/2025/20250718_public-consultation-on-scenarios-and-data-for-energy-consumption-and-supplyevolution/subject/consultation_report_18072025_subject_to_public_consultation.pdf]* :

> *At this stage of the process, the objective is to develop a set of scenarios and assess:*
> *• Yearly final energy demand per sector and per energy vector up to 2050*
> *(except for methane, hydrogen and ammonia where data is provided up to*
> *2040 only, considering current uncertainties). Some data being also provided per region, and*
> *• The corresponding supply-side trajectories both for electricity and molecules*
> *(some also provided by region), and*
> *• Capacities for transformations between the different vectors.*

Tegenover de jaarlijkse verbruikshoeveelheden worden dus ook reeds een aantal eerste realistische leveringsscenario's gedefinieerd. Hierbij zijn kostenbatenanalyses, economische optimalisaties en netwerkmodellering (nog) niet in scope.

Om aan netontwikkeling te doen moeten de jaarlijkse hoeveelheden op nationaal niveau uiteraard vertaald worden naar een lokaal netniveau om te zien wat de impact op het net is. De Vlaamse Nutsregulator ziet deze stap onder het proces '**Reference Offtake and Injection'**, waarvoor de Elia taskforce LRIO aan stakeholders meer inzicht tracht te geven wat betreft de methodologie. In deze stap worden de jaarlijkse hoeveelheden op geaggregeerd niveau vertaald naar een lokaal netniveau via een proces van "lokale redistributie" (in Fluvius termen: "strooiing"). Vervolgens kan dan de noodzakelijke netontwikkeling geanalyseerd worden, onder het proces '**identification of System Needs'**.

Het lijkt de Vlaamse Nutsregulator zinvol verder te verduidelijken op welk punt in deze processen er precies wordt overgegaan van jaarlijkse energiehoeveelheden naar uurcurves, en bijgevolg dus ook een eerste vorm van capaciteit. In het consultatiedocument wordt wel vermeld dat dit pas in
een latere fase gebeurt, eens de scenario's met jaarhoeveelheden finaal zijn afgeklopt:

"*It is important to note, that the precise hourly dispatch will only be simulated once the supply and demand scenarios are finalized, and the corresponding input data is available. This will be done independently for the electricity market/system and molecules.*"

	De uurcurves voor netontwikkeling *[Footnote: Hier wordt dan uitdrukkelijk niet adequacy onder verstaan.]* krijgen voornamelijk nut na het proces van de lokale redistributie, gezien dan de impact op het netwerk duidelijk wordt en bijvoorbeeld ook een zicht ontstaat op afnameprofielen (anders dan verbruiksprofielen) en belastingsprofielen op netelementen, wat finaal de investeringsnoden transparant maakt. Op basis hiervan worden in de systematiek van Elia de investeringsprojecten verder geactualiseerd binnen een **dynamisch project portfoliobeheer** na goedkeuring via de respectievelijke **investeringsplannen of ontwikkelingsplannen** ("optimal grid proposal").
Vlaamse Nutsregulator	In de publieke consultatie worden de nationale getallen verdeeld over de drie gewesten. Het is voor de Vlaamse Nutsregulator niet volledig helder hoe deze opsplitsing zich verhoudt tot de verdere "lokale redistributie" die al in meer gedetailleerde mate rekening houdt met het elektrische net. De Vlaamse Nutsregulator merkt op dat het opdelen door Elia van haar methodologie voor opmaak van de investeringsplannen over verschillende, opeenvolgende processen bij stakeholders tot verwarring kan leiden. Alhoewel Elia wel duidelijk maakt welke het doel en toepassingsgebied van een bepaalde methodologie of studie is, kan dit volgens de Vlaamse Nutsregulator nog explicieter en meer consequent. Dit zal stakeholders in staat stellen om hun vragen en opmerkingen gerichter en in de juiste context te stellen. Bovendien biedt het de stakeholders de mogelijkheid om ook over de samenhang van de processen vragen en opmerkingen te formuleren.

ANSWER

Regarding the redistribution of offtake and injections to a local level

The redistribution of load and production to a more local level is indeed important to ensure investments are made where they are needed. In the present consultation Elia has taken a step forward with respect to previous consultations by providing a split of the load over the regions. The redistribution to local levels for the electricity related components is discussed in the framework of the Task Force Local Redistribution of Injections and Offtakes[11] which is organised by Elia. In this Task Force, local redistribution methodologies are presented by Elia experts in interactive workshops, and each iteration ends with a public consultation. A separate Task Force about local redistribution

[11] Task Force LRIO

methodologies has been preferred, as these methodologies not only impact the Federal Development Plan, but also the Regional Development Plans and other studies performed by Elia, such as clients connection studies.

Regarding the methodology to translate annual to hourly loads

Elia would like to point out that the methodology to translate annual loads to hourly loads (for electricity) at regional or federal level was part of the present consultation. The hourly loads which will result from this methodology will be developed once the scenarios are final and as such were not part of the consultation. This translation to hourly loads is an intensive process which will take place once the final scenarios are known and the Minister of energy has taken position on the scenarios to be used in the national development plans.

In a nutshell, the profiles at Belgian level are created by considering different layers:

- Rescaling historical profiles of existing usages to reflect factors like economic growth, population changes, and energy efficiency.
- Adding new electrification forms not present historically (e.g., heat pumps, electric vehicles) since they have unique profiles. Some profiles are defined based on local incentives and tariffs (defined ex-ante), while others are market-driven (optimised in the market model).
- The flexibility of the different categories and processes is accounted for in the simulation. The consumption will be influenced by the market-dispatch (for the 'market-driven' flexibility).
- The final hourly profiles are then only known at the very end of the market study.

Note that the creation of profiles at local level is discussed in the context of the Task Force LRIO and not in the scope of this consultation.

6.2.2 Hourly profile and peak demand

Hourly profile and peak demand

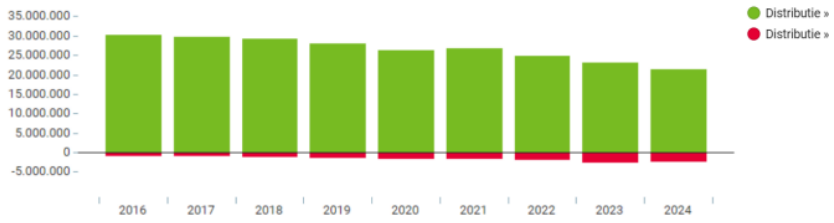
Stakeholder	Feedback received
Vlaamse Nutsregulator	Voor de beoordeling van netinvesteringen is, zoals reeds aangehaald in paragraaf 2.1, de evolutie van het jaarlijkse elektriciteitsverbruik minder relevant; wel de **evolutie van de afname(piek) en injectie(piek)** van het net. Niet het verbruik door gezinnen en bedrijven, maar de piekbelasting op het net zou netinvesteringen in hoofdzaak moeten drijven *[Footnote: Die*

piekbelasting hangt af van de mate waarin gezinnen en bedrijven hun verbruik spreiden. Dat wordt onder meer beïnvloed door de manier waarop de nettarieven worden aangerekend. In Vlaanderen gebeurt dat sinds 2023 deels met een capaciteitstarief. In een recent rapport (link: https://www.vlaamsenutsregulator.be/nl/document/rapp2025-11) stelt de Vlaamse Nutsregulator kwantitatief vast dat het capaciteitstarief netgebruikers effectief aanzet om hun verbruik te spreiden en maandpieken te beperken. Vooral netgebruikers met hoge pieken, in het bijzonder EV-eigenaars, passen hun gedrag aan. Zij verlagen hun piekverbruik gemiddeld met 5%. Dat vertaalt zich in een vergelijkbare daling van de belasting op de distributienetten. Het kan zinvol zijn voor Elia om ook rekening te houden met die resultaten in zijn toekomstscenario's.] .

Beide evoluties zijn niet noodzakelijk gelijklopend, zoals blijkt uit het laatste jaarlijkse rapport van de CREG over de evoluties op de Belgische groothandelsmarkten *[Footnote: Study on the functioning and price evolution of the Belgian wholesale electricity market - Monitoring Report 2024, par. 1.1 Total load and residual load, https://www.creg.be/nl/publicaties/studie-f2965]*. Zowel het elektriciteitsverbruik als de afname van het transmissienet in België vertonen over de voorbije jaren een licht dalende trend, maar het verschil tussen verbruik en afname wordt daarbij telkens iets groter. Steeds meer lokale productie en zelfverbruik spelen daarin een rol.

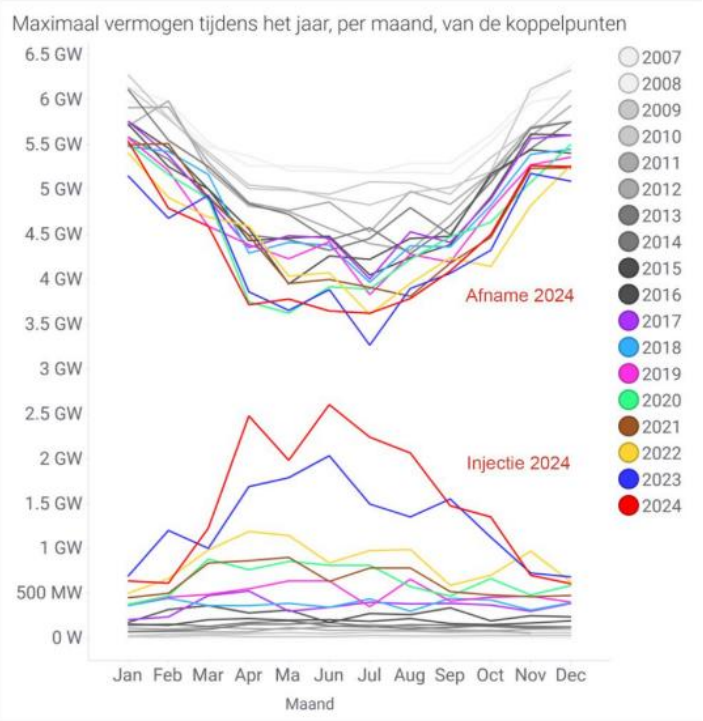
De studie van de CREG over de elektriciteitsbelevering van grote industriële afnemers in 2023 *[Footnote: Studie (F)2904 van 5/12/2024 'Studie over de elektriciteitsbelevering van grote industriële afnemers in België in 2023', par. 2.1 Bestudeerd segment.]* bevestigt die tendens, nl. ze illustreert dat zowel het aantal grote industriële afnemers als hun totale afname doorheen de jaren daalt.

De Vlaamse Nutsregulator stelt vast dat de jaarlijkse energiehoeveelheid afname door het Vlaamse distributienet van het transmissienet niet stijgt, maar al enkele jaren daalt. De jaarlijkse injectie vanuit het distributienet naar het transmissienet neemt daarentegen toe. Onderstaande grafiek toont die evoluties (in MWh per jaar). Cijfers op maandelijkse basis zijn beschikbaar in een dashboard op de website *[Footnote: Zie dashboard aantal elektriciteitsgebruikers en hun verbruiken.]*.



Figuur 5 - Uitwisseling tussen distributienet en transmissienet (MWh)

Ook de maximale afnamebelasting op de koppelpunten van het transmissienet met het Vlaamse distributienet vertoont doorheen de jaren een algemeen dalende trend. Voor injectie is die trend stijgend. Dat blijkt uit onderstaande grafiek, die per jaar en per maand de hoogste gezamenlijke afname- en injectiepiek (in GW) op de koppelpunten weergeeft.



Figuur 6 - Synchrone piek afname en injectie op de koppelpunten

ANSWER

Regarding the methodology to translate annual to hourly loads

The methodology to translate annual loads to hourly loads (for electricity) at regional or federal level was part of the present consultation. This translation to hourly loads is an intensive process which will take place once the final scenarios are known and the profiles including the dispatch of flexible load will only be known once the market-dispatch simulations have been run.

Regarding peak load

Secondly, Elia recognises that local peak loads are dimensioning parameters for the grid. It should however be noted that peak loads on the transmission grid depend heavily on the market dispatch and the actions taken by flexible assets. As such, defining peak loads ex-ante risks in under or overestimating the actual peak load after market dispatch. To

properly capture the investment needs, simulations (such as the ones which will be performed in the framework of the national electricity development plan) are required.

Regarding the evolution of energy offtake towards the distribution grid

VNR comments that a drop is seen in historical offtake of (energy) from the transmission grid towards the distribution grid. First it is key to understand that the total annual offtake is not the same as the peak load. While the total annual volume might be lower, sufficient capacity should be made available to support the needs at any moment, also during peaks. Secondly, care should be taken extrapolating historical trends towards the future. As steps are made towards the decarbonisation, the way we consume and produce energy is set to fundamentally change, moving towards more electrification. It is the goal of the current exercise to create a wide, yet credible range of such future scenarios.

6.2.3 Optimised planning

Optimised planning

Stakeholder	Feedback received
BBL - Canopea	**Importance d'une meilleure planification géographique y compris régionale** Le développement d'un plan de développement des réseaux énergétiques n'est pas seulement une question de quantité mais davantage de LOCALISATION des demandes et des consommations énergétiques à fortiori pour déterminer les besoins locaux et les productions décentralisées. A ce titre, la consultation donne peu d'informations sur les moyens d'optimiser le développement du Grid à l'échelle du territoire belge. . Plusieurs éléments devraient servir à cet effet : - Publier des cartes de capacité du réseau, comme spécifié dans le paquet législatif EU Energy Market Design. Cela serait également conforme au plan d'action récemment annoncé par Elia et Fluvius pour la gestion de la congestion pour les entreprises... - Promouvoir une intégration des réseaux de transport avec les réseau de distribution et les projets de réseaux énergétiques émergents (chaleur). - Le développement au niveau régional d'une meilleure stratégie et d'une meilleure planification des développements industriels notamment en fonction des besoins énergétiques.
FEBELIEC	Febeliec is of the opinion that in a situation with a scarce resource such as currently connection capacity, it is important to enable all available synergetic effects to use this scarce resource as

efficiently as possible. This includes integrating the synergetic effects of mixed sites, where load, generation and/or storage are combined, into grid planning and investment, to make more efficient use of the same reserved grid capacity as compared to standalone projects. Febeliec insists that such mixed sites and their efficiency improvement of grid use and thus reduction of investment costs should duly be taken into account and this on all grid levels, which are both currently not or at least insufficiently the case.

Vlaamse Regering

Bij de opmerkingen die hieronder nader worden toegelicht, dient het BASE-scenario telkens als uitgangspunt.

[...]

De problematiek rond laattijdige aansluitingen van bedrijven op het elektriciteitsnet is voor mij een groeiende zorg die nauw samenhangt met structurele congestie op de koppelpunten tussen transmissie- en distributienetten. Deze koppelpunten vormen de schakel waarlangs energie van het hoogspanningsnet naar het fijnmazigere distributienet wordt overgedragen. Wanneer deze punten onvoldoende capaciteit hebben, ontstaan er bottlenecks die de aansluiting van nieuwe of uitbreidende bedrijven ernstig vertragen wat directe gevolgen heeft voor de economische ontwikkeling en de energietransitie. Gezien de toenemende vraag naar elektriciteit, onder meer door elektrificatie van industrie en mobiliteit, is het van cruciaal belang dat deze koppelpunten tijdig en structureel worden versterkt. Scenario's voor netontwikkeling moeten deze versterkingen expliciet meenemen om toekomstige knelpunten te vermijden.

Daarbij is ook een robuust en toekomstgericht uitgebouwd hogerliggend transmissienet essentieel om de groeiende capaciteit op het distributienet mogelijk te maken. Recente communicatie van netbeheerders bevestigt dat meerdere zones reeds kampen met netcongestie, en de verwachting is dat deze situatie zich verder zal uitbreiden indien er geen doortastende maatregelen worden genomen. Voor bedrijven die aangesloten zijn op het distributienet is het hoogspanningsnet immers een onmisbare ruggengraat: zonder voldoende capaciteit op het transmissieniveau kunnen ook zij niet rekenen op tijdige of voldoende versterking, zelfs al zou het distributienet voldoende sterk zijn gedimensioneerd. In dit kader rust er een duidelijke verantwoordelijkheid om proactief te handelen en zo te vermijden dat de energietransitie wordt vertraagd of zelfs gehinderd. Alleen door voldoende en tijdige investeringen en een gecoördineerde aanpak kunnen we de noodzakelijke infrastructuur garanderen die de economische groei en de klimaatdoelstellingen ondersteunt.

	Verder is het van groot belang om tijdig en transparant te communiceren over de impact van Elia's geplande netinvesteringen op de toekomstige nettarieven. Hoewel Elia aangeeft dat markt- en beleidsontwikkelingen het moeilijk maken om het effect van de investeringen op de nettarieven te voorspellen, is een tariefaanpassing aannemelijk als gevolg van de nodige investeringen. Gezien de maatschappelijke impact daarvan, vooral voor huishoudens en bedrijven, vraagt de Vlaamse overheid om duidelijke input op dit vlak.
Bnewable	**3. Dynamischer updateproces op basis van marktrealiteit** Scenario's en investeringsplannen moeten sneller kunnen worden bijgestuurd wanneer de marktrealiteit door economische en technologische evoluties wijzigt en een sterke afwijking wordt vastgesteld van de oorspronkelijke aannames. Belangrijke signalen voor bijsturing zijn onder andere: • wijzigingen in het beleidskader (zoals mogelijks het wegvallen van de vrijstelling van transmissienettarieven voor rechtstreeks aangesloten elektriciteitsopslag (FTM) vanaf 2028); • kostendaling van batterijen; • belangrijke wachtrijen in het aanvraagproces bij DNB's en TSO; • input uit marktconsultaties zoals deze. **4. Meer capaciteitsefficiëntie door passende producten en transparantie** Bestaande netcapaciteit moet efficiënter ingezet worden en schaarse netcapaciteit moet maximaal beschikbaar worden gesteld via: • tarifaire producten voor firm en non-firm capaciteit; • meer transparantie over de aard en oorzaak van congestie; • verdere ontwikkeling van flex ibiliteitsmarkten; • betere interactie tussen marktspelers, DNB's en TSO's rond congestiebeheer en aansluitingsaanvragen. **5. Betere afstemming met ruimtelijke ordening en vergunningen** De haalbaarheid van industriële projecten en netontwikkeling hangt sterk af van de ruimtelijke en vergunningstechnische context. Wij pleiten voor een betere integratie van ruimtelijke planning in de scenario-ontwikkeling, maar ook omgekeerd: noden die voortvloeien uit de ontwikkelingsplannen zouden aangewend moeten kunnen worden om ruimtelijke planning bij te sturen. Deze interactie kan tegelijk bijdragen aan meer voorspelbaarheid en snelheid in vergunningsprocedures.
Belgian Offshore Platform	Grid developments are the bottlenecks for timely realisation of renewable energy projects. This has become very visible by the delay of the offshore tender for the Princess Elisabeth

developments due to the delays in the grid reinforcement projects "Ventilus" and "Boucle-du-Hainaut" as well as the new offshore grid infrastructure of the MOG2. Therefore grid developments for large (renewable) energy projects are to be anticipated to the largest extent possible, by providing long-term visibility and to explore and utilise the available possibilities under the "Anticipatory investment framework for developing forward-looking electricity networks" the European Commission has created.

ANSWER

Concerning the three elements brought forward by BBL - Canopea

Elia would first like to confirm BBL – Canopea that the three elements mentioned in their response are covered. Firstly a map of grid capacity is available publicly on the Elia website[12]. Secondly, district heating was discussed during the workshops and taken into account in the scenarios. Finally, to ensure grid planning follows the needs of the grid users Elia involves as much as possible regions, distribution system operators, NGOs, academics, private and public actors… in the scenario development process. The present Task Force with its workshops, bilateral discussions and public consultation is a good example of this. More particularly, special attention was given to the regional authorities during the process in order to grasp their input for the scenarios. The answers from the Flemish and Walloon authorities on this consultation are very welcome to ensure that the grid that will be developed is in-line with the regional expectations and industrial development.

Concerning scarcity of grid connection capacity

Febeliec and the Vlaamse Regering comment that grid hosting capacity is currently a scarce resource. The Vlaamse Regering further stresses the importance to foresee sufficient capacity for further growth of electricity consumption. Elia wants to remark that this highlights the need for transmission system operators to get timely information from the authorities and grid users of where new capacity needs to be foreseen and by what time horizons.

Finally, Febeliec further urges Elia to consider mixed sites (energy consumption and generation) as an efficient way to integrate more capacity on the grid. Elia would like to confirm that such synergetic effects are indeed taken into account in grid planning processes. The hosting capacity map (see earlier) also incorporates this which further allows grid users to identify the optimal location for a new grid connection depending on its characteristics (load/flexibility…).

[12] https://www.elia.be/en/customers/connection/grid-hosting-capacity

Concerning the total cost of scenarios and impact on the tariffs

Elia and Fluxys would like to remind that the goal of this scenario process is not to assess the total costs or tariff impact of scenarios. Its goal is rather to create a diverse but credible set of scenarios which can be used as basis for the federal/regional development plans of Elia and Fluxys. These scenarios will be used as a basis to assess, in the next phase of said development plans, the needs for further grid reinforcement. A view on future planned projects, and indicative costs of these, can thus only be indicated in a next phase.

Concerning the comments of Bnewable

On the update of the scenarios, Elia is following the energy landscape evolution on constant basis and updating the scenarios regularly, based on latest information. While the Federal Development Plan is not a yearly exercise, Elia is constantly busy with grid studies. As discussed within the framework of the Task Force Local Redistribution of Injections and Offtakes (Task Force LRIO), the scenarios for grid studies are defined through public consultations, that take place in the context of the Adequacy and Flexibility studies (every 2 years) or the Federal Development Plan (every 4 years) and updated on a yearly basis by Elia to support grid studies such as connection studies, long term infrastructure adaptation studies and dynamic portfolio management, based on the latest available information.

In order to enhance the communication on the grid hosting capacity, Elia is publishing a map available publicly on the Elia website. This map is intended to pre-inform grid users on a first, high-level view on grid hosting capacities on top of already reserved/allocated capacities. It is however important to keep Elia informed on new projects and launch the existing processes (i.e. orientation and detailed connection studies) which will integrate additional constraints not taken into account in the grid hosting capacity.

Elia is working in close collaboration with the stakeholders both for both the 'macro' scenarios (as shared in this consultation) as for the local redistribution of injections and offtakes (LRIO Task Force) to ensure best estimate of the local data. Information from grid users and DSOs are used together with input from public authorities and associated agencies.

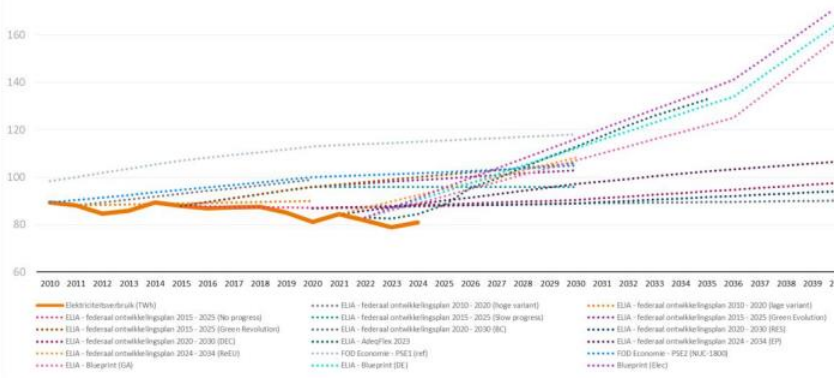
Concerning the comment from Belgian Offshore Platform

Elia actively supports anticipatory investments as part of its long-term strategy to ensure a resilient, future-ready and accessible electricity grid. This is especially important given the long lead times (often 10+ years) required to build transmission infrastructure compared to the faster deployment of e.g. renewable generation (3–5 years). This is also why Elia is asking for guidance from the authorities and the stakeholders and having such

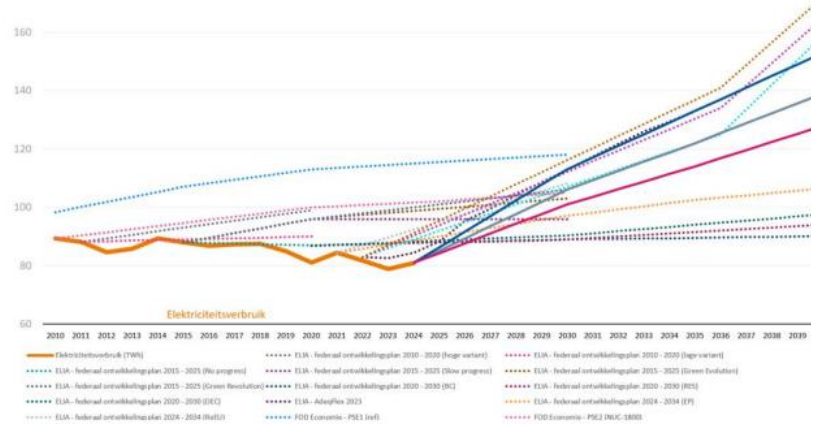
public consultations on the scenarios to ensure development of the electricity grid on time, in the interest of society.

6.2.4 Electricity demand projections

Electricity demand projections

Stakeholder	Feedback received
Vlaamse Nutsregulator	Aansluitend op zijn reactie in het kader van de publieke consultatie van de CREG over het MOG II *[Footnote: https://www.vlaamsenutsregulator.be/nl/document/rapp-2025-06]* herneemt de Vlaamse Nutsregulator zijn bedenkingen omtrent de scenario's voor de toekomstige evolutie van de elektriciteitsafname. De assumpties hieromtrent hebben immers een belangrijke impact op de raming van de benodigde investeringen en de verwachte kosten en baten die die investeringen voor netgebruikers opleveren. De Vlaamse Nutsregulator wenst hierbij volgende drie bedenkingen te maken: Het verleden leert ons dat een **voorzichtige benadering** bij het gebruik van toekomstscenario's voor het elektriciteitsverbruik aangewezen is. De Vlaamse Nutsregulator toonde eerder met onderstaande grafiek *[Footnote: Uit presentatie Ondernemingsplan Vlaamse Nutsregulator 2025.]* de evolutie van het werkelijk elektriciteitsverbruik in België (in TWh) sinds 2010 (oranje lijn) en de verschillende inschattingen die door Elia en de FOD Economie in het verleden werden gemaakt richting 2040 (stippellijnen). Een vergelijking met het werkelijk elektriciteitsverbruik voor de periode tussen 2010 en 2024 toont aan dat de verwachte evolutie telkens  *Figuur 3 - Elektriciteitsverbruik België (TWh/jaar) (bron: Elia, FOD Economie)* een beduidende overschatting van de werkelijke evolutie bleek te zijn.

De scenario's in de huidige publieke consultatie voorzien nog steeds de verwachting van een sterke stijging van het elektriciteitsverbruik. We stellen evenwel een lichte herziening naar beneden vast ten opzichte van de scenario's uit Elia's laatste Blueprint studie, zoals blijkt uit onderstaande grafiek.



Figuur 4 - Elektriciteitsverbruik België (TWh/jaar) met de nieuwe toekomstscenario's in volle lijn (bron: Eli Economie)

ANSWER

Past electricity demand evolutions versus projections

Elia would like to point out that the past evolution of electricity demand is not always a good indicator as to how future demand could evolve. Assuming constant or limited growth of electricity demand would imply sustained consumption of oil, gas and other fossil fuels, which does not align with European, Federal nor regional emission reduction objectives to which the respective development Plans are bound.

The figures shared by the VNR are not using the same definition of electricity consumption. Some of the studies excluded losses and energy transformation, other do not use normalised data as starting point. We would like you to refer to a similar figure published in the recent Adequacy & Flexibility study (June 2025) where Elia has depicted the evolution of electricity demand scenarios over the past 10 years from its recent Adequacy and Flexibility studies:

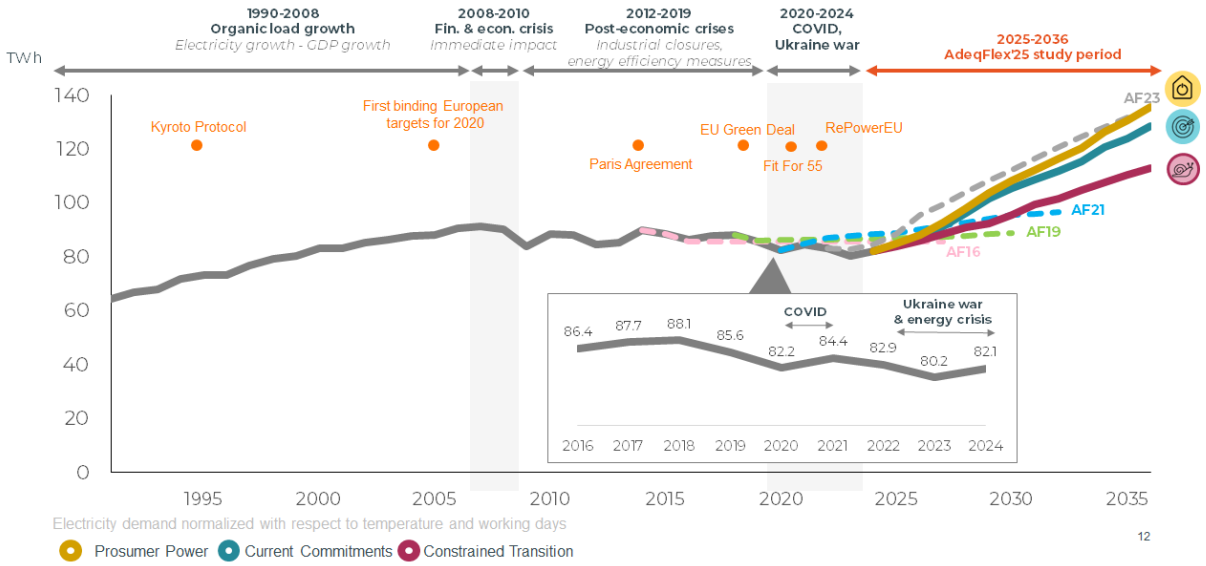


Figure 6-1 - Evolution of the normalised total electricity demand in Belgium

In the period 1990-2007, electricity demand has mainly followed gross domestic product (GDP) growth. The economic crises in 2008-2009 abruptly broke this historical trend leading to an immediate negative impact caused by the closure and delocalisation of some heavy industrial companies in Belgium. Despite the country's steady economic recovery, electricity demand stagnated in the period 2010-2019, mainly because of a significant improvement in energy efficiency across all sectors, while new forms of electrification (EVs, heat pumps, industrial heat) driven by decarbonisation efforts were nearly non-existent.

Scenario exercises inherently involve limitations when it comes to anticipating unexpected events (such as a global pandemic or the geopolitical and economic impacts of a war in Europe) which can significantly disrupt demand trends. Between 2020 and 2023, the COVID-19 pandemic, subsequent supply chain issues, price increases, and the Russian war in Ukraine led to new changes in electricity consumption patterns. After a small post-COVID rebound in 2021, the level of electricity consumption further decreased in 2022 and 2023, mainly due to the energy-intensive industrial sector facing challenges linked to elevated energy prices and resulting economic slowdown. As a result of higher energy bills, some residential and commercial consumers have become more economical in their energy use. However, the long period of high energy prices dampened some of the expected impact, slowing down the pace of electrification in certain sectors. In 2024, the electricity demand recovered somewhat (2% increase compared with 2023), as energy prices returned to more normal levels and the first effects of electrification of mainly the transport sector are being felt; however, it should be noted that energy prices remain higher than they were before the Russian invasion of Ukraine and are much higher than in certain regions of the world.

Future electricity demand projections compared to other studies

One of the key requirements of these long-term demand scenarios requires that Europe (and Belgium) eventually reaches net-zero emissions by 2050. One of the main levers to achieve this concerns the switch from fossil fuels to direct electrification and indirect electrification (green & low carbon molecules, CCS/U...). As illustrated below, other studies[13][14] which endogenously optimise the full energy demand and supply at least cost, while achieving net-zero (or near-zero) emissions similarly reach high levels of electricity demand:

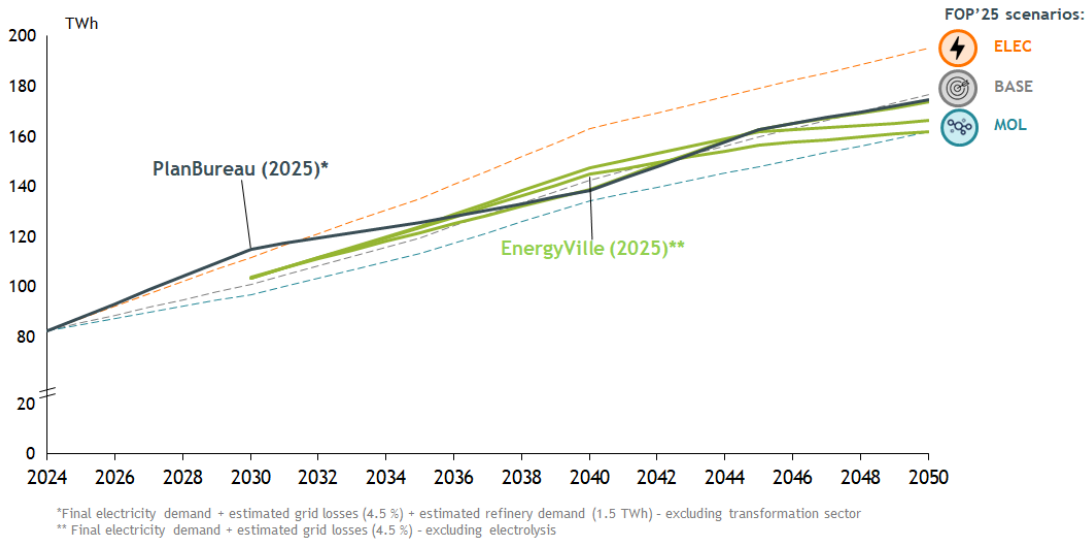


Figure 6-2 - Future electricity demand projections compared to other studies

Indeed, within the period under examination, it is expected that a new dynamic will come into play, as part of which electricity demand is expected to be mainly driven by the phasing out of oil, coal and natural gas in favour of electricity. In the transport sector, this evolution is already underway, whereas the uptake of heat pumps in the building sector remains slow in Belgium. In the industrial sector, many projects have been announced or are underway. The reason for the expected increase in electrification relates to several factors:

- In the wake of the Paris Agreement in 2015, and following the development of European and national targets, various European strategies and supporting measures that could positively impact electrification were put in this place;
    - The European Green Deal, FitFor55 (and associated packages), REPowerEU, ETS, CBAM and ETS2, Clean Industrial Deal, Electrification Action Plan and others.

[13] Main Edition 2025 | Energy outlook
[14] Welk elektriciteitssysteem is geschikt voor net zero?

- (Academic) consensus have grown showing the long-term need for near full electrification of the transport and buildings sectors, whereas electrification in industry is also the main lever to decarbonise, but uncertainty around economical & technical considerations lead to larger uncertainty in that sector;
- In response to the energy crisis, the European Union[15] and several of its Member States introduced plans to accelerate electrification and reduce the level of demand, in order to reduce their dependence on fossil fuels. These initiatives were intended to strengthen Europe's energy resilience and were aligned with climate goals.

6.2.5 KPI for scenario evaluation

KPI for scenario evaluation

Stakeholder	Feedback received
negaWatt	**Report an energy independence/self-sufficiency KPI** Given recent geopolitical volatility, we recommend reporting an explicit KPI on energy independence for each scenario—covering both electricity and molecules. This should quantify import dependence (energy and capacity), domestic resource utilization, and exposure to external shocks. Such a KPI will help policymakers balance cost, climate, and resilience objectives.

ANSWER

Fluxys and Elia acknowledge that energy independence is a valuable metric across all scenarios. An indicative assessment of this metric will be included in the scenario report -first at the level of each energy vector, and subsequently for the overall energy system. At this stage, only an estimation is possible, as the complete dispatch data is not yet available.

As such, in a first step towards assessing this element, tentative energy-demand balances were presented in the report under consultation. A similar figure will be added to the updated scenario report. The economic dispatch simulation results will allow for a

[15] Electrification - Energy - European Commission

more refined assessment. Additionally, energy independence metrics will be added to the Grid Federal Development Plan reports when analysing the scenarios.

6.3 Scenarios

Changes made since the public consultation:

- **Addition of a sufficiency sensitivity**: sensitivity including a set of behavioural levers leading to reduced useful energy demand
- **Addition of a Datacenter+ sensitivity**: sensitivity exploring the impact of a rapid and larger uptake of data centre demand in Belgium

6.3.1 General comments

General comments

Stakeholder	Feedback received
Belgian Hydrogen Council	**Scenario differentiation**: In the Excel file, there appears to be no distinction between the BASE, ELEC, and MOL scenarios. These should ideally yield different outcomes, reflecting varying market dynamics and broader infrastructural shifts occurring across sectors.

ANSWER

For the short term, the hydrogen figures are mainly based on market interest, with a translation into the scenarios depending on maturity and probability level. However, there is a significant difference in H_2 between the three scenarios (around 100% between lowest and highest values), which is not always visible on the graphs due to the relatively small numbers compared to other energy vectors. Important note: the H_2 values only includes low carbon and renewable hydrogen, grey H_2 is integrated in the CH_4 values.

It is not excluded that the evolution towards 2050 will show even more significant differences between the three scenarios due to the uncertainties in the projection towards 2050.

6.3.2 Addition of a 'policy' scenario

Addition of a 'policy' scenario

Stakeholder	Feedback received
BBL - Canopea	**Etablissement d'un scénario Policy**

Nous sommes clairement préoccupés par la multiplication des documents définissant des scénarios énergétiques de références tant au niveau régional *[Footnote : Etude en cours sur pacte intervectoriel (ICEDD, Climact)]* que federal *[Footnote : Etude pacte intervectoriel ; Blueprint 2050 Elia; Adequacy 2025 Elia; Vers un système énergétique optimal pour la Belgique, Fluxys…]*.
Dans l'absolu, la détermination du mix énergétique optimal tel que poursuivi par les autorités belges relève d'une décision politique. Elle est centralisée dans le **Plan national énergie climat** prévu par le règlement 2018/1999 qui **établit les objectifs politiques notamment en terme de développement renouvelable et d'efficacité énergétique**. C'est pour nous la boussole officielle de nos politiques énergétiques.
Nous comprenons bien sur que certains des objectifs semblent clairement remis en question par les trajectoires actuelles et comprenons la nécessité d'adopter des scénarios inscrits dans ses tendances actuelles à titre de comparaison mais afin d'éclairer au mieux la décision politique, **le scénario qui reflète les objectifs politiques doit être clairement modélisé.**
En pratique :

- **Nous proposons d'établir un scénario CURRENT POLICY (POL)** intégrant les objectifs présents dans les Plan climat énergie jusque 2030 et simulant un maintien des trajectoires prévues entre 2025 et 2030 jusque 2035. Ceux-ci ont récemment été mis à jour par la région wallonne, flamande et par l'échelon fédéral.
- The modelled scenarios should clearly show the trade-offs between the different scenarios for the supply of adequate electricity, in order to allow decision makers to understand where they have to make choices

ANSWER

As pointed out by BBL-Canopea, it is true that consolidating all regional and federal energy policies into consistent scenarios is a challenging exercise. Especially given the fact that the final consolidated NECP was not available when the public consultation was launched. However, Elia and Fluxys have performed an extensive deep dive into the existing European, Federal and regional legislation and policies. Furthermore, the Flemish[16] and Federal[17] contributions to the NECP have recently been published, with no update of the ECPs for Brussels[18] and Walloon[19] region since 2023. Regarding the quantification of useful demand (same for the 3 'main' scenarios) and final energy in the BASE scenario, Elia and Fluxys constructed the scenarios based on existing trends,

[16] definitief VR VEKP 21-30
[17] De definitieve bijdrage aan het Nationaal Energie- en Klimaatplan goedgekeurd door de federale regering! | Jean-Luc Crucke
[18] document.environnement.brussels/opac_css/elecfile/PACE_NL.pdf
[19] 21/03/2023 : Plan Air Climat Énergie 2030 - Site énergie du Service public de Wallonie

legislation and potential policies (included in the ECPs or other formal documents), rather than the emissions or other high-level objectives which are not supported by concrete measures. This implies that in the case a region or Belgium as a whole does not reach its climate objective, this is a consequence of the existing (and potential additional measures in the ECPs) measures being insufficient to reach its objectives.

Elia and Fluxys are of the opinion that is not their role to propose potential additional measures to reach the objectives in case those are not met. This is a political responsibility.

6.3.3 Sufficiency levers

Sufficiency levers

Stakeholder	Feedback received
BBL - Canopea	**Ajout d'un scénario Sufficiency et augmentation de l'ambition de sobriété dans le scénario BASE** A La question posée par la consultation ''Do you think it would be valuable to create a sensitivity to assess the impact of sufficiency?'' Nous répondons, oui et non, **Non** ; La sobriété doit directement être mieux intégrée dans le scénario BASE ELEC et MOL. Dans nos réponses sectorielles ci dessous, nous soulignons certains leviers de sobriété insuffisamment pris en compte dans les scénarios principaux. En outre, nous vous renvoyons vers la réponse a cette consultation adressée par Negawatt Belgium. **OUI**: En parallèle Surtout nous préconisons le développement d'un scénario sobriété complémentaire plutôt que des études de sensitivité. Ce scénario doit en tout cas inclure une analyse économique (EVA) complète seule à même de mettre en avant les impact socio économiques du scénario sobriété. [Infobox "why should sufficiency levers be investigated"]
negaWatt	**Sufficiency as a core driver, not only a sensitivity** We strongly recommend integrating energy sufficiency as a core assumption across scenarios rather than limiting it to a stand-alone sensitivity. The consultation document itself explicitly solicits feedback on sufficiency for buildings and transport (e.g. stakeholder requests to "create a sensitivity to assess the impact of sufficiency"). Treating sufficiency only as an optional add-on under

"Decarbonization options" understates its systemic nature and its policy relevance.

Sufficiency should be reflected across all sectors, including the tertiary and industrial sectors, not only framed as individual behavioural change. It represents a political and societal choice that re-shapes service demand and technology needs. We therefore ask that sufficiency be included in the central results set (and not only as a post-hoc sensitivity), with explicit legislative and programmatic levers considered.

CREG

13. La CREG soutient la proposition d'Elia & Fluxys d'ajouter une analyse de sensibilité pour évaluer l'impact de mesures de « sufficiency ». Une telle sensibilité permettrait d'estimer dans quelle mesure des mesures de sobriété énergétique pourraient réduire la demande globale d'énergie. Elle offrirait également un outil pour comparer l'efficacité de ces mesures par rapport aux politiques d'efficacité énergétique, et pour analyser leur contribution à l'atteinte des objectifs climatiques.

EDORA

Section 1.4.1 : Demand scenarios

Pour EDORA, la planification des infrastructures de transport d'énergie devrait être menée de manière à permettre à la Belgique d'atteindre les objectifs et de satisfaire aux obligations découlant de la législation européenne en matière de transition énergétique, comme annoncé dans l'introduction de cette section.

[...]

Enfin, dans la mesure où l'efficacité énergétique et la réduction de la demande d'énergie sont des piliers fondamentaux de la transition énergétique, dès lors qu'elles facilitent l'intégration et la montée en puissance relative des énergies renouvelables dans le mix énergétique et réduisent la pression sur les réseaux, nous estimons qu'il serait effectivement utile de prévoir un scénario ou une variante « SUF » misant à l'avenir sur davantage de sobriété. Mais plutôt que de compter sur une évolution radicale des mentalités pour y arriver, nous proposons de construire celui-ci sur des hypothèses explicites en matière de prix et de fiscalité des énergies, en supposant par exemple :

- la suppression effective de toute subvention ou abattement fiscal en faveur des énergies fossiles *[Footnote : Estimées, rien que pour les subventions directes, à 13,3 milliards*

d'euros en 2022 selon le dernier inventaire fédéral (2025) : https://climat.be/actualites/2025/4e-inventaire-federal-des-subventions-aux-energies-fossiles], y compris en leur trouvant des alternatives plus vertueuses que les tarifs sociaux et autres chèques gaz/chèques mazout, pour les ménages précarisés,

- une évolution à la hausse significative et rapide du prix d'équilibre du carbone dans le cadre de la mise en œuvre de l'ETS-2,
- la disparition prochaine des avantages fiscaux octroyés aux voitures de société, quelle que soit leur motorisation *[Footnote : Environ 4 milliards en 2024, selon la même étude.],*
- la mise en œuvre d'un « tax shift » entre électricité et énergies fossiles, essentiellement par un relèvement de la fiscalité sur ces dernières, plutôt que via un allègement de la fiscalité sur l'électricité.

ANSWER

For the development of useful energy requirements in the three main scenarios, Elia and Fluxys would like to clarify that it incorporated as much as possible existing policies that would impact those.

- In **transport**, Elia and Fluxys use the projections from the Federal Planning Bureau which includes the quantifiable policy measures present in the latest federal and regional policies. These already include some impacts that lead to lowered useful demand. For example: The total demand for car transport grows by less than 3% between 2050 and 2025, while population grows with 7%. On modal shares, the share of cars decreases over that period and the share of rail in freight transport goes from 9% in 2025 to 19% in 2050, implying already some sort of modal shift away from road transport.
- In the **residential sector**, the main scenarios (BASE, ELEC, MOL) do not incorporate explicit sufficiency measures for several reasons:
  - Temperature set-point: no measures are included in the NECP strategy.
  - Surface area reduction: similarly, the NECP does not consider any measures, and there is no clear historical trend indicating a reduction in the size of new dwellings (see later).

  Nevertheless, it is proposed to use 2024 as a reference year for the building sector rather than 2021. This reduces by 4% the useful demand for space heating and by 14.5% the consumption of lighting and appliances demand in the residential sector, which considers the observed behavioral change following the energy crisis.

- For **industry**, the majority of stakeholders agreed to not assume additional industrial closures versus today. A thorough analysis of the federal and regional energy plans, policies and objectives does not seem to indicate any concrete measures which could lead to potential industrial output decrease. On the contrary, several measures are listed to reduce the energy cost for industry in order to keep and/or boost production. However, the impact of additional circularity and reduced need for industrial goods will be included in the sufficiency sensitivity.

6.3.4 Delayed transition scenario

Delayed transition scenario

Stakeholder	Feedback received
FEBELIEC	Febeliec strongly recommends that, in addition to a net-zero scenario, a 90% emission reduction scenario be included. This would allow stakeholders and policy makers to better understand the marginal costs and system impacts of the final 10% reduction within the grid development plan.
Essenscia	Please note that the scope of our input is limited to the content presented during the industrial demand stakeholder workshop and does not extend to the full consultation documentation. Our comments - listed below - are intended to contribute constructively to the consultation process. […] • **Scenarios:** • The current scenario set-up distinguishes between ELEC, BASE, MOL. While these can form a starting point for the network development plans, the three scenarios show little differences and all seem rather optimistic: o **Rapid kicking in of the transition**: Today, the business case to implement technologies/processes/energy vector to reach net-zero is barely available for hard-to-abate industry (and for other industries/sectors). And strict regulation is often a hindrance rather than a help (e.g. set-up of current RFNBO targets). Moreover,

technological solutions are not always available or mature.

- **Ample availability of cost-competitive low-carbon energy carriers**: While the analysis is still to be further developed at Elia/Fluxys side, EU simulations show that the availability of cost-competitive low-carbon energy carriers (e.g. biomass, electricity, hydrogen) might be a challenge.

- **Delayed transition scenario:** Apart from the optimistic scenarios and considering the large uncertainty ahead, we would suggest also exploring scenarios where the energy transition (and therefore the demand for low-carbon energy carriers) goes slower than hoped for due to technological and economic reasons. Such scenarios should not focus on reducing the energy demand of one or several specific sectors, but rather include a general reduction of overall demand starting from the base scenario. Potentially these could be used - together with the optimistic scenarios - to detect least-regret options in the network development plans.

ANSWER

Some stakeholders inquired the addition of lower ambitions/delayed transition and/or the inclusion of less ambitious assumptions regarding the uptake of certain low carbon solutions (e.g. new technology developments).

Fluxys and Elia fully acknowledge and understand these concerns. However, in the framework of the TEN-E Regulation (EU) 2022/869, Transmission System Operators (TSOs) are not allowed to foresee, develop or use scenarios that are not aligned with the EU's 2050 climate neutrality objective in the context of the Ten-Year Network Development Plans (TYNDPs).

As such, scenarios that imply a slower uptake of low-carbon technologies or a delayed transition would not be compatible with the requirements of the TEN-E framework that is to be used in this exercise.

Regarding Febeliec's comment on the marginal costs of the system for the final 10% reduction, it should be noted that total system costs are out of scope of this exercise. The goal of the Task Force Multi-Energy Scenarios from Elia and Fluxys is to provide scenarios, which are defined ex-ante, for a varied but yet credible set of possible energy futures. Other studies that are available in literature could provide an answer to this question.

6.3.5 MOL scenario

MOL scenario

Stakeholder	Feedback received
BBL Canopea	**Intégrer en amont une analyse d'impact et une évaluation du potentiel durable en terme de production et d'importation de molecules** Nous sommes particulièrement critiques à l'égard du scénario MOL. À notre avis, il repose sur une série d'hypothèses qui ne sont pas réalisables pour des raisons techniques. Le CCS est fortement surestimé, tout comme les importations de biogaz et de molécules. Ce scénario ne peut être envisagé que dans le cas où l'électrification ne se déroule pas à la vitesse nécessaire. Étant donné que nous considérons que le CCS et le biogaz/les molécules ne sont pas disponibles en quantités suffisantes pour atteindre la neutralité carbone, ce scénario doit être considéré comme le pire des cas, mais ne doit en aucun cas être pris en compte comme une voie souhaitable pour 2050. Le scénario MOL repose sur une énorme importation de molécule. L'adéquation entre les ''besoins'' identifiés dans les scénarios et la disponibilité en molécule n'est pas faite, la question de l'approvisionnement en molécule étant traitée a posteriori. **C'est pour nous un biais méthodologique** fondamental qui invalide largement toute comparaison des scénarios MOL et ELEC en termes de coûts et en termes de décarbonation...Pratiquement, si le scénario ELEC INTERNALISE la décarbonation à l'économie européenne, le scénario MOL l'EXTERNALISE ce qui pose de nombreuses questions. 1. **Incertitude sur les coûts**. Des incertitudes techniques fondamentales demeurent pour le scénario MOL dont notamment de savoir sous quelle forme les molécules seraient importées, ou le timing de disponibilité. Les MOU signés par la Belgique avec certains pays producteurs ne sont à notre connaissance pas engageants. Les études scientifiques récentes estiment '' that without European policy interventions, green H2 from Africa remains prohibitively expensive'' *[Footnote: Mapping the cost competitiveness of African green hydrogen imports to Europe. Nat Energy ; Juin 2025]* 2. **Externalisation des coûts** : Beaucoup de coûts du scénario MOL sont cachés car externalisés dans les

économies des pays producteurs de molécules. Il est illusoire d'imaginer que l'ensemble des coûts sont internalisés dans les couts au MWh des molécules importées. Notamment les coûts indirects comme l'augmentation des prix des terres agricoles, les investissements d'infrastructures publics sont peu ou pas internalisés.

3. **Externalisation des émissions de GES** :

a. En pratique, si le rapportage ou la comptabilité carbone n'est pas fiable cela pourrait être une décarbonation de papier dans le scénario MOL. Or nous manquons clairement de recul sur la capacité de l'UE européenne à mesurer, et vérifier l'origine décarbonée de la production d'Hydrogène étrangère.

b. A ce stade en tout cas, les calculs d'empreinte CO2 européens sont déficients, notamment les actes délégués relatifs à l'H2 renouvelable n'incluent pas les émissions indirectes de CO2 (H2 produit a base d'électricité renouvelable en base load et poussant le pays d'accueil a augmenter sa production d'électricité fossile…) .

c. En outre, la priorité pour les pays exportateurs d'H2 est bien de décarboner leur propre système énergétique non d'exporter les molécules.

EDORA

Le scénario « MOL » étant en totale contradiction, non seulement avec les obligations européennes et internationales de notre pays, mais également avec les évolutions attendues de « l'état de l'art » en matière d'électrification des usages, nous n'en voyons pas l'intérêt.

ANSWER

The goal of the Task Force Multi-Energy Scenarios from Elia and Fluxys is to provide possible scenarios which will be used for the investment plan for the electricity and hydrogen grids. We would like to point out that all scenarios, including the molecule scenario, are in line with the net-zero target for 2050. The molecule scenario represents one of the possible storylines to achieve these objectives.

The input sources for the molecule scenario, just like for the other scenarios, are derived from government targets, policies and objectives, and from multiple national and international publications. Moreover, the results of external and in-house cost-optimised

modeling has been integrated. Therefore, we believe this scenario is not unrealistic and must be included in order to analyse the impact on the infrastructure network.

6.3.6 Time horizons under consideration

Time horizons under consideration

Stakeholder	Feedback received
CREG	6.La CREG souligne que l'évaluation d'hypothèses prises pour des horizons temporels éloignés (au delà de 2040) est complexe vu le grand degré d'incertitude. Les recommandations pour ces horizons de temps servent donc principalement à vérifier la compatibilité avec les objectifs climatiques. Toutefois, la CREG estime qu'il n'est pas pertinent de se prononcer sur les hypothèses prises au-delà de 2040 vu l'absence d'incidence sur l'élaboration du plan de développement fédéral du réseau de transport d'électricité et du plan de développement fédéral du réseau de transport d'hydrogène.

ANSWER

Elia and Fluxys would like to highlight that the development of transmission infrastructure takes considerable time. In addition, this infrastructure has a lifetime extending well beyond the horizon of the investment plan and the scenarios proposed in this exercise. The fact that the technical lifetime of assets extends beyond the coming 10 years is well described in Elia's tariff methodology[20].

As such, to enable robust investment decisions, time horizons beyond the 10 years of the plan should be duly considered. Using scenarios stretching beyond the investment horizon under consideration is therefore standard and implemented across the sector:

- In ENTSO-E's ten-year network development plans
- Network development plans of TSOs (Elia's, previous development plan, the German Netzentwicklungsplan …)
- Investment plans of DSOs (Fluvius…)

Finally, while it is indeed possible to verify the compatibility of the scenarios with climate targets using the later time horizons, it should be mentioned that intermediate targets exist and could serve this purpose as well.

[20] Z1109-11NL.pdf, Art 15 §4

7. Comments received on final energy demand

This section provides an overview of the reactions and concerns of stakeholders on the final demand that Fluxys and Elia received on the documents submitted for consultation.

7.1 Overall scenario results in terms of final energy demand

7.1.1 Price elasticity of demand

Price elasticity of demand

Stakeholder	Feedback received
CREG	10. La CREG observe que l'exercice actuel cherche à envisager des projections des demandes d'énergie sur des horizons de 10, 20 ou même 30 ans comme des données fixes et non comme des variables qui peuvent également être ajustées. Ces données fixes se basent principalement sur les politiques énergétiques actuelles avec quelques sensibilités sur certains paramètres d'évolutions de la demande en énergie, sans envisager de changements comportementaux aux prix ou d'impact sur l'activité économique. A cet égard, il pourrait être intéressant d'intégrer une demande en énergie plus élastique face au prix, tout en continuant à respecter les objectifs climatiques.

ANSWER

Inclusion of energy price elastic demand

It is out of scope of the current exercise to identify the level of macro-economic activity depending on energy prices. Such exercise is performed by other institutions such as the Federal Planning Bureau of which several inputs on the level of demand for the different sectors are accounted for as input for this exercise. Nevertheless, shorter term reactions of demand to energy prices (demand-side response) will be added to the economic dispatch simulation.

Fluxys and Elia would first like to stress that the goal of the scenarios created for the development plans aim to establish a diverse, yet credible set of possible energy futures based on government ambitions and other studies. This range of possible futures form the basis of the development of the grid for the coming years. The recurrent nature of

these development plans as well as portfolio management make that adjustments can be made to grid investments if necessary.

7.1.2 Molecule projections

7.1.2.1 Hydrogen and methane historical demand and projections

Stakeholder	Feedback received
CREG	12. Er is verduidelijking wenselijk dat de binnenlandse waterstofvraag vooral bepaald zal worden door de industriële vraag en dan meer in het bijzonder de grootindustrie waar elektrificatie niet altijd een optimale oplossing biedt (hard-to-abate industrie). De potentiële vraag is vooral lokaal geclusterd en bij aanvang in Gent en Antwerpen. De CREG is van mening dat slechts beperkt aandacht wordt besteed aan vraagscenario's voor waterstof
ENGIE	Fluxys reports historic methane final energy demand values that are slightly lower (by 3% to 5%) than the historical values published by the Federal Public Service (FPS Economy). • According to Fluxys: 121.4 TWh (2010), 125.9 TWh (2021), 101.2 TWh (2022), and 100.2 TWh (2023) • According to FPS Economy: 127.9 TWh (2010), 130.3 TWh (2021), 106.5 TWh (2022), and 104.4 TWh (2023) [...] Fluxys forecasts hydrogen demand to reach only 5 TWh or 10 TWh by 2040, depending on the scenario (5 TWh in the BASE and ELEC scenarios, and 10 TWh in the MOL scenario). ENGIE Belgium considers these forecasts for hydrogen final energy demand to be unrealistic, for the following reasons: 1. Mismatch with CREG data and with the current state of the market • According to CREG, Belgium's current hydrogen demand is 18–19 TWh, consisting almost entirely of grey hydrogen (also in line with the Belgian Hydrogen Council (BHC) data) • This demand is expected to remain relatively stable by 2030 (around 17–19 TWh), although the supply meeting this demand is anticipated to be clean hydrogen. • Beyond 2030, CREG's projections diverge significantly, ranging from 35 TWh to 143 TWh by 2050 (median: 107 TWh), highlighting considerable uncertainty but generally indicating higher demand levels than those assumed by Fluxys. The BHC expects an increase of hydrogen demand (also in line with the supply) for the steel, chemical, and fuel segments. An increase of 40% if foreseen.

[...]

4. Ambiguities in scenario results
    - Interpreted literally, the Excel consultation file suggests:
        - no hydrogen demand before 2030, despite current demand already existing, and o
        - no hydrogen demand in 2050, due to the limited forecast horizon.
    - Such results are clearly misleading and inconsistent.

[...] ENGIE Belgium asks Fluxys to clarify the hydrogen demand volumes at the Belgium level and to distinguish national demand needs from transit needs in its development plan. Additionally, it would be useful to acknowledge that SMR is not the only low-carbon hydrogen production technology and to account for the different efficiencies of the various H2 production technologies when calculating the corresponding hydrogen volumes. [...]

FEBEG

There are inconsistencies in the historic methane demand values reported by Fluxys compared with those from FOD Economy (SPF Economie, P.M.E., Classes moyennes et Energie), excel data file accompanying the Belgian Energy Data Overview, 26 June 2025.). These differences should be clarified, and it should be made clear whether the figures are based on high or low heating values. This transparency is important for accurate planning and comparison.

Belgian Hydrogen Council

In general we agree with most data regarding demand of hydrogen and derived molecules.

ANSWER

Historical methane demand

The values for historical methane demand from the FOD economy mentioned above include feedstock and don't include refineries. Conversely, the historical values shown in the overall final energy demand results take into account the demand from refineries and not the demand for feedstock. Also, the methane energy vector, presented in the documents submitted to consultation, includes biogas (+=- 1.1 TWh in 2021). Finally, it must be noted that the values in the consulted excel were rounded to 0.1 TWh precision per sector and energy vector, their aggregation could lead to small deltas.

Historical and projected hydrogen demand

Fluxys understands the confusion regarding current hydrogen consumption in Belgium. The results regarding hydrogen (H_2) demand in the scenarios should be interpreted as the

volume of low-carbon and renewable H_2, rather than the total demand. This hydrogen will be consumed directly or, in compliance with the legislation, be transported through a specific network. Currently, most hydrogen production is derived from natural gas or is a by-product of refinery processes. The existing hydrogen demand and production is integrated in different categories: for refineries, it falls under carbo-liquids demand, and for steam methane reforming (SMR), it is included under methane demand. Therefore, the H_2 values in the report do not reflect total hydrogen demand, especially in the short term.

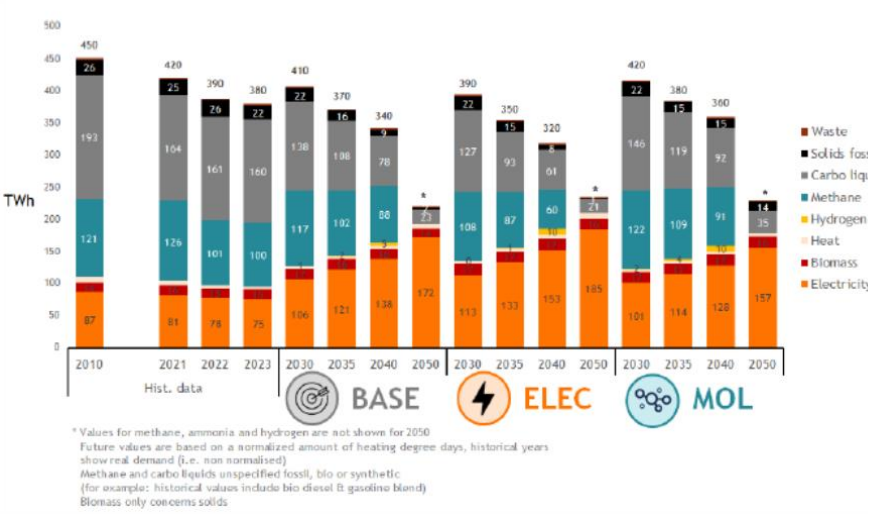
For the short term, the H_2 values are aligned with Fluxys' estimation of the market interest. Furthermore, we would like to note that hydrogen derivatives are shown separately, such as ammonia, and also as part of the (not yet specified) share of carbon-based liquids.

The mentioned values of 5 to 10 TWh/y in 2040 are only reflecting pure H_2 for final demand. The dimensioning of the hydrogen network will be determined by H_2 transport for final demand and feedstock (22 TWh/year in the molecule scenario for 2040), for potential production of e-fuels (ammonia, methanol, synthetic methane, ...) and for transit to neighbouring countries. The transit aspect has not yet been included in the document for public consultation, but it will be taken into account in the simulations to determine transport capacity.

Regarding production: various supply options are described (electrolysis, shipping imports, etc.). The efficiency of any potential conversion process will be taken into account.

7.1.2.2 Molecules projections in 2050

Stakeholder	Feedback received
ORES	Nous sommes interpellé par la volonté de Fluxys de ne pas mentionner les données de fourniture et de demandes en molécule dans un scénario long terme. Nous comprenons qu'il peut y avoir une incertitude sur l'évolution du marché de l'hydrogène mais faire abstraction de l'ensemble nous fait croire que Fluxys ne croit pas à la présence de molécules sur le long terme.

	Nous trouverions normale d'au moins représenter le volume d'énergie attribué aux molécules et éviter d'interpréter que le volume global de demande d'énergie est fortement diminué en  2050.
Belgian Hydrogen Council	**In general**, it is a shortcoming that there are no 2050 estimates. Especially for the renewable molecules, the time horizon of 2040 is rather limited. This way, the crucial role of e.g. green ammonia is underestimated resulting in a distorted picture for 2050.

ANSWER

Due to the high level of uncertainty over the longer term, Fluxys has taken the decision to not show the evolution of molecules demand after 2040.

7.1.3 Electricity demand projection between scenarios

Electricity demand projection between scenarios

Stakeholder	Feedback received
Vlaamse Nutsregulator	De 3 **scenario's** van Elia **wijken slechts beperkt af** van elkaar wat betreft jaarlijks elektriciteitsverbruik. Het geschat verbruik in 2040 in zowel het scenario met hoog elektriciteitsverbruik (ELEC) als het scenario met laag elektriciteitsverbruik (MOL) verschilt slechts 9 à 10 % van dat in het basisscenario (BASE). In combinatie met bovenvermelde bedenkingen maakt dat het risico op overschatting zelfs in het scenario met laag elektriciteitsverbruik zeer reëel. Het gebruik van meer uiteenlopende scenario's zou dat risico kunnen

verminderen. Het uitvoeren van de nodige sensitiviteitsanalyses kan hier ook mede aan tegemoet komen.

ANSWER

One of the key requirements of these long-term demand scenarios requires that Europe (and Belgium) eventually reaches net-zero emissions by 2050. (One of) the main lever(s) to achieve this concerns the switch from fossil fuels to electrification.

Many studies show that near full electrification of the road transport and building sector is a least system cost solution to remove emissions in these sectors[21][22]. It is true that the rate at which this transformation might take place can be put into question. However, as stated previously, the final goal for these scenarios is to reach net-zero emissions by 2050.

Regarding industry, more uncertainty exists in the long-term pathways to reduce emissions in this sector due to trade-offs in technology-readiness and costs. However, electrification of low to medium temperature heat is a no-regret solution for defossilising these processes in all cases. Elia and Fluxys are of the opinion that the three demand scenarios sufficiently cover the different options. For example, the ELEC scenario investigates higher degrees of electrification by assuming more novel techniques such as electric steam cracking and other (very) high temperature heat supply. On the other hand, in the MOL scenario gaseous fuels remain important for these processes with bigger importance for CCS to compensate these remaining emissions. Additionally, a 'sufficiency' sensitivity will explore lower energy and electricity demand due to different measures leading to lowering useful energy demand.

As explained in section 6.2.4, other studies which endogenously optimize the full energy demand and supply at least cost, while achieving net-zero (or near-zero) emissions similarly reach high levels of electricity demand.

As explained earlier in this consultation report, Elia and Fluxys will also add a sufficiency sensitivity which has a reduced final energy (and electricity demand) due to several sufficiency levers.

[21] Main Edition 2025 | Energy outlook
[22] Welk elektriciteitssysteem is geschikt voor net zero?

7.2 Residential demand

Changes made since the public consultation

- **Renovation rate**: same for all scenarios and values from Federal Planning Bureau.
- **New dwellings evolution**: methodology adapted to follow evolution of households published by Federal Planning Bureau.
- **New dwellings surface**: reviewed based on historical values from Statbel.
- **Efficiency of heating appliances**: efficiencies of combustion-based appliances has been adapted.
- **Useful demand of space heating**: regionalisation has been adapted based on the comments received.
- **Space heating of new dwellings**: a constant demand [kWh/m^2] is used instead of a decreasing demand.
- **Reference year**: use 2024 as a starting point to evaluate the residential demand.
- **Share of heating appliances**: adapted for space and water heating to improve regionalisation and match Eurostat data in 2024, and incorporation of the latest regional policies and inputs.

7.2.1 Evolution of dwellings: renovations and new constructions

Renovations and new constructions

Stakeholder	Feedback received
ORES	Nous comprenons le principe suivi et estimons que les taux de rénovations et de constructions du bâti ne sont pas dépendant du scénario suivi. Il nous semble pertinent de n'appliquer qu'une seule évolution du taux de rénovation et une évolution du taux de nouvelles constructions. Dès lors nous recommandons l'utilisation des hypothèses du scénario BASE pour la rénovation pour l'ensemble des scénarios Aujourd'hui, en Wallonie, le taux moyen historique de construction est de 0,8%, nous pensons qu'il faut garder ce taux comme point de départ et ne pas descendre sous celui-ci.
BBL – Canopea	**Le non-respect des objectifs présents dans le NECP nous pose question**. En effet, les objectifs en termes de rénovation relèvent dans l'idéal d'une décision politique et non technique. **Le rénovation rate ne devrait pas varier d'un scénario à l'autre.** En vertu du principe efficiency first, la priorité politique devrait dans tous les cas viser à atteindre le plus haut taux de rénovation possible à savoir le taux de 3% tel que dans le scénario ELEC.

L'installation de pompes à chaleur plus importantes ne justifie pas un non investissement dans l'isolation thermique.
L'évolution du nombre de nouveaux logements (dans tous les scénarios) en Wallonie et à Bruxelles ne correspond pas aux projections du Bureau Fédéral du Plan *[Footnote : 4 [1] https://statbel.fgov.be/fr/themes/population/perspectives-de-la-population]* En effet, celui-ci estime une population bruxelloise décroissante avant la fin des années 2020. En Wallonie, le nombre d'habitants supplémentaires se réduit jusqu'à devenir négatif à la fin des années 2040. Il n'y aurait donc aucun besoin de construire à un taux constant.

Création de logements uniquement par la construction. Cela semble irréaliste de ne compter que sur des nouvelles constructions pour créer du logement alors que plusieurs études démontrent un énorme potentiel de densification douce (via par exemple la division, l'ajout d'un étage, la collocation, la réaffectation de bureaux ou de bâtiments vacants...).

Par exemple, cette étude de la *CPDT [Footnote: Hendrickx, S., & Boodts, A. (2021). Recyclage urbain et exploitation optimale du stock bâti et du foncier artificialisé.]* en Wallonie ou encore celle-ci de Perspective.*brussels [Footnote : https://perspective.brussels/sites/default/files/documents/about_nr8_conversionbureaux_avril2024_fr_v7_4.pdf]*. Cette stratégie de densification et de réduction de la surface par personne est d'une part beaucoup moins chère à appliquer (comme le montre cette étude récente du SPF *[Footnote : Comité d'étude sur les investissements publics & SPF Santé publique, DG Environnement , Scénarios d'émissions « zéro net » en Belgique : analyse comparative des investissements additionnels (2025)]* mais aussi beaucoup plus sûre, en dépendant beaucoup moins de la disponibilité des matériaux par exemple (puisque la quantité de matériaux à mobiliser en t/m2 entre la construction neuve et la rénovation d'un bâtiment de logements, est de 40 à 80 fois plus importante selon sa typologie *[Footnote : https://presse.ademe.fr/2019/12/etude-la-construction-neuve-beaucoup-plus-consommatrice-de-materiaux-que-la-renovation.html])*.

En outre, les projections en termes de nouvelle construction reposent sur une évolution sur les 5 dernières années. Or, on voit une forte réduction des constructions neuves sur les 2-3 dernières années dûe probablement à une hausse des prix des matériaux et une réduction de la disponibilité en terrain. Ne risque pas de s'améliorer dans les années à venir !

- Il semble donc indispensable de **modifier les hypothèses pour qu'au moins un des scénarios de l'étude (ELEC ?) se**

base sur le scénario "Habitat densification" de l'étude du SPF mentionnée ci-dessus.

Le taux de rénovation utilisé est trompeur car il est basé sur les données de permis de Statbel. Ils n'intègrent donc pas toutes les rénovations thermiques (Beaucoup de travaux de rénovation thermique n'ont pas besoin de permis). En outre, ces chiffres ne font pas de distinction entre rénovation profonde et superficielle ce qui impacte pourtant les consommations énergétiques et l'électrification potentielle du chauffage.

CREG

14. La CREG s'attend à ce que le taux du nombre de logements nouvellement construits (hors démolition-reconstruction) diminue progressivement pour différentes raisons :

- La baisse de la croissance démographique entraînant un ralentissement de la croissance du nombre de ménages. Le Bureau Fédéral du Plan estime 35 921 nouveaux ménages entre 2020 et 2021 contre seulement 11 521 ménages entre 2049 et 2050, ce qui représente une baisse de 68% entre 2021 et 2050 ;
- La pression foncière et les contraintes environnementales restreignant le nombre de zones constructibles qui vont limiter le nombre de nouveaux logements constructibles dans les années à venir ;
- L'augmentation du nombre de logements pour répondre à la croissance démographique ne se traduit pas uniquement par l'augmentation du nombre de nouveaux logements mais également par la diminution de la surface habitable par ménage (par la reconversion de maisons unifamiliales en plusieurs unités résidentielles par exemple).

15. Pour ces raisons, la CREG recommande d'ajuster le rythme des nouvelles constructions de manière à le faire évoluer en parallèle à la trajectoire du nombre de ménages projetée par le Bureau Fédéral du Plan sur la période 2021-2050, ce qui correspond à une diminution annuelle de 3,85 % par rapport au niveau de 2021.

La CREG s'interroge toutefois sur la définition retenue pour les "nouvelles constructions" visées dans la consultation publique : incluent-elles également les démolitions-reconstructions ou ccs dernières sont-elles comptabilisées dans la catégorie "rénovations" ? Le cas échéant, le taux du nombre de logements nouvellement construits devrait être adapté sur base de la définition retenue.

16. La CREG estime qu'il n'est pas pertinent d'utiliser un taux de rénovation plus faible dans le scénario « ELEC » que dans le scénario « BASE ». L'utilisation d'un taux de rénovation de 3% en 2050 pour le scénario « ELEC » et de 2% pour le scénario « BASE »,

	apparaît plus cohérente. En effet, dans le scénario « ELEC » une accélération de l'électrification est prévue, le déploiement accru des pompes à chaleur devra nécessairement s'accompagner d'une accélération du rythme de rénovation. La pertinence économique des pompes à chaleur dans le secteur résidentiel est principalement viable dans les habitations bien isolées (cf. Etude (F)3017 de la CREG). 17. La CREG recommande dès lors de viser un taux de rénovation de 3% pour le scénario « ELEC » à l'horizon 2050 et de retenir un taux de 2% pour le scénario « BASE ».
EDORA	**Section 2.4 : Residential demand** S'agissant du taux de rénovation, les deux valeurs retenues nous semblent cohérentes avec l'objectif poursuivi (de 3% par an), d'une part, et avec une vision moins optimiste mais néanmoins ambitieuse (au regard de la situation actuelle), d'autre part. Il nous semblerait par contre plus logique d'attribuer au scénario « ELEC » le paramètre le plus optimiste et au scénario « BASE », l'hypothèse la plus pessimiste. Comme indiqué précédemment, le scénario « MOL » ne nous semble pas pertinent.
Gouvernement wallon	Concernant la rénovation, deux scénarios ont été retenus. · **Scénario « Delayed ambitions »** : vise un taux de rénovation de 3% en 2050, avec une augmentation linéaire jusque-là. · **Scénario "Steady increase"** : vise un taux de rénovation 2% en 2050, avec une augmentation linéaire jusque là Selon Elia, pour atteindre les objectifs du PNEC, il faudrait déjà atteindre 3% aujourd'hui. Aujourd'hui, le taux de rénovation en Wallonie est le même que depuis une dizaine d'année et stagne en-dessous de 1%. Question reformulée : *Quelles sont les ambitions de la Région wallonne en termes de rénovation ?* *Réponse* : En matière de rénovation, il est renvoyé à l'adoption récente en première lecture du décret PEB, qui sera suivie par plusieurs arrêtés du Gouvernement wallon précisant notamment les exigences relatives au niveau PEB. La Région rappelle par ailleurs l'adoption de la stratégie wallonne de rénovation et travaille

en parallèle à un plan de rénovation, dont l'adoption est prévue d'ici la fin de l'année.

ANSWER

Based on the different comments, several changes were made to the scenarios.

Regarding the evolution of new dwellings

The evolution of new dwellings has been adapted with the following assumption: the average ratio between number of new dwellings and number of new households for the last 10 years (2014-2024 period) has been calculated for each region (1.22 for Flanders, 1.14 for Wallonia, and 1.1 for Brussels). To evaluate the evolution of dwellings, the household evolution is taken from Federal Planning Bureau[23], to which this ratio is applied. From this evolution, the annual additions and removals of dwellings can be computed and the resulting stock of total dwellings per region.

Regarding the renovation rate

For consistency purposes, it is proposed to assume the same renovation rate for all scenarios, resulting in the same useful demand for space heating in all scenarios. Indeed all other sectors assume the same useful demand (industry, transport…) across all scenarios. In addition, the comments received are divergent on the rate to be chosen. The chosen renovation rate evolution is based on the most recent study from Federal Planning Bureau. This evolution accounts for both shallow, medium and deep renovations unlike Statbel which reports renovation permits that primarily reflect deep renovations. In this exercise, it is considered that renovations before 2035 allow a 15% decrease in space heating demand, and 30% after 2035. Considering today dwellings have an average space heating demand of 75 kWh/m^2, it is assumed that renovations, which are a mix of deep, medium and shallow renovations, lead to an average space heating demand of 65 kWh/m^2 before 2035, and 55 kWh/m^2 after 2035. The same changes have been applied to the tertiary sector.

Regarding the evolution of habitable space

According to Statbel[24] data, the average surface of newly constructed dwellings in Belgium has decreased over the years. The evolution is depicted below. Flanders saw a decrease in the period 2010-2019, after which the average size has stabilised since 2019.

[23] Perspectives de ménages 2024-2070 | Bureau fédéral du Plan
[24] Building permits | Statbel

This sudden decrease may be attributable to the Flemish Lease Decree in 2018 which broadened the definition of a main residence. In Wallonia the trend is rather stable in recent years. Extrapolating the evolution over 5, 10, 15, or 20 years can lead to either an increase or decrease in future dwelling sizes, depending on the chosen period. Due to high uncertainty and the lack of a clear trend, nor concrete policies, it is proposed to assume the 2024 values, i.e 147 m^2 for Flanders, 190 m^2 for Wallonia, and 150 m^2 for Brussels.

However, the decrease of residential surface will be considered in the sufficiency sensitivity.

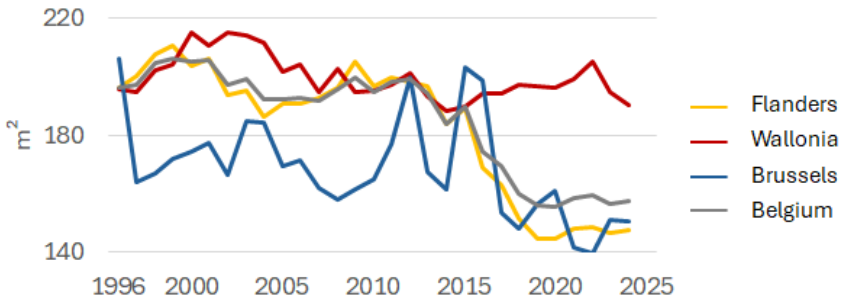


Figure 7-1 - Evolution of new dwellings surface [m^2] from Statbel.

7.2.2 For Useful demands: space heating and cooking

7.2.2.1 Space heating useful demand

Stakeholder	Feedback received
ORES	**Space heating useful demand (Onglet Residential du fichier XLS)** La référence prise pour 2021 (16,8 TWh) ne nous semble pas correct et beaucoup trop basse. Le SPW Wallonie indique que les besoins de chaleur (chauffage) pour le résidentiel, en 2021 étaient de 22.6 TWh, soit +125% par rapport à votre référence. Dans nos scénarios de prospective, nous sommes en phase avec les chiffres du SPW Wallonie

Wallonie énergie SPW

Type logement	Usage	Gasoil	Gaz naturel	Charbon	Butane / Propane	Bois	Géothermie	Pompes à chaleur	Solaire thermique	Electricité
Tous logements	Cuisson	-	175,5	0,2	203,3	5,61	-	-	-	619,9
Tous logements	Eau chaude sanitaire	1218	1.456,0	0,7	225,0	37,2	-	51,5	91,0	1.044,1
Besoins de chaleur – Total hors chauffage		1218	1.631,5	0,9	428,3	42,8	0	51,5	91,0	1664
Tous logements	Chauffage d'appoint	-	-	9,3	-	2.367,4	-	-	-	454,8
Appartements Chauf. princip.	Chauffage central	939,2	1.327,4	0,4	23,1	3,6	2,1	28,2	-	105,3
Appartements Chauf. princip.	Chauffage décentr.	4,6	81,5	5,8	14,6	8,1	-	-	-	58,5
Maisons unifamil. Chauf. princip.	Chauffage central	7.642,0	6.258,9	6,7	519,2	450,1	0,3	184,4	-	427,2
Maisons unifamil. Chauf. princip.	Chauffage décentr.	472,5	540,1	114,6	47,3	316,5	-	-	-	190,1
Besoins de chaleur – Total chauffage		9.058,3	8.207,9	136,8	604,2	3.145,7	2,4	212,6	0,0	1.235,9
Besoins énergétiques – Hors chaleur		-	-	-	-	-	-	-	-	3.880,6
Consommation énergétique totale		10.276,3	9.839,4	137,7	1.032,5	3.188,5	2,4	264,1	91,0	6.780,5
Part des besoins énergétiques assurés par vecteur		32,5%	31,1%	0,4%	3,3%	10,1%	0,0%	0,8%	0,3%	21,4%
Besoins de chaleur	Total	10.276,3	9.839,4	137,7	1.032,5	3.188,5	2,4	264,1	91,0	2.899,9
	En part du total	100%	100%	100%	100%	100%	100%	100%	100%	43%
Besoins de chaleur substituable	Total	10.276,3	9.663,9	137,5	829,2	3.182,9	2,4	264,1	91,0	2.280,0
	En part du total	100%	98,2%	99,9%	80%	99,8%	100%	100%	100%	34%

Tableau 2 : Répartition de la consommation d'énergie finale du secteur résidentiel par vecteur et par usage en 2021 (GWh) [3]

Lien vers notre source : Directive d'efficacité énergétique 2023/1791/EU - ART. 25

Si l'on considère que ce tableau correspond à la consommation en chaleur et non pas au besoin en chaleur, alors le besoin de chaleur est de 18,3 TWh en y appliquant les valeurs de rendement repris dans le même document du SPW et non pas 16,8 TWh.

Vlaamse Regering

Assumpties in de residentiële sector

We wensen een eerste bedenking te maken bij de assumpties over de **verwarming van gebouwen** (ofwel 'Space heating useful energy demand'). We merken een daling op in de energievraag bij nieuwbouw en renovaties. Het is echter niet aannemelijk dat de energievraag in nieuwbouwwoningen en gerenoveerde huizen afneemt in de tijd. Bij nieuwbouw verwachten we bijvoorbeeld dat de vraag constant blijft voor alle jaartallen en eerder rond de 30 kWh/m^2 ligt. De voornaamste reden hiervoor is het feit dat de EPB-eisen voor nieuwbouw niet meer verstrengd zijn voor nieuwbouw vanaf 2021. Verder lijkt ons het verschil in 2021 tussen bestaande woningen en nieuwbouwwoningen te klein (respectievelijk 70 kWh/m^2 en 62 kWh/m^2).

ANSWER

Space heating useful demand of the Walloon region

Elia and Fluxys thank Ores for the remark. There was indeed an error in the document submitted to consultation. From Eurostat data, with the assumed heating appliances efficiencies (updated with your feedback), and normalisation, a value of 17.7 TWh is obtained in 2021 for Wallonia which is closer to your suggested value.

It is proposed to change the starting point for the building (tertiary and residential) sector from 2021 to 2024. The reason is to consider more recent data. This has an impact both on space heating and lighting and appliances, while the other services (cooking, water heating) are negligibly impacted.

In the residential sector, the useful space heating demand decreases by 4%, and the lighting and appliances by 14.5%.

From Eurostat 2024 data, the Belgian useful demand for space heating is derived: efficiencies applied on final energy consumption and then normalised. To regionalise, the same distribution as 2021 has been taken, as no detailed data is available.

Regarding the heating demand of new dwellings

Elia and Fluxys thanks the Vlaamse Regering for the remark. The comment has been taken into account. The space heating demand for new dwellings is no longer decreasing; a constant value of 30 kWh/m^2 is now assumed from today until 2050.

7.2.2.2 Cooking useful energy demand

Stakeholder	Feedback received
ORES	**Cooking useful energy demand (Onglet Residential du fichier XLS)** La référence prise pour 2021 (0,5 TWh) ne nous semble pas correct et beaucoup trop basse. Le SPW Wallonie indique que les besoins en eau chaude sanitaire pour le résidentiel, en 2021 étaient de 1 TWh (ou 0,9 TWh en énergie utile), soit le double de votre référence. Wallonie énergie SPW Tableau 2 : Répartition de la consommation d'énergie finale du secteur résidentiel par vecteur et par usage en 2021 (GWh) [1] Lien vers notre source : Directive d'efficacité énergétique 2023/1791/EU - ART. 25

ANSWER

For cooking, the source[25] used in the consultation was Eurostat, which reports a final consumption of 1.55 TWh for Belgium in 2021. Assuming there were 5 million households in 2021, this amounts to 310 kWh per household. Given that there were 1.6 million households in Wallonia in 2021, a value of 0.5 TWh is obtained for Wallonia. The assumption was made that for this sector, useful demand equals final consumption, and therefore it is assumed that the useful demand is 0.5 TWh for Wallonia.

Shifting to 2024 as a reference point, a final consumption of 1.49 TWh for 2024 is extracted from Eurostat data. As the categorisation into services (space heating, water heating, cooking, etc.) is not yet available, the same categorisation as 2023 is considered for 2024. Assuming 1.49 TWh for cooking leads to 290 kWh per household. This amounts to a value of 0.5 TWh for Wallonia in 2024, which is similar to the 2021 value.

Comparing the value from SPW to Eurostat suggests Wallonia consumes 2/3 of the Belgian cooking demand which should not be the case when looking at households' distribution in Belgium. Thus, Elia and Fluxys propose to keep a value of 0.5 TWh for Wallonia, to be aligned with Eurostat.

7.2.3 Heating technologies

7.2.3.1 General evolution of heating appliances

Stakeholder	Feedback received
ODE Vlaanderen	De evolutie van de elektrificatie van de residentiële ruimte-verwarming (door warmtepompen) zal erg afhankelijk zijn van de taxshift en de renovatiegraad van het woningbestand. De aangenomen variabelen die dit bepalen of beïnvloeden, lijken deskundig gekozen. ODE gaat in zijn werking maximaal uit van het nastreven van het ELEC-scenario (Accelerated Electrification).
CREG	18. En ce qui concerne le secteur résidentiel, la directive sur la performance énergétique des bâtiments (EPBD) n'a pas encore été transposée dans les réglementations régionales. À ce jour, il n'existe donc aucune interdiction générale d'installer des chaudières à combustibles fossiles lors de rénovations. Par ailleurs, le taux d'adoption des pompes à chaleur dans les bâtiments rénovés reste limité, principalement en raison de leur rentabilité encore insuffisante.

[25] [nrg_d_hhq] Disaggregated final energy consumption in households - quantities

19. Le maintien de la TVA à 6 % pour les pompes à chaleur, associé à l'augmentation de la TVA sur les chaudières à combustibles fossiles à 21 %, constitue un levier favorable à leur déploiement. Cependant, l'absence actuelle d'un rééquilibrage fiscal entre l'électricité et les combustibles fossiles, combinée à l'entrée en vigueur de l'ETS2 prévue pour 2027 et à un prix du CO_2 attendu relativement faible lors des premières années, rend les projections de déploiement des pompes à chaleur trop optimistes à court terme.

20. La CREG souligne également une incohérence dans les scénarios présentés : le scénario « MOL » prévoit un taux de pénétration des pompes à chaleur équivalent à celui du scénario « ELEC » en 2030, alors qu'il serait attendu plus faible. De même, en 2040, le scénario « MOL » présente un taux égale ou supérieur au scénario « Base » en Flandre et en Wallonie.

EDORA

Nous souhaitons rappeler à cet égard qu'un des objectifs de la directive (UE) 2024/1275 (PEB4) est « la décarbonation du chauffage et du refroidissement, y compris au moyen des réseaux de chauffage et de refroidissement urbains, et la suppression progressive des combustibles fossiles dans le secteur du chauffage et du refroidissement, en vue d'une élimination complète des chaudières à combustibles fossiles d'ici à 2040 » (« indicateur obligatoire » des futurs plans de rénovation des bâtiments prévus à l'article 3, tels que décrits à l'annexe II).

Il ne nous semble certes pas déraisonnable d'imaginer un retard d'une dizaine d'année dans l'atteinte de cet objectif, ce qui nous conduirait déjà à une décarbonation complète du chauffage des bâtiments d'ici à 2050. Etant donné les besoins considérables en gaz renouvelables des secteurs les plus difficiles à électrifier, il ne nous semble par contre pas pertinent d'anticiper un maintien de chaudières au gaz dans le secteur du bâtiment à l'horizon 2050.

FEBELIEC

In the Base and Molecules scenarios, 25–40% of space heating in 2050 is provided by gas boilers. If Belgium is to achieve net zero, this implies the use of net-zero molecules for low-temperature heat—a highly inefficient pathway. Electrification offers a far more cost-effective and straightforward decarbonisation option for heating buildings. If these assumptions are maintained, Fluxys should clarify which net-zero molecules are expected to be used, and at what cost.
Febeliec believes that all low-temperature heat should be electrified by 2050, not only in a net-zero scenario but also in a 90% reduction pathway. In the latter case, the residual 10% of emissions

should be reserved for truly hard-to-abate sectors such as high-temperature processes and cement.

Vlaamse Regering

In de tabel met de **verwarmingstechnologieën** (ofwel 'Heating technologies') willen we graag een kleine aanpassing brengen aan enkele percentages. Wat betreft de elektrische boilers in het BASE scenario lijkt het ons logischer om onderstaande percentages aan te nemen. De verklaring is het volgende: volgens de REG-enquête *[Footnote: Rationeel Energiegebruik- enquête = een tweejaarlijkse bevraging om na te gaan in hoeverre de Vlamingen zich bewust zijn van het belang van rationaal energiegebruik.]* van het VEKA zou 9% van de woningen elektriciteit als hoofdverwarming hebben, exclusief warmtepompen. Door het wegvallen van de voordelen van het exclusief nachttarief verwachten we dat alle huizen (uitgezonderd appartementen) met elektrische verwarming tegen 2030 veranderd zullen zijn naar lucht-lucht warmtepompen gezien de hogere energie-efficiëntie en de korte terugverdientijd. Om die reden verwachten we een relatief sterke daling in 2030 ten opzichte van 2021 in het aandeel elektrische boilers. [...]

2021	2030
9%	3%

Wat betreft het aantal warmtepompen was er op basis van EPB-data sprake van slechts 2% in 2021 (exclusief lucht-lucht warmtepompen) in plaats van de geschatte 8% van Elia in het BASE-scenario. In 2030 verwachten wij 290.000 extra warmtepompen waardoor er 9% moet bijgeteld worden op de 2% in 2021 (290.000 warmtepompen voor 3,1 miljoen huishoudens leidt tot een extra 9%). Als we luchtlucht warmtepompen zouden meetellen, komen we op 17% warmtepompen in 2030. Indien we de effecten van de Vlaamse taxshift mee in rekening brengen, verwachten we 400.000 warmtepompen bij in 2030 in plaats van 290.000. Dat zou leiden tot 20% warmtepompen in totaal in 2030. [...]

	2021	2030
Referentie scenario	2% (excl. LL)	11% (excl. LL)/ 17% (incl. LL)
Scenario incl. VL taxshift	2%	20% (incl. LL)
Hoog scenario	2%	25%

Gouvernement wallon

Concernant le chauffage des bâtiments, Elia propose trois scénarios distincts, en différenciant les bâtiments existants et les nouveaux bâtiments. Ces scénarios s'inscrivent dans les trois

trajectoires globales de la consultation (BASE, ELEC, MOL). Chaque scénario envisage différentes hypothèses sur la période de fin des différents types de chaudières fossiles.

Scénario BASE (législation existante)

- Bâtiments existants : Interdiction des chaudières mazout/charbon à partir de 2026 (remplacement progressif) et pas de restriction sur les chaudières gaz.
- Nouveaux bâtiments : Interdiction des chaudières mazout/charbon dès 2025 et pas de restriction sur les chaudières gaz.

Scénario ELEC (électrification poussée)

- Bâtiments existants : Interdiction des chaudières gaz à partir de 2030.
- Nouveaux bâtiments : Interdiction des chaudières gaz à partir de 2030.

Scénario MOL (molécules dominantes)

- Bâtiments existants : Les chaudières gaz restent autorisées jusqu'en 2050.
- Nouveaux bâtiments : Les chaudières gaz restent autorisées jusqu'en 2045.

Des éléments de décision sont déjà disponibles pour le premier scénario :

- Pour les bâtiments existants : La proposition actuelle (soumise au Gouvernement dans la NGW présentant l'arrêté mentionné ci-dessous) est de fixer la date d'interdiction pour le mazout et le charbon à 2031 avec un jalon intermédiaire à 2027 si le raccordement au gaz passe dans la rue.
- Pour les nouveaux bâtiments : Interdiction dès le 1er janvier 2026 comme validé dans l'AGW modifiant l'AGW du 15 mai 2014 portant exécution du décret du 28 novembre 2013 relatif à la performance énergétique des bâtiments

Question reformulée : Quelle ambition législative la Wallonie doit-elle adopter pour la sortie du chauffage au gaz ?

Réponse : **Pour le scénario BASE**, nous sommes d'avis de modifier les dates d'interdiction, conformément aux dispositions réglementaires en vigueur pour les bâtiments neufs et aux discussions au sein du Gouvernement wallon concernant les bâtiments existants.

- Bâtiments existants : interdiction des chaudières au mazout/charbon au 1er janvier 2031
- Bâtiments neufs : interdiction des chaudières au mazout/charbon 1er janvier 2026

Par ailleurs, **pour le scénario BASE**, le fait qu'aucune chaudière biomasse ne soit installée en 2040 ne nous semble pas correct et

entraine une potentielle surestimation de l'installation de pompes à chaleur.

Concernant le scénario ELEC, bien que, à ce stade, un positionnement ne soit pas arrêté sur l'échéancier d'interdiction de chaudières à gaz, par souci de cohérence, il nous semblerait logique de différencier la date d'interdiction pour les bâtiments neufs et existants, à l'image des autres scénarios. Nous proposerons dès lors :

- Bâtiments existants : interdiction des chaudières au gaz à partir de 2035
- Bâtiments neufs : interdiction des chaudières au gaz à partir de 2030

ANSWER

General remarks on the assumptions of heating stock in buildings

Elia and Fluxys argue that only looking at historical trends to construct future trajectories is not sufficient as these future changes in the number of heating devices across Belgium largely depend on several (new) pieces of legislation and policy. The ones that will likely have the largest impact are listed below (note: this list is non-exhaustive).

European policies

- The Energy Performance of Buildings Directive (EPBD)[26] from the EU needs to be translated into regulation by the regional authorities in Belgium by 30/05/2026. Indeed, to this date this has not been implemented, but the regional authorities are legally bound to do so in the short term, therefore this directive will have an impact on the trajectories. Amongst other elements, this directive aims to increase the amount of renovations and finally to achieve a zero emission building stock by 2050. From 2030, all new buildings in the EU must be zero-emission buildings. For public buildings, this requirement applies from 2028 onwards. Therefore, regional regulations which accelerate the deployment of heat pumps can be expected in the near future.
- The expansion of the CO_2 allowances system in the form of the ETS2[27] will increase the cost of fossil fuel heating systems and vehicles from 2027 onwards, incentivizing a possible shift towards heat pumps.

Federal policies

[26] https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en#:~:text=of%20Buildings%20Directive-,The%20revised%20Energy%20Performance%20of%20Buildings%20Directive%20(EU%2F2024%2F,performing%20buildings%20in%20each%20country.

[27] https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/ets2-buildings-road-transport-and-additional-sectors_en

- The Federal government agreement[28] foresees a decrease of the VAT on heat pump purchases from 21% to 6% and an increase from 6% to 21% for fossil fuel heating devices, which improves the business case for heat pumps as compared to fossil fuel alternatives.

Regional policies

- In Flanders and the Brussels Capital region, the installation of new oil boilers has been banned respectively in 2021[29] and in 2025[30].
- In Flanders, the installation of new gas connections has been forbidden in new buildings since the start of 2025[31].
- The Flemish government has put forward a tax-shift from electricity to gas in order to incentivise the uptake of heat pumps[32]
- In the Brussels Capital region, no new gas connections have been allowed in new buildings since the start of 2025; this will apply from 2030 onwards in deep renovations[33].

It is true that the exact impact of financial incentives such as tax shifts (for example via ETS-2 or VAT measures) is hard to correctly assess. Therefore 3 scenarios are proposed with a distinct evolution in the amount of heat pumps.

Assumptions on remaining gas boilers and heat pumps

The trajectory in the BASE scenario would imply a gradual increase in the installed amount of heat pumps. Yet, in the short-term all regions would fall short of their emission reduction targets for the building sector. Given the requirement of climate-compliant scenarios in the long run, Elia and Fluxys deem the proposal by CREG to assume an even lower uptake of heat pumps, as incompatible with such objective.

As pointed out by Febeliec, Edora, ODE Vlaanderen and external studies[34][35], reaching high degrees of heat pump installations is an optimal solution for the building sector in a total system cost perspective. This aligns with the assumptions made in the ELEC scenario, reaching a near complete phase-out of gas-based systems. However, achieving this in practice will be challenging and depends on different technical and financial levers. Therefore, it is assumed that some gas boilers remain in the BASE and MOL scenario, assuming that this shift will not be completed by 2050. Even in these scenarios,

[28] https://www.belgium.be/sites/default/files/resources/publication/files/Regeerakkoord-Bart_De_Wever_nl.pdf
[29] https://www.vlaanderen.be/nieuwe-verwarmingsinstallatie-kiezen/verbod-op-het-plaatsen-en-vervangen-van-stookolieketels
[30] https://environnement.brussels/citoyen/reglementation/obligations-et-autorisations/installer-une-chaudiere-dans-un-logement-quelles-sont-les-exigences-peb
[31] https://www.vlaanderen.be/nieuwe-verwarmingsinstallatie-kiezen/geen-aardgasaansluitingen-meer-bij-nieuwbouw-en-nieuwe-grote-projecten
[32] https://publicaties.vlaanderen.be/view-file/69476
[33] https://environnement.brussels/citoyen/reglementation/obligations-et-autorisations/installer-une-chaudiere-dans-un-logement-quelles-sont-les-exigences-peb
[34] Main Edition 2025 | Energy outlook
[35] Welk elektriciteitssysteem is geschikt voor net zero?

emission targets could be achieved by the use of low carbon CH4 (especially biomethane).

In conclusion, Elia and Fluxys are of the opinion that the trajectories cover sufficiently the feedback received from the different stakeholders during the Task Force Multi-Energy Scenarios process and propose to keep the assumptions regarding technology shares.

Evolution of direct electricity appliances in Flanders

Firstly, the reference year was shifted from 2021 to 2024 in order to account for more recent data. Based on the available historical regional data, it is possible to regionalise the Eurostat final energy consumption in 2024 for residential space heating. By doing so, it results that 4% of the final consumption for space heating purposes is electricity in Flanders. This electrification is due to direct electricity appliances and heat-pumps. If it is assumed that 15% of this electricity consumption is due to heat pumps, and 85% due to direct electricity appliance (based on detailed Walloon data on final consumption – not available for Flanders), and corresponding efficiencies (99% for direct electricity, and 369% for heat-pumps), 7% of the useful demand for space heating is satisfied by electricity: 2.7% by heat pumps, and 4.2% by direct electricity. This shows that although 9% of homes use direct electricity to heat, in terms of end-use demand share, it is much smaller and is assumed 4.2% in 2024 for this exercise.

Secondly, regarding the evolution of these direct electricity appliances, it is assumed that no households will replace their heating appliances by a direct electricity technology. For this reason, the presence of the technology slowly decreases due to lifetime, and the absence of replacement.

Evolution of heat-pumps in Flanders

Thank you for the suggested numbers for Flemish heat pumps. When comparing the suggested numbers for heat pumps (excluding air-air heat pumps), and the primary heat pumps: *referentie scenario* is aligned with the BASE scenario.

Oil boilers, gas boilers and biomass boilers in Wallonia

The phase-out of oil boilers has been adapted in the BASE scenario in accordance with the new Gouvernement wallon proposal, i.e. no more oil boilers installed in existing/renovated dwellings from 2031, and no more oil boilers installed in new dwellings from 2026. This has also been adapted in the tertiary sector.

Concerning biomass boilers, the comment has been taken into account, and their presence remains until 2050 in all scenarios (BASE, ELEC, MOL).

The ELEC scenario is kept identical to account for a highly electrified variant and consistency across regions, i.e. no more gas boilers installed in new or existing/renovated dwellings across Belgium as of 2030.

7.2.3.2 District heating networks

Stakeholder	Feedback received
BBL - Canopea	Nous regrettons le **faible recours aux réseaux de chaleur dans le scénario MOL**, vu les potentiels de chaleur fatale et de géothermie (notamment en Wallonie). Selon la stratégie chaleur wallonne *[Footnote : https://energie.wallonie.be/fr/une-strategie-pour-une-consommation-d-energie-thermique-plus-durable-en-wallonie.html?IDC=10373&IDD=152026]* qui étudie l'optimum financier pour la chaleur résidentielle selon diverses typologie de logement, le réseau de chaleur utilisant les potentiels de chaleur fatales semble le plus cost efficient.
Karno.Energy	**Executive Summary** La Belgique doit planifier, à l'échelle des trois Régions, un déploiement ambitieux mais réaliste des réseaux de chaleur (RdC) pour sécuriser la décarbonation de la chaleur, soulager les réseaux électriques et mobiliser les gisements locaux (chaleur fatale industrielle et des data centers, stations d'épuration, géothermie, biomasse durable, solaire thermique). Les meilleures études européennes (Aalborg/sEEnergies) montrent qu'un taux de couverture par RdC de l'ordre de 48 % en 2050 est techniquement et économiquement atteignable au niveau UE si l'on planifie et priorise correctement les zones denses et les sources locales de chaleur *[Footnote : https://vbn.aau.dk/ws/portalfiles/portal/603638943/20231114_REPower_District_Heating_HRE5_Final_V2.pdf]*. La directive Efficacité énergétique (EED 2023/1791) impose désormais des **plans chaleur locaux** et des évaluations complètes, ce qui fournit le cadre juridique pour y parvenir *[Footnote : https://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX%3A32023L1791]*. Résultat final – Part de la demande de chaleur couverte par des réseaux de chaleur en 2050

Nous proposons ci-dessous trois références ou méthodes pour définir le niveau possible d'ambition sur la pénétration de réseau de chaleur dans la demande de chaleur des trois régions. La première et dernière colonnes sont identiques pour les 3 régions et correspondent respectivement à un taux de croissance de la conversion vers les réseaux, et à l'ambition issue des analyses de REPowerEU. La colonne centrale exprime le potentiel dans trois scénarios (minimum, extended et economic) des plans régionaux détaiilés dans la section 6.

Région	Pente limitée de conversion	Plans régionaux (Potentiel)	REPower
Wallonie		15% - 25% - 35 %	
Flandre	Low[3] : 12.5 % Mid[4] : 22.5 %	15% - 35% - 55 %	Objectif : 3 Potentiel : 4
Bruxelles		15% - 25% - 50 %	

[Footnote : [3] Taux de conversion de la France sur les 10 dernières années : 0.5%/an x 25 ans
[4] Taux progressivement plus haut (0.5% pendant 10 ans, 1% pendant 10 ans, 1.5% pendant 5 ans)]

ANSWER

The situation today

According to VEKA[36], 835 GWh of heat was produced by district heating in Flanders in 2023. Of this, 35% was delivered as warm water and 4% as steam to the building sector (residential and tertiary), totaling 325.6 GWh.

According to SPW[37], 304.3 GWh of heat was produced by district heating in Wallonia in 2021. Of this, 3% (10.3 GWh) was delivered to the residential sector, and 42% (126.6 GWh) to the tertiary sector, totaling 136.9 GWh for the building sector.

According to Bruxelles Environnement[38], 330 GWh of heat was produced off-site in Brussels in 2021. Of this, 40% for the residential sector (133 GWh), and 60% for the tertiary sector (197 GWh). The report mentions that this off-site heat is produced by CHPs, and district heating.

Values suggested by different studies for the future

[36] Warmtenetrapportering 2023, https://publicaties.vlaanderen.be/view-file/72304
[37] Potentiel d'efficacité en matière de chaleur et de froid – Synthèse, https://energie.wallonie.be/servlet/Repository/synthese-potentiel-d-efficacite-en-matiere-de-chaleur-et-de-froid-2023-1791-eu-art25.pdf?ID=84473
[38] Evaluation complète en matière de chaleur et de froid pour la région de Bruxelles-Capitale en vertu de l'article 25 de la directive 2023/1791 – Annexe A : Consommations et approvisionnement 2021.

According to EnergyVille[39], reaching 12.4-12.9 TWh of heat delivered to the building sector results as an optimal solution in 2050. Of this, 7.7-8.2 TWh to the residential sector, and 4.7 TWh to the tertiary sector. When reporting these values to the useful demand for space heating in the Task Force exercise, this would lead up to 18% of residential heat supplied by district heating, and 27% in the tertiary sector. It should be noticed that EnergyVille foresees an increasing demand for the tertiary sector (decreasing in the Task Force exercise). The values for tertiary might not reflect the optimal use in the Task Force exercise.

In the Blueprint study published by Elia, the value considered for district heating was 3.5 TWh in 2050, with a HEAT sensitivity described as extreme reasonable of 15 TWh.

According to SPW[40], Wallonia has a technical potential of 16.7 TWh of heat for district heating.

According to VEKA[41], Flanders has a technical potential of 17-57% of its heating demand for district heating depending on the uncertainties: availability of residual heat, investment costs of district heating networks, and the cost of fuels. The study mentions a heating demand of 53 TWh in 2022 (excluding industry), 17-57% then translates into a potential of 19-30 TWh.

According to Bruxelles-Environnement[42], district heating networks could provide 35% of regional heat in 2050 for a specific scenario. They estimate a regional heat demand of 6.3 TWh in 2050, which results in 2.2 TWh of potential heat provided by district heating networks in that case.

Elia and Fluxys proposal

However, a big gap remains between the existing infrastructure today and regional potentials, certainly due to technical barriers such as high costs, complexity of infrastructure installation, integration of networks into existing urban environments, etc.

The assumptions are the following:

- New dwellings: In Flanders and Wallonia, 10% connect to district heating if constructed before 2040, and 20% after 2040. For Brussels, 5% before 2040, and 10% after 2040.

[39] Paths2050, https://energyville.be/en/product/paths-2050/
[40] Stratégie de réseaux de chaleur et de froid alimentés par des cogénérations, des énergies fatales ou des sources d'énergies renouvelables, 2021.
[41] Rapport Warmtekaart, 2024, https://assets.vlaanderen.be/image/upload/v1722332286/Warmtekaart_2024_-_rapport_definitief_bgmq3z.pdf
[42] Evaluation complète en matière de chaleur et de froid pour la région de Bruxelles-Capitale en vertu de l'article 25 de la directive 2023/1791, https://document.environnement.brussels/opac_css/elecfile/RAP_20240417_Evaluation_complete_chaleur_froid_RBC.pdf

- Replacements: In Flanders and Wallonia, the share of district heating increases to reach 10% in 2050, and in Brussels 5%.

By considering these hypotheses (similar for all three scenarios), the following results are obtained in the BASE scenario:

- For the residential sector: 8% of the space heating demand in Flanders and Wallonia will be satisfied by district heating in 2050, and 5% in Brussels. This adds up to 3.6 TWh of heat in 2050.
- For the tertiary sector: 8% of the space heating demand in Flanders will be satisfied by district heating in 2050, 7% in Wallonia, and 6% in Brussels. This adds up to 1.2 TWh of heat in 2050.

Considering heat supplied by district heating for both water and space heating, a value of 5.2 TWh is obtained in 2050 for the building (residential and tertiary) sector. This will already require a consequent uptake of the technology.

7.2.3.3 Efficiencies of heating appliances

Stakeholder	Feedback received
ORES	**Heating appliances – efficiencies (Onglet Residential du fichier XLS)** Les rendements des chaudières à gaz nous semblent nettement sous-estimés. Chaudières classiques Rendement moyen : 80 à 90 % Ces chaudières perdent une partie de l'énergie dans les fumées de combustion et sont moins efficaces que les modèles récents. Chaudières basse température Rendement moyen : 90 à 95 % Elles fonctionnent à des températures plus basses, ce qui permet une meilleure efficacité énergétique, surtout avec des émetteurs adaptés (plancher chauffant, radiateurs chaleur douce) Chaudières à condensation Rendement moyen : 100 à 110 % (calculé sur le pouvoir calorifique inférieur, PCI) Elles récupèrent la chaleur latente contenue dans la vapeur d'eau des fumées, ce qui permet jusqu'à 30 % d'économies d'énergie par rapport à une chaudière Classique (source ADEME) De plus, la réglementation impose une efficacité énergétique saisonnière minimale de 86 % pour les modèles ≤ 70 kW (Règlement (UE) n° 813/2013).

Nous pensons donc que pour 2021, les rendements pris en compte sont trop bas et devraient plus s'approcher des 85% pour évoluer à 90% pour 2035 avec un maximum à 95% en 2050.

Les rendements des pompes à chaleur nous semblent sur-estimés.
Selon des essais en laboratoire semi-virtuel menés par EDF R&D pour l'ADEME, les COP annuels (coefficient de performance) observés sont voisins de 3 (source ADEME Test de pompes à chaleur air/eau en laboratoire semi-virtuel)

Un rendement de 100% pour le réseau de chaleur nous semble trop optimiste.
En 2022, les réseaux de chaleur ont **consommé environ 35 TWh d'énergie** pour produire de la chaleur, et ont **livré près de 26 TWh** aux consommateurs. Cela correspond à un **rendement global d'environ 74 %**, en tenant compte des pertes de distribution et des variations climatique (source : Réseaux de chaleur | Chiffres clés de l'énergie - Édition 2024, ministère de la transition écologique et de la cohésion des territoires, chiffres clés de l'énergie Edition 2024.

ANSWER

Assumptions on the efficiencies of heating appliances

Efficiency of heat-pumps will be maintained as proposed during the consultation. The value is based on COP curves shared by the CREG in the context of the public consultation of the "Adequacy and Flexibility 2026-2036"- study.

The efficiency of combustion boilers usually depends on their age. However, accurately assessing the age of installed boilers across the fleet is a challenging task. For gas boilers, the proposed efficiencies (85% in 2025, 90% in 2035, and 95% in 2050) are considered. For other combustion boilers, a baseline efficiency of 80% is assumed for both biomass and oil, with oil boilers projected to reach 90% efficiency by 2035.

Concerning district heating, following final energy demand definition of EUROSTAT for 'heat' demand in district heating, the efficiency should not be taken into account.

7.3 Tertiary demand

Changes made since the public consultation

- **Renovation rate**: same for all scenarios based on values from Federal Planning Bureau.
- **Efficiency of heating appliances**: efficiencies of combustion-based appliances has been adapted.
- **Useful demand of space heating**: regionalisation has been adapted.
- **Space heating of new surfaces**: a constant demand [kWh/m^2] is used instead of a decreasing demand.
- **Reference year**: use 2024 as a starting point to evaluate the tertiary demand.
- **Share of heating appliances**: adapted for space and water heating to match Eurostat data in 2024. and incorporation of the latest regional policies and inputs.

7.3.1 General comments

General comments

Stakeholder	Feedback received
negaWatt	**Tertiary demand – go beyond insulation and efficiency** We acknowledge the use of aggregated approaches for the services sector. However, modelling that relies mainly on floor-area evolution and efficiency (as described for the tertiary sector) risks overlooking structural sufficiency levers (space use optimization, service-level shifts, occupancy management, temperature set-points, digital sobriety in offices, etc.). These drivers are likely in a context of cost control and corporate social responsibility, and they can materially reduce useful demand beyond insulation alone. We recommend: (i) explicitly representing sufficiency in tertiary demand (with clear policy handles), and (ii) reporting a sensitivity where service intensity per m^2 and operational practices evolve towards lower energy-intensity trajectories.
EDORA	**Section 2.5 : Tertiary demand** Les hypothèses simplificatrices retenues en matière de demande tertiaire nous semblent acceptables, compte tenu du manque de données réelles détaillées. Il serait cependant utile d'intégrer davantage de granularité à l'avenir, en tenant compte par exemple de l'évolution des technologies de refroidissement et des systèmes

de gestion des bâtiments pour mieux capturer la demande croissante en électricité.

CREG

21. De manière analogue à la demande résidentielle, la CREG estime que la matérialisation du scénario « ELEC », qui mise sur une électrification plus rapide et un déploiement accru des pompes à chaleur dans le secteur tertiaire, est conditionnée à une rénovation accélérée des bâtiments. A cet égard, la CREG considère peu réaliste de supposer un taux de rénovation plus faible pour le scénario « ELEC » que pour le scénario « BASE ».

22. La CREG recommande donc de viser un taux de rénovation d'au moins 3 % pour le scénario « ELEC » avant 2050, tout en maintenant un taux de 2 % pour le scénario « MOL ».
[Referring to the methodology used which bases the evolution of useful energy for the tertiary sector on surface area evolution and efficiency gains due to isolation]

23. La CREG estime que la simplification proposée par Elia/Fluxys est acceptable pour des projections à long terme, compte tenu du manque de données détaillées sur le secteur tertiaire.

ANSWER

Concerning sufficiency

Due to the absence of sufficiency measures in regional plans and policies for the tertiary sector, and the lack of vision concerning the evolution of tertiary surface, the assumptions regarding useful demand for the tertiary sector will be kept as such in the main scenarios (BASE, ELEC, MOL). However, it is proposed to use 2024 as the reference for buildings instead of 2021, which reduces the space heating demand by 6%, and the consumption of lighting and appliances by 6.5%, which accounts for post-crisis behavioral changes. Moreover, it should be noticed that the main scenarios already assume no net increase in the tertiary surfaces.

For the sufficiency sensitivity, the following levers could be incorporated: reduction of surface and lower energy-intensive demand for services due to behavioral changes.

Concerning the renovation rate

For consistency purposes, it has been decided to assume the same renovation rate for all scenarios, resulting in the same useful demand for space heating in all scenarios. The chosen renovation rate evolution is based on the Federal Planning Bureau. This evolution includes shallow, medium and deep renovations. The same changes have been applied to the residential sector.

7.3.2 Useful demands: space heating and cooking

7.3.2.1 Space heating useful demand

Stakeholder	Feedback received
ORES	**Space heating useful demand (Onglet Tertiary du fichier XLS)** La référence prise pour 2021 (4,9 TWh) ne nous semble pas correct et trop basse. Le SPW Wallonie indique que les besoins de chaleur (chauffage) pour le tertiaire, en 2021 étaient de 6,5 TWh, soit +13 5% par rapport à votre référence. Wallonie énergie SPW Tableau 5 : Répartition de la consommation d'énergie finale par usage pour chaque branche du secteur tertiaire en 2021 (GWh) Lien vers notre source : Directive d'efficacité énergétique 2023/1791/EU - ART. 25 Si l'on considère, comme repris dans le document du SPW, un rendement énergétique moyen de 82,4%, on obtient une énergie utile de 6 TWh.
Vlaamse Regering	<u>Assumpties in de niet-residentiële/tertiaire sector</u> De opmerkingen over verwarming van gebouwen in de residentiële sector (zie hierboven) gelden grotendeels ook voor de niet-residentiele gebouwen. De weergegeven daling – meer dan een halvering – van de energievraag bij nieuwbouw lijkt niet logisch. Verder lijkt de energievraag bij bestaande gebouwen (een constante van 83 kWh/m^2) realistisch. Op basis van EPC data/niet-residentieel komen wij uit op 77 kWh/m2 wat dus slechts 6 kWh/m2 verschilt. Wat betreft de **totale energievraag voor verwarming** komen we op basis van de energiebalans uit op 19 TWh in 2021 (methodiek: totale

Secteur tertiaire (2021, GWh)	Total Chauffage (1)	ECS (1)	Cuisson	Besoin de chaleur		Besoins de chaleur substituable (Σ 1)		Autres usages (hors chaleur)	Consommation énergétique totale
				Total	Part du total	Total	Part du total		
Commerce	1.903,8	206,0	5,8	2.115,5	44,3%	2.109,7	44,1%	2.663,4	**4.778,9**
Transport communication	190,6	21,5	-	212,2	43,5%	212,2	43,5%	275,3	**487,4**
Banques assur et serv. aux entr.	857,3	72,1	-	929,4	40,3%	929,4	40,3%	1.378,3	**2.307,7**
Enseignement	870,4	45,2	-	915,6	77,5%	915,6	77,5%	265,2	**1.180,8**
Santé	701,2	245,8	-	947,0	54,3%	947,0	54,3%	795,7	**1.742,7**
Culture sports	387,7	44,0	-	431,8	63,5%	431,8	63,5%	248,7	**680,4**
Autres services	728,2	84,0	-	812,2	81,4%	812,2	81,4%	186,2	**998,4**
Administration	641,2	55,1	-	696,3	64,6%	696,3	64,6%	380,8	**1.077,1**
Divers	207,0	24,1	-	231,1	25,2%	231,1	25,2%	686,1	**917,2**
Total	**6.487,5**	**797,8**	**5,8**	**7.291,0**	**51,5%**	**7.285,2**	**51,4%**	**6.879,5**	**14.170,6**

	energievraag niet-residentieel minus elektriciteit). De energievraag in 2023 komt zelfde methodiek neer op ongeveer 16,6 TWh. Dit is lager dan hetgeen men projecteert voor 2030. Het gaat natuurlijk slechts over beperkte data, maar het is aannemelijk dat de daling al sneller begint. In de eerste 10 jaar daalt die nu maar met 0,8 TWh en in de laatste 10 jaar met 3,4 TWh. De logische beweging zou eerder omgekeerd zijn waarbij de laatste besparingen de moeilijkste zijn en de daling aan het einde zich trager voltrekt.

ANSWER

Space heating useful demand of the Walloon region

Thank you for the remark. Indeed, the regionalisation reported in the public consultation seems not aligned with SPW values for Wallonia.

It is proposed to change the starting point for the building (tertiary and residential) sector from 2021 to 2024. The reason is to consider more recent data. This has an impact both on space heating and lighting and appliances, while the other services (cooking, water heating) are negligibly impacted.

In the residential sector, the useful space heating demand decreases by 6%, and the lighting and appliances by 6.5%.

From Eurostat 2024 data, the Belgian useful demand for space heating is derived: efficiencies applied on final energy consumption and then normalised. To regionalise, the same distribution as 2021 has been taken (based on regional data) as no detailed data is available. By doing so, a useful space heating demand of 5.7 TWh is considered for Wallonia in 2024 for the tertiary sector, which is closer to the suggested value (considering there was a reduction of useful demand in the tertiary sector compared to 2021).

Space heating useful demand of the Flemish region

Indeed, 2023 and 2024 show a reduction in terms of useful demand for space heating compared to 2021. Elia and Fluxys propose to use 2024 as a reference year (which is very similar to 2023) to use the most up-to-date data, accounting for the post-crisis impact. By doing so, a useful demand for space heating (normalised) of 13.3 TWh in 2024 for Flanders is obtained. Although taking 2024 as a reference point reduces the demand, the reduction due to renovations still occurs at the end of the period because the renovation rate considered increases over time (i.e. being higher at the end of the period).

7.3.2.2 Cooking useful energy demand

Stakeholder	Feedback received
ORES	**Cooking useful energy demand (Onglet Tertiary du fichier XLS)** La référence prise pour 2021 (0,78 TWh) ne nous semble pas correct et sur-estimé. Le SPW Wallonie indique que les besoins pour la cuisson tertiaire, en 2021 étaient de 0,06 TWh, soit 10 fois moins que votre référence. Wallonie énergie SPW Tableau 5 : Répartition de la consommation d'énergie finale par usage pour chaque branche du secteur tertiaire en 2021 (GWh)

Secteur tertiaire (2021, GWh)	Total Chauffage (1)	ECS (1)	Cuisson	Besoin de chaleur		Besoins de chaleur substituable (Σ 1)		Autres usages (hors chaleur)	Consommation énergétique totale
				Total	Part du total	Total	Part du total		
Commerce	1.903,8	206,0	5,8	2.115,5	44,3%	2.109,7	44,1%	2.663,4	**4.778,9**
Transport et communication	190,6	21,5	-	212,2	43,5%	212,2	43,5%	275,3	**487,4**
Banques assur et serv. aux entr.	857,3	72,1	-	929,4	40,3%	929,4	40,3%	1.378,3	**2.307,7**
Enseignement	870,4	45,2	-	915,6	77,5%	915,6	77,5%	265,2	**1.180,8**
Santé	701,2	245,8	-	947,0	54,3%	947,0	54,3%	795,7	**1.742,7**
Culture sports	387,7	44,0	-	431,8	63,5%	431,8	63,5%	248,7	**680,4**
Autres services	728,2	84,0	-	812,2	81,4%	812,2	81,4%	186,2	**998,4**
Administration	641,2	55,1	-	696,3	64,6%	696,3	64,6%	380,8	**1.077,1**
Divers	207,0	24,1	-	231,1	25,2%	231,1	25,2%	686,1	**917,2**
Total	**6.487,5**	**797,8**	**5,8**	**7.291,0**	**51,5%**	**7.285,2**	**51,4%**	**6.879,5**	**14.170,6**

ANSWER

Eurostat does not provide the breakdown of tertiary consumption into end-use service (space heating, space cooling, etc.). However, a consistent set of disaggregated energy-economy-emissions data available for each member state of the European Union, JRC-IDEES[43] , and provides the breakdown until 2021. In 2021, the consumption for catering, which is translated into cooking services was 3.6 TWh. A value of 5.8 GWh for Wallonia seems extremely low. Firstly, this represents less than 2% of the Belgian catering demand defined by JRC-IDEES. Secondly, this represents less than 5% of the tertiary cooking demand for Brussels reported by Bruxelles-Environnement (141.3 GWh).

However, shifting to Eurostat 2024 data, a value of 2.9 TWh is obtained by applying the same energy vector to end-use service distribution as JRC-IDEES 2021. Then, by regionalising with respect to surfaces, a value of 0.7 TWh is obtained for Wallonia. This remains higher than the SPW value. However, for consistency with Eurostat national values, a consumption of 0.7 TWh will be considered for Wallonia.

[43] Joint Research Centre Data Catalogue - JRC-IDEES-2021 - European Commission

7.3.3 Heating technologies

7.3.3.1 General evolution of heating appliances

Stakeholder	Feedback received
Vlaamse Regering	Wat betreft de onderverdeling van gebruikte **verwarmingstechnologieën** voor ruimteverwarming ('Share of useful energy demand for space heating per technology') is er uit de EPC data/niet-residentieel een analyse gemaakt op basis van EPC's met maar één opwekker. Deze cijfers verschillen echter met de data van Elia. De cijfers op basis van onze berekeningen zijn als volgt:

Verwarmingstechnologieën	Percentage
Warmtepomp	15,9%
Opwekkers op aardgas	71,6%
Opwekkers op propaan/butaan	0,3%
Opwekkers op stookolie	7,8%
Opwekkers op biomassa	0,1%
Elektrische weerstandsverwarming	2,8%
Restwarmte	0,6%
Externe warmtelevering	0,8%

ANSWER

The share of heat pumps put forward bij de Vlaamse Regering seems quite high. In the Rapport Warmtekaart Studie[44] 2024, it is mentioned that 0.47 TWh of heat is produced by heat pumps in the tertiary sector in 2022. When comparing that value to the useful demand defined in the report (12.3 TWh), the share is lower: 3.8%. Additionally, when consulting the VEKA database[45], there were only slightly more than 2 000 hydronic heat pumps installed in the tertiary sector in Flanders.

Using Eurostat 2024 data and additional assumptions, it is assumed that 2.8% of the useful demand for the tertiary sector will be supplied by primary heat pumps in Flanders. To stay consistent with Eurostat data, it is proposed to consider a value of 2.8%.

It must also noted that in the calculations for the scenarios, Elia and Fluxys specify a share of useful space heating demand. This is not the same as share of total appliances installed in Flanders. Indeed, today heat pumps are mainly installed in new or very well unsulated buildings, with lower useful demands. This implies that even with a high

[44] Rapport Warmtekaart Studie
[45] Energiekaart Vlaanderen | VEKA

penetration of heat pumps, the share in total Flemish useful demand for heat pumps can be significantly lower.

7.3.3.2 Heating appliances efficiency

Stakeholder	Feedback received
ORES	**Heating appliances – efficiencies (Onglet Tertiary du fichier XLS)** Les rendements des chaudières à gaz nous semblent nettement sous-estimés. Les rendements des pompes à chaleur nous semblent nettement sur-estimés. Un rendement de 100% pour le réseau de chaleur nous semble trop optimiste.

ANSWER

Concerning the efficiency of heating technologies

The efficiencies of heating appliances for the residential and tertiary sectors are considered the same.

Efficiency of heat-pumps will be maintained as proposed during the consultation. The value is based on COP curves shared by the CREG in the context of the public consultation of the “Adequacy and Flexibility 2026-2036”- study.

The efficiency of combustion boilers usually depends on their age. However, accurately assessing the age of installed boilers across the fleet is a challenging task. For gas boilers, the proposed efficiencies (85% in 2025, 90% in 2035, and 95% in 2050) are considered. For other combustion boilers, a baseline efficiency of 80% is assumed for both biomass and oil, with oil boilers projected to reach 90% efficiency by 2035.

7.4 Transport demand

7.4.1 National transport

Changes made since the public consultation:

- **Evolution of transport needs & modal share:** The Federal Planning Bureau made an update of the demand data behind the Perspectives Énergétiques 2024 to be included in their latest study to be published. They shared the data with Elia and Fluxys prior to their publication of the demand part of their study to allow for the scenarios BASE, ELEC and MOL to be updated accordingly.
- **Two-wheelers:** Two-wheeler modelling was added, following the Federal Planning Bureau's values.
- **Rail energy consumption:** Updated based on direct inputs.
- **Loading factors:** Cars, vans and trucks segments' loading factors (in pass./km and ton/km) were calibrated so that the billion of km driven by each segment are aligned with the historical evolution provided by FEBIAC source.
- **BEV cars efficiency:** reduced in 2050 following feedback and literature review of assumptions made in other publications.
- **BEV share for vans:** reduced to align with the latest Flemish VEKP and feedback received from DSOs.

7.4.1.1 Scenarios, evolution of transport needs and modal shares

7.4.1.1.1 General remarks on the scenarios

Stakeholder	Feedback received
BBL - Canopea	The MOL scenario seems to be a complete underestimation of how quickly the market will evolve in the coming years.
EV Belgium	It is important to emphasize that the carbon intensity of electricity will decrease significantly in the coming years. The increased integration of renewable energy sources into the energy mix will lower the total emissions from electricity production. This makes the electrification of mobility not just a transition from fuel to electricity, but also a direct contribution to the overall decarbonization of society. This positive development must - in our opinion - be highlighted and strengthened in the plans. The overall plan considers zero emission by 2050 in all scenario's, which is good, however, too little attention is given throughout the study in our opinion.

ANSWER

Elia and Fluxys acknowledge the comment made by EV Belgium and share the analysis on the carbon intensity of electricity. The complete electrification of transport (with an exception for hydrogen trucks and a small remaining part of thermal engines in the MOL scenario) is indeed assumed in the three scenarios.

Regarding the MOL scenario, it is important to note that the vision of Elia and Fluxys is that the reduction of emissions in transport will go together with a 100% electrification of the fleet (with a plausible exception for hydrogen trucks). However, the current discussions in the European instances on the 2035 ban on internal combustion car sales clearly show that the speed at which this electrification will take place is far from certain. The three scenarios reflect this uncertainty with different target years for the 100% electrification: between 2040 and 2050 for the ELEC scenario, in 2050 for the BASE, and after 2050 for the MOL scenario (assuming the EU ban on fossil car sales is delayed towards 2040). However, the MOL scenario is still compliant with the Net Zero objective in 2050 and thus relies on green molecules (such as bio- or synthetic fuels) to compensate for the delay in electrification.

7.4.1.1.2 General remarks on evolution of transport needs and modal shares

Stakeholder	Feedback received
BBL - Canopea	**Non Intégration de la mobilité douce** ; Les projections de parts modales semblent ne considérer que les voitures, bus et trains/tram/métros. Or les autres modes de transports, comme les deux roues motorisées, le vélo ou la marche, ont un impact (à la hausse ou à la baisse) significatif sur la demande en énergie. En particulier, le développement de nouveaux EDPM (trottinettes, monoroues) et l'électrification des vélos (généralisation des VAE, développement des speed-pedelecs) a un impact direct sur la consommation d'électricité.
BBL - Canopea	Incohérence par rapport aux scénarios existants. Pour l'évolution de la demande de transport et des parts modales, il est étonnant de se référer aux projections tendancielles du Bureau Fédéral du Plan (BFP).Les 3 scénarios étudiés semblent faire totalement abstraction de l'étude réalisée par Climact pour le SPF Environnement. Cette étude proposait aussi 3 scénarios dont voici quelques chiffres saillants:

	2015	BEH	Core 95	TECH
Milliards de pers.km en voiture	109	53	85	110
Part modale de la voiture	62%	33%	45%	51%
Parc automobile (millions)	5,7	0,5	1,6	2,5

Notamment les 3 scénarios (y compris le TECH) supposent tous une décroissance considérable du parc automobile.

EDORA

Nous n'avons pas de raison de douter de la pertinence de l'étude "Perspectives Énergétiques" du Bureau Fédéral du Plan pour la modélisation de la demande de transport.

Les évolutions attendues en matière de transport ne nous semblent par contre pas tenir suffisamment compte des importants changements technologiques en cours (conduite autonome, drones, etc.), ce qui devrait accélérer encore l'électrification de ce secteur et pourrait conduire à une sous-estimation de la consommation d'électricité pour le transport national. Les hypothèses retenues dans le cadre du scénario « MOL » nous semblent ici, une fois encore, totalement hors de propos.

Vlaamse Regering

Bij het hoofdstuk '**Transport need evolution**' heeft Elia gebruik gemaakt van een studie van het Federaal Planbureau *[Footnote: https://www.plan.be/nl/publicaties/energievooruitzichten-van-belgie-bij-aangekondigd]* als basis voor de aannames over de transportvraag ('passenger transport demand' en 'freight transport demand'). Die studie dateert echter van mei 2024 en was nog gebaseerd op het ontwerp-NEKP 2021-2030. Intussen is er een definitief NEKP 2021-2030 in opmaak, met andere aannames en cijfers dan in het ontwerpplan. De studie van het Federaal Planbureau is dus niet langer actueel.

Hoewel het definitieve NEKP 2021-2030 nog gecompileerd wordt, werden de definitieve deelplannen van de gewesten wel al finaal goedgekeurd en gepubliceerd. Voor Vlaanderen werd het definitieve Vlaams Energie- en Klimaatplan (VEKP) 2021-2030 goedgekeurd door de Vlaamse Regering op 12 september 2025. Het definitieve plan is online *[Footnote: https://www.vlaanderen.be/vlaamse-regering/beslissingen-van-de-vlaamse-regering/definitieve-actualisatie-vlaams-energie-en-klimaatplan-vekp-2021-2030-na-technisch-nazicht]* beschikbaar.

De studie van het Federaal Planbureau houdt nog geen rekening met enkele nieuwe aannames die gemaakt werden in het definitieve VEKP:

Het definitieve VEKP veronderstelt voor het licht vervoer in Vlaanderen een daling van het aantal afgelegde kilometers over de weg met minimaal -4% in 2030 ten opzichte van 2015.

	Het definitieve VEKP veronderstelt voor het zwaar vervoer in Vlaanderen een maximale toename van +13% van het aantal afgelegde kilometers over de weg in 2030 ten opzichte van 2015.
Vlaamse Regering	Merk op dat Elia geen toename van biobrandstoffen veronderstelt. In de doorrekeningen voor het VEKP werd echter rekening gehouden met de bijmenging van biobrandstoffen volgens volgend groeipad: 8,95% in 2020-2021; 9,25% in 2022; 9,55% in 2023; 9,8% in 2024; 10% in 2025; 10,2% in 2026 en 12,65% in 2027-2030. De bevoegdheid inzake de bijmengverplichting voor biobrandstoffen in transport ligt op het federale niveau.
Gouvernement wallon	Elia propose trois scénarios pour l'évolution des véhicules électriques, différenciant les voitures particulières, les bus, les camionnettes et les camions. Ces scénarios s'alignent sur les objectifs européens et les dynamiques technologiques. 1. Voitures particulières • Interdiction des ventes de véhicules thermiques: o Scénario BASE : Respect de l'échéance 2035 (obligation européenne). o Scénario ELEC : Anticipation de 5 ans (2030). o Scénario MOL : Report de 5 ans (2040). • Objectif 2050 : o BASE/ELEC : 100 % de véhicules électriques dans le parc automobile. o MOL : 91 % de véhicules électriques (9 % thermiques/hybrides résiduels). 2. Bus • 100 % électriques en 2035 dans tous les scénarios. 3. Camionnettes • Objectif 2050 : o BASE/ELEC : 100 % électriques. o MOL : 91 % électriques (9 % thermiques/hybrides). 4. Camions • Répartition en 2050 : o Scénario BASE : 90 % électriques, 10 % hydrogène. o Scénario ELEC : 100 % électriques. o Scénario MOL : 80 % électriques, 20 % hydrogène. *Question reformulée :* *- Quelle est l'ambition sur les véhicules électriques personnels ?* *- Est-ce qu'à l'horizon 2050, il est envisagé d'avoir une part de véhicules roulant à l'hydrogène ?* *- Y-a-t'il des points d'attention sur les autres types de véhicules ?*

Réponse : Le règlement européen sur le déploiement d'une infrastructure pour carburants alternatifs (AFIR) a été publié en 2023. Il vise à accélérer la transition vers l'électromobilité dont l'imposition de quotas obligatoires de bornes de recharge pour chaque État membre, et aussi, par exemple, l'imposition d'une borne de recharge rapide tous les 60 km sur le Réseau Transeuropéen des transports (RTE-T). Dans ce cadre la Région wallonne, au travers de la SOFICO, doit installer sur un ensemble d'aires autoroutières des stations de recharge électrique d'une puissance de 10.000 kVA et ce pour 25 sites.

[...]

Par ailleurs, le Gouvernement renvoie vers la récente adoption en première lecture du décret PEB qui sera suivie par plusieurs arrêtés du Gouvernement wallon précisant notamment les exigences en termes d'électro-mobilité dans le bâtiment. Ce trajet législatif vise notamment à transposer la directive PEB4 (2024/1275) qui impose via son article 14 une série d'exigences minimales en termes d'installation de bornes de recharge dans les bâtiments.

ANSWER

Regarding the integration of recent publications and trends to the demand

The Federal Planning Bureau published a study on the electrical energy system in September 2025[46]. This study is based on an update of the Perspective Énergétiques 2024 data regarding demand with the latest trends and announced policies. The Federal Planning Bureau shared with Elia and Fluxys the updated demand values before their official forthcoming publication so that the BASE, ELEC and MOL scenarios of the Federal Development Plan could include the most recent trends.

The study mentioned by BBL -CANOPEA was published at the end of 2021 and includes very ambitious assumptions regarding reduction of transport needs & modal shifts. The forthcoming Federal Planning Bureau's values seem more relevant.

The updated values provided by the Federal Planning Bureau give, at the federal level, a 14% increase in freight road transport and a 4% increase of passenger road transport in 2030 compared to 2015. Despite not knowing the regional repartition of those evolutions, the values seem aligned with the most recent historical trends observed in Flanders and are not incompatible with the evolutions shared by the Vlaamse Regering.

Regarding the scope of the modal share

The assumptions provided by the Federal Planning Bureau in their study are shaping the demand for all segments in terms of passenger-kilometers. The non-motorised mobility

[46] Quel système électrique pour atteindre « zéro émission nette » ? | Bureau fédéral du Plan.

is not considered in their numbers for passenger demand since it doesn't impact the energy consumption, but it doesn't mean that they did not include its effect in the demand. Elia and Fluxys provided assumptions for all the subsequent parameters to reach a credible evolution of the final energy demand. Those assumptions are based on discussions with DSOs and other stakeholders during the workshops. Their role is to reflect the reality of the current market and its most plausible evolutions. The important technological changes mentioned by EDORA are not yet considered mature enough to shape the market or are not changing the demand per se (the autonomous car should have limited impact on passenger-kilometer demand).

Two-wheeler modelling was added, following the Federal Planning Bureau's values and definition.

On the biofuels assumptions

The biofuels are included in the carbo liquids category, for the computation of emissions, indeed, the federal blending shares are assumed.

Regarding the charging infrastructure

The evolution of charging infrastructure is directly considered in our scenarios and is implicitly assumed to evolve according to the evolution of the electrification of transport.

7.4.1.2 Passenger cars

Passenger cars

Stakeholder	Feedback received
EV Belgium	We believe that the projections by Elia and Fluxys for the electrification of passenger transport follow a very realistic and well-considered approach. The work demonstrates a solid understanding of the anticipated growth in the number of electric vehicles and the associated charging infrastructure needs. This forms an important basis for the focus on developing the electricity grid, as these projections will result in the installation of more accessible/public AC- and DC-chargers, specifically in Wallonia where a delay in charging installations is becoming a reality. As overall remarks, we would like to highlight the following points regarding the passenger car market: • We wanted to highlight that the share of BEV's in stock in 2025 already surpassed the 5% (by the end of 2024) and will

land somewhere around the 7% by the end of 2025 (between 430.000 and 450.000 cars).

We strongly support the energy efficiency factors that are being attributed to BEV's today(about 0,20kWh/km). We would however like to stress that the expectations in this field towards 2050 are very hard to predict and may be underestimated in this case. Battery Technology, Aerodynamics, Drivetrain and the use of Lightweight Materials might change the reality. We do however support the forecast for now, given that these may be reviewed if new scientific research establishes the fact or when technological advances are made.

- At last, we partially share the estimations of the evolution of the passenger cars by 2050 as highlighted in the BASE and ELEC scenarios. Given today's technological status, we believe that the Belgian passenger cars will be 98% to 100% full-electric by 2050. Ourforecast - shared by other stakeholders - also shows that the modelling of BEV's in the Excel-sheet may be too limited due to inclusion of PHEV's. Our forecast for Belgium show that the total parc of BEV's will grow as followed:

- 2030: 2,1 milj BEVs and 200k PHEV's

- 2035: 3,9 milj BEVs and 100k PHEV's

- 2040: 5,3 milj BEVs and no more PHEV's

It would thus be advisable to review these numbers in the ELEC and BASE scenario as such that they better reflect this reality.

CREG

24. La CREG recommande de ne pas appliquer l'augmentation de 5 % prévue par rapport à l'étude Adéquation & Flexibilité 2026-2036 pour la consommation en kWh/km des véhicules électriques, celle ci étant déjà en hausse par rapport aux hypothèses retenues dans le cadre des scénarios du CRM 2025.

25. Concernant les véhicules particuliers, l'étude Adéquation & Flexibilité 2026-2036 retient une consommation actuelle moyenne de 19 kWh/100 km, correspondant au parc actuel, constitué en grande partie de véhicules de société. Ces derniers sont en moyenne plus grands et plus lourds que les véhicules privés, ce qui se traduit logiquement par une consommation énergétique plus élevée.

26. La CREG estime qu'à mesure que la part des véhicules électriques privés augmentera dans le parc total, la taille moyenne des véhicules électriques en Belgique devrait diminuer. Cette

évolution entraînerait, toutes choses égales par ailleurs, une baisse progressive de la consommation spécifique (kWh/km) des véhicules électriques.

27. Sur la base d'une analyse des immatriculations de voitures privées durant les six premiers mois de l'année 2024, combinée aux données de consommation par modèle issues de la base de données Electric Vehicle Database, la consommation moyenne des véhicules privés apparaît inférieure d'environ 7 % à celle des véhicules de société (soit 93 % de la consommation moyenne de ces derniers).

28. En conséquence, la CREG recommande de distinguer, dans les hypothèses de modélisation, les consommations moyennes applicables aux véhicules de société et aux véhicules privés, en appliquant un facteur de réduction de 7 % pour ces derniers.

29. La CREG rappelle également que, dans son étude Futurs Énergétiques 2050, RTE retient, pour l'année 2050, une consommation de 14 kWh/100 km dans son scénario de référence et de 13 kWh/100 km dans son scénario de sobriété. L'étude de RTE ne précise toutefois pas s'il s'agit d'une consommation mesurée batterie à la roue ou borne de recharge à la roue.

30. Même si ces valeurs correspondent à une consommation « batterie à la roue », l'ajout de pertes moyennes estimées à 8,6 % *[Footnote : Selon l'ICCT, les pertes énergétiques liées à la recharge des véhicules électriques varient entre 7 % pour le courant alternatif et 17,5 % pour le courant continu. En tenant compte du fait qu'environ 85 % des recharges en Belgique s'effectuent en courant alternatif, notamment à domicile et sur bornes publiques, la perte moyenne peut être estimée à environ 8,6 %]* conduit à une consommation équivalente d'environ 15,2 kWh/100 km pour le scénario de référence. Ce niveau demeure sensiblement inférieur à la valeur retenue dans l'étude Adéquation & Flexibilité 2026-2036 d'Elia, ce qui plaide pour une réévaluation prudente et réaliste des hypothèses de consommation des véhicules électriques.

31. L'estimation du nombre de véhicules électriques et hybrides n'est pas directe à partir des données fournies. En effet, les données relatives aux voitures par région incluent à la fois les véhicules électriques et hybrides, sans distinction entre ces deux catégories. Elles ne permettent donc pas d'obtenir directement le nombre de véhicules électriques pour les différents horizons temporels.

De plus, les proportions des différents types de voitures (ICE, PHEV, BEV) sont données sur la base des kilomètres parcourus, qui ne sont pas identiques pour les véhicules privés et de société.

La CREG a néanmoins souhaité estimer le nombre de véhicules en supposant que les proportions communiquées, en tenant compte des kilomètres parcourus, sont approximativement les mêmes que celles obtenues sans tenir compte de cet impact. Sur la base du nombre de véhicules électriques et hybrides par région et des proportions par type retenues dans les trois scénarios, le nombre de véhicules électriques peut ainsi être estimé comme suit :

[millions of BEV]						[millions of PHEV]			
Scenario	**Region**	**2030**	**2035**	**2040**	**2050**	**2030**	**2035**	**2040**	**2050**
Elec	FL	1,327	2,390	3,459	3,900	0,1731	0,1103	0,0412	0,0000
Elec	WL	0,619	0,956	1,285	1,900	0,0808	0,0441	0,0153	0,0000
Elec	BXL	0,265	0,287	0,395	0,500	0,0346	0,0132	0,0047	0,0000
TOTAL		**2,212**	**3,632**	**5,139**	**6,300**	**0,288**	**0,168**	**0,061**	**0,000**
Base	FL	1,074	1,786	2,526	3,900	0,326	0,214	0,074	0,000
Base	WL	0,307	0,625	1,069	1,900	0,093	0,075	0,031	0,000
Base	BXL	0,153	0,268	0,389	0,500	0,047	0,032	0,011	0,000
TOTAL		**1,535**	**2,679**	**3,983**	**6,300**	**0,465**	**0,321**	**0,117**	**0,000**
Mol	FL	0,975	1,676	2,286	3,600	0,325	0,224	0,114	0,000
Mol	WL	0,225	0,441	0,762	1,600	0,075	0,059	0,038	0,000
Mol	BXL	0,150	0,265	0,381	0,400	0,050	0,035	0,019	0,000
TOTAL		**1,350**	**2,382**	**3,429**	**5,600**	**0,450**	**0,318**	**0,171**	**0,000**

32. La CREG constate que, dans le scénario « BASE », les hypothèses relatives au nombre de véhicules électriques (BEV) ainsi estimées pour 2030 et 2035 semblent inférieures à celles retenues dans le scénario « Current Commitments » de la dernière étude Adéquation & Flexibilité 2026-2036, tout en demeurant ambitieuses. La CREG recommande dès lors de les ajuster à la baisse. Cette recommandation repose principalement sur les éléments suivants :

- Reports confirmés ou nouveaux des interdictions des véhicules fossiles et des zones zéro émission : [...]
- Proposition d'amendement des standards européens de CO_2 pour les voitures et utilitaires légers (2025-2027) : [...]
- Infrastructure de recharge toujours insuffisante : [...]
- Coûts des véhicules électriques pour les particuliers : [...]
- Investissements et incitations financières : [...]
- Différenciation entre voitures de société et voitures privées : [...]

Compte tenu des éléments développés ci-dessus, la CREG recommande, pour le scénario « BASE », de retenir les projections suivantes :

- 1 450 000 véhicules électriques et 280 000 véhicules hybrides en 2030 ;

- 2 154 000 véhicules électriques et 131 000 véhicules hybrides en 2035.

Les scénarios « ELEC » et « MOL » devraient alors être adaptés en conséquence, en diminuant proportionnellement l'évolution des véhicules électriques et hybrides, comme pour les diminutions apportées au scénario « BASE ».

33. La CREG observe que les taux d'occupation de passagers par véhicule restent constants entre 2030 et 2050 à un niveau de 1,3

pour les voitures et 10,7 pour les bus. La CREG estime que cette hypothèse n'est pas réaliste principalement pour les raisons suivantes :

- La mise en œuvre du système ETS 2 [...]
- Des politiques publiques incitant au covoiturage, à la mobilité partagée et aux transports en commun [...]
- L'avènement du télétravail et de l'ère digitale [...]
- Des ambitions politiques annoncées d'augmenter le taux d'occupation des voitures personnelles [...]
- D'autres études considèrent des taux d'occupation plus élevés, notamment l'étude negaWatt Belgium qui prévoit un taux d'occupation de 2 personnes par voiture en moyenne en 2050. [...]

La CREG recommande de faire évoluer linéairement le taux moyen d'occupation des voitures de 1,3 personnes/véhicule aujourd'hui à 1,5 personnes/véhicule en 2030 personnes (conformément à l'objectif PACE en Région wallonne) puis à 1,7 en 2050 (30% d'augmentation par rapport au niveau actuel).

FEBELIEC

Moreover, Febeliec notes with concern that Elia seems to assume that EVs initially leased as company cars will disappear entirely from the Belgian market once their lease ends. This assumption requires clarification, as it strongly influences the projected evolution of EV penetration.

[...]

Elia's adequacy and flexibility study projects just under 3 million EVs by 2036. This seems underestimated, as it appears to assume that company cars exiting leases do not remain in Belgium as second-hand vehicles. If this assumption is revised, EV numbers could be closer to 4 million by 2036.

Vlaamse Regering

In lijn met het hoofdstuk '**Regionalisation of electric vehicles**' wordt er in het VEKP een inschatting gemaakt van het aantal elektrische voertuigen in de totale vloot. Voor de personenwagens lijken die aannames het meest aan te sluiten bij het MOL-scenario van Elia.

Voertuigtype	Brandstof	2030
Car	BEV	970.914
Car	PHEV	306.693

ANSWER

On the assumed amounts of EVs

The following graphs summarise the figures in the comments received:

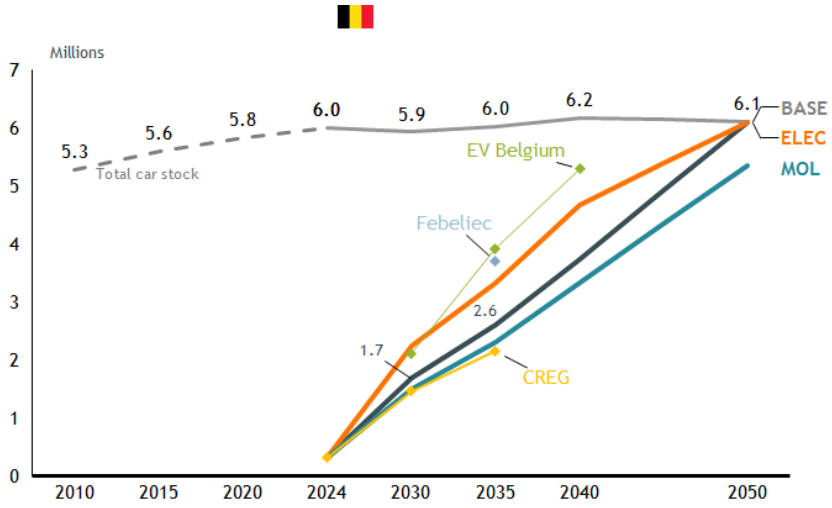


Figure 7-2 - Number of battery electric vehicle for the different scenarios in Belgium

For Flanders:

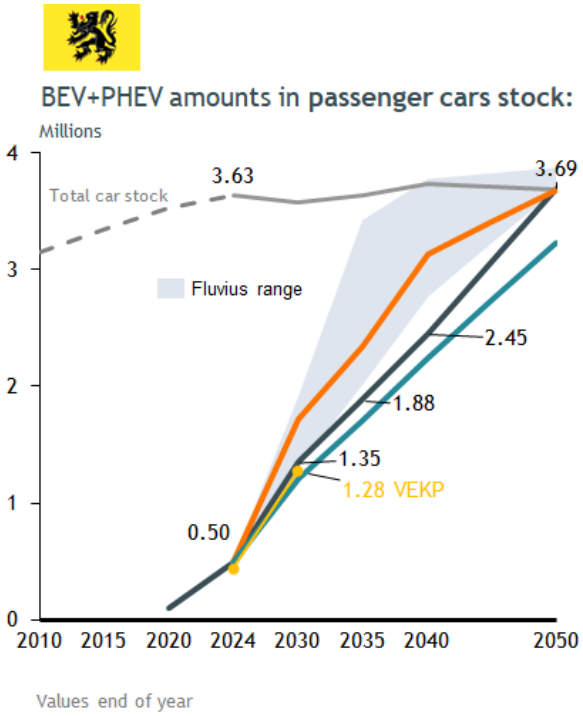


Figure 7-3 - Number of electric vehicles (BEV + PHEV) for the different scenarios in Flanders

Source Fluvius range[47]

Despite not aligning perfectly within the values shared by the stakeholders, the range proposed between the three scenarios BASE, ELEC and MOL seems to be in line with the comments.

It is important to note that the three trajectories proposed were also presented to the DSOs and discussed during the workshop on demand. All the drivers mentioned having already been taken into account for, Elia and Fluxys see no significant reason to modify them.

All Belgian passenger cars are assumed to be fully electric in 2050, which is reflected in the ELEC and BASE scenarios, for the MOL scenario a small share is assumed to be still powered by liquid fuels.

Regarding BEV and PHEV number of vehicles, the values provided by 'EV Belgium', despite not perfectly aligning with the ones presented in the document submitted to consultation in the later years, seem to fall in close range to the ELEC scenario. Given the requirement of long-term climate-compliant scenarios and the overall evolution of car transport derived from the Federal Planning Bureau study, Elia and Fluxys deem the proposal by CREG to assume a low uptake of EVs, as incompatible with such objective. Such trajectories could be included in delayed and/or lower ambition scenarios, which

[47] Investeringsplan 2026-2035

are not in scope of this study. Note that in the sufficiency sensitivity, the overall amount of EVs is also lower (due to the total stock of cars being lower in total).

On the split between BEV and PHEV

The value provided in the word document of the consultation for the share of passenger.km of BEV in 2024 is 7%. This figure seems to align with the 7% highlighted by EV Belgium for 2025, when taken into consideration that BEV drive more in average than internal combustion cars, hence that their share in the passenger.km is higher than their share in the stock of cars.

Elia and Fluxys acknowledge the difficulties mentioned on the repartition between BEV and PHEV vehicle stock and will provide a clear distinction between both in the updated scenario report. The CREG is right to underline that calculating the amount of BEV in stock based on the repartition of car.km is not straightforward and not possible with the current values in the Excel. It is important to note however that the « top-down » methodology used in this modelling doesn't rely on or compute any number for the stock of vehicle. The stock provided in the Excel is a post calculation made to help stakeholders compare with their values. But it is not the intention to put the focus on this value and hence, its calculation methodology. Nevertheless, the calculations carried out for the stock do consider a differentiated number of kilometers between private and company vehicle, as well as a share of private vehicle in stock depending on the rate of electrification.

On the assumed efficiency of EVs

The "Adequacy&Flexibility2025 + 5% in 2050" used to refer to the efficiency in the public consultation's report was misleading. The values however show correctly the assumption taken: 5% reduction in BEV consumption in 2050 compared to 2035 (for which the Adequacy&Flexibility2025's figure was used). The wording will be made clearer in the updated scenario report.

Elia and Fluxys take note of the input on the CREG on the efficiency and would like to mention that other grid operators in Belgium do not foresee an improvement in efficiency. Nonetheless after discussing bilaterally with RTE, the efficiency of BEV was decreased and the reduction from 2035 to 2050 will then reach 10% instead of 5%, bringing the BEV consumption in 2050 to around 16kWh/100km (charger-to-wheel).

Regarding the size of EVs, it is true that today most EVs are company owned. As the share of privately owned cars increases, the average size of EVs might decrease. However, the trend of increasing size and weight of cars is not exclusive to company cars and this trend also applies to the private sector. Therefore, the effect of relatively more private cars can be compensated by these units increasing in size. As it is impossible to determine in which direction and to what extent both effects will evolve, Elia proposes to keep a prudent approach and not take the car size as an explicit parameter in the efficiency

calculations. Elia and Fluxys are of the opinion that differentiating the efficiency for both segments adds an additional layer of complexity without added precision in the assumptions.

Regarding the occupancy rate

The occupancy rate for cars was updated from 1.3 to 1.25 passenger/car to better calibrate the kilometers driven by all cars on the historical trends provided by FEBIAC[48]. This value is also aligned with the value used by negaWatt for 2019. Elia and Fluxys take note of the comment of the CREG and would like to mention that increasing the occupancy rate is going opposite to the historical trends. Furthermore, the figures provided to Elia and Fluxys by the Federal Planning Bureau on the occupancy of cars show a flat evolution of that parameter over the years 2030-2050, the 1.25 passenger/car was then kept throughout the entirety of the time horizon. A scenario where the impact of strong political measures pushing the occupancy rate to increase will be assessed in the sufficiency sensitivity.

On the secondhand market for leased cars

It is true that the exact dynamics of the second-hand car market are not explicitly taken into account in this study, and this could indeed lead to a higher uptake of BEV cars in the private marker. However, as illustrated above, the proposed trajectories seem to fall in the range of the proposed trajectories by stakeholders. Note that in 2024 only 3% of second hand cars were BEV, implying that not all BEV company cars directly seem to transfer to the private car market. Implicitly it could be argued that the 'ELEC' (which higher BEV sales in the private market) could incorporate such dynamics. In any case the impact of the secondhand car market will be analysed with scrutiny in the future.

7.4.1.3 Vans & Trucks

Vans & Trucks

Stakeholder	Feedback received
ORES	Au 01/08/2024, le parc wallon des camions & camionnettes est de 284.000 unités. Le PACE prévoit 30% de véhicules électriques en 2030, soit 42.500 unités. Les valeurs prises pour la Wallonie nous semblent donc surévaluées (entre 42.000 et 135.000 unités).
EDORA	Comme évoqué précédemment, nous estimons que le transport terrestre de marchandises sera presqu'entièrement électrifié bien

[48] 2.E.1.b. Distances parcourues par type de véhicule

avant 2050 *[Footnote : Voir notamment : International Council on Clean Transportation (2023), A total cost of ownership comparison of truck decarbonization pathways in Europe : https://theicct.org/publication/total-cost-ownership-trucks-europe-nov23/]* C'est, nous semble-t-il, ce que devraient refléter le scénario « BASE » et a fortiori le scénario « ELEC », seuls pertinents dans ce domaine.

EV Belgium

A second point of discussion concerns the anticipated transition of freight transport. While the plans account for the electrification of LDV's and heavy transport, we expect the transition
in this field to proceed faster than the scenarios might suggest. This is driven by technological innovations in battery technology, increasing pressure on companies to reduce their ecological footprint, decreasing prices of e-trucks, increasing fuel prices (ETS2 & professional diesel) and potentially supportive government policies (e.g. e-LDV's). This acceleration requires proactive preparation of the grid to accommodate the charging needs of logistics hubs and transport corridors. It is crucial that the investment plans build in sufficient flexibility to respond to this accelerated demand. We therefore suggest the following amendments to the forecasts:

- For the stock of LDV, we do expect a steeper growth than forecasted in the Elia/Fluxys study. Definitely given the economic advantage, (on average) lower number of kilometers driven, upcoming impact of ETS2 and the slack that Belgium is experiencing today in this field (compared to other EU countries). It can thus be argued that the stock will take off at a certain point and grow faster than forecasted now. We do notice that the starting point for LDV's in 2025 might be on a rather high level, only getting to 5% of LDV sales in 2025 YTD. We kindly refer to the first part our analysis of this specific market here: Aanbevelingen EV Belgium: Elektrische bestelwagens in België - EV Belgium

Regarding the trucks, a similar analysis may be struck as for the LDV with some important differences. Overall, the e-truck market is still in an early phase but growing at a steady rate of doubling the number of trucks every year. Here too we expect that the growth will take off as of 2027 in a more extensive manner. By 2050, we do expect that about 90% to 100% of trucks registered in Belgium will be BEV. This because international longhaul trucks only represent a minor group within the total stock of Trucks. We expect that the majority of trucks will more easily electrify as of 2027. The expected growth as of then will also be
steeper than for LDV and passenger cars, because of the higher impact of competition between companies (every cent counts). Some specific and targeted policy measures are however needed to unlock this sooner than later market.

	- We do put questions forward regarding the efficiency of e-Trucks as defined in the consultation. We don't have hard numbers, but believe that the efficiency is already better than mentioned and could be checked with relevant scientific sources
BBL - Canopea	**Freight:** We are currently seeing more than a doubling in the number of BEV registrations year after year. So that number will really start to create volume in the coming years. Even the base scenario includes a 5% share of hydrogen by 2035, an assumption that is not in line with current market trends. Electrification is growing exponentially and TCO is almost there, while hydrogen has a really marginal share.
Vlaamse Regering	In lijn met het hoofdstuk '**Regionalisation of electric vehicles**' wordt er in het VEKP een inschatting gemaakt van het aantal elektrische voertuigen in de totale vloot. Voor de personenwagens lijken die aannames het meest aan te sluiten bij het MOL-scenario van Elia.

Voertuigtype	Brandstof	2030
Ldv	Electric	44.713
Heavy duty trucks	Electric	7.677

ANSWER

On the amount of BEV vans and BEV trucks

Based on stakeholders' feedback, the share of BEV vans was reduced in all scenarios. Numbers are now more aligned with values mentioned by Ores and Vlaamse Regering.

The value shared by Vlaamse Regering for heavy duty trucks is aligned with the value of the BASE scenario of 8,000 BEV trucks in 2030.

On the vector shares of Trucks

Currently, almost all trucks are internal combustion and the sales of BEV trucks in Belgium are below the 10% of market share. Knowing that, even if the TCO of the BEV trucks will be better than the one of ICE trucks in 2030, assuming BEV trucks will take 100% of market share in 5 years seems unrealistic. Or this would be required to reach a full electrification of this segment "long before 2050" since, according to the European Automobile Manufacturers Association, the average age of trucks in early 2025 is 14.1

years[49]. Furthermore the TCO doesn't represent accurately all the complexity of the ICE vs BEV business case and discussion on range, timeshifts, investment timelines… can also impact the final decision for operators. The assumption for the ELEC scenario already reaches ~95% of BEV in truck sales in 2035.

On Hydrogen vs BEV trucks, the trend is indeed clearly in favour of electrification, which is reflected in the three scenarios, having between 80% and 100% of BEV share in 2050. However, it would be a mistake to not consider hydrogen trucks as a plausible solution and the not 5% but 2% of kilometers driven by trucks in 2035 being with hydrogen vehicles in the BASE scenario seems realistic.

On the efficiencies of BEV trucks

On BEV trucks efficiencies, the values come from the Adequacy&Flexibility 2025 study for which assumptions went under public consultation form stakeholders. Without any other value being proposed, the current assumptions will be kept.

7.4.1.4 Buses

Buses

Stakeholder	Feedback received
EV Belgium	We support the forecast on buses as is set in the slides. We underline herewith the obligations under the EU CO2 mandate for buses which clearly mandate a 100% zero emission by 2035 (and 90% in 2030) for urban buses. Given that most buses pass through urban area's in Belgium, we do not expect that many will be left in the park as of 2030. It could thus be that they even go faster than the forecasts predict. However, we do not deem it necessary to amend the estimations in this field yet.
CREG	En ce qui concerne les bus, la CREG considère que l'augmentation absolue des km x passagers parcourus en transport en commun entraînera à terme une augmentation de l'offre en heures de pointe mais plus marginale voire inexistante en heures creuses. Si ce scénario se confirme, il aura pour effet d'augmenter le taux moyen d'occupation. La CREG préconise par conséquent de faire évoluer linéairement le taux d'occupation moyen de 10,7 personnes par bus aujourd'hui à 13,9 personnes par bus en 2050 (30% d'augmentation).

[49] Fact sheet: trucks - ACEA - European Automobile Manufacturers' Association

EDORA	Naturellement, la trajectoire d'électrification des bus à 100 % d'ici 2050 (dans tous les scénarios) et l'augmentation des parts de marché des BEV (Véhicules Électriques à Batterie) ne tiennent que pour autant que le renforcement des réseaux électriques permette un développement suffisamment rapide des infrastructures de recharge nécessaires.
Vlaamse Regering	In lijn met het hoofdstuk 'Regionalisation of electric vehicles' wordt er in het VEKP een inschatting gemaakt van het aantal elektrische voertuigen in de totale vloot. Voor de personenwagens lijken die aannames het meest aan te sluiten bij het MOL-scenario van Elia.

Voertuigtype	Brandstof	2030
Buses	Electric	2.502

Gouvernement wallon	Concernant les objectifs d'électrification des bus, sur base du rythme prévu du remplacement de la flotte, le Gouvernement estime que 20% des bus du réseau TEC seront électriques à horizon 2030 ; la tendance à l'horizon 2035 serait de 30 à 40 % de bus électriques.

ANSWER

Elia and Fluxys take note of the opinion from the CREG regarding the increase of passenger.km for buses being absorbed by the existing parc and leading to an increase of passengers per bus rather than an increase in the number of buses. However, no source backing up this statement has been found. Furthermore, it goes against the feedback given by DSOs during the co-creation process of the scenario for which they proposed to assume an increase in the parc of buses coherent with the increase in passenger.km. This matter was explicitly presented during the workshops without any comment raised against it. It is therefore proposed to keep the current assumption for the main scenarios. An increase in occupancy rate for buses will be assessed in the sufficiency sensitivity.

The numbers provided by the Vlaamse Regering are aligned with the 2,600 buses assumed in the three scenarios ELEC, BASE and MOL for Flanders in 2030.

Elia and Fluxys thank the Walloon government for providing their values. The values have been updated accordingly. Wallonia reaches 400 public BEV buses in 2030 and 1,000 public BEV buses in 2035 for all three scenarios.

7.4.1.5 Inland navigation

Inland navigation

Stakeholder	Feedback received
EDORA	Le transport fluvial devrait suivre la même évolution, ce qui nous conduit à la même conclusion concernant l'hypothèse proposée dans le cadre du scénario « MOL ».

ANSWER

The layout of the Excel jointed to the public consultation seems to be containing an error in the sheet "1.3 National transport" on row 205. The values in this row, labelled "Electricity" are the ones corresponding to the "Carbo liquid" category. Those will be corrected in the updated scenario report.

Nevertheless, Elia and Fluxys acknowledge that the range covered by the three scenarios for the Inland Navigation (from 50% electrified in MOL to 100% in ELEC in 2050) is wide. This range represents the high uncertainty on this segment, few sources are available which allow to reduce this uncertainty.

7.4.2 International transport

7.4.2.1 General comments on international transport

General comments

Stakeholder	Feedback received
TotalEnergies	RED III considerations for 2030 targets: Are the transport and shipping ambitions outlined in RED III, including sub-targets and associated fuel volumes for 2030, integrated into the scenario development?

Vlaamse Regering	Voor het internationale transport worden op Vlaams niveau geen prognoses opgemaakt.

ANSWER

Given that the transposition of RED III targets for 2030 was drafted and consulted upon in early Q3 2025, those were not taken into account for the scenario development. Based on the preliminary draft for RED III for transport at Belgian federal level (which still has to be implemented), the total demand for RFNBO to reach the proposed targets (& sub-targets) would be ~1.2 TWh LHV (excl. refineries) by 2030. This means part of the fuel demand will have to be RFNBO compliant, which is not in contradiction with the demand scenarios and supply potentials (which are sufficient to cover this demand) presented in the document submitted to consultation. This will be determined by the molecule supply and its origin, the obligated party being the fuel supplier.

7.4.2.2 Shipping

International shipping

Stakeholder	Feedback received
Belgian Hydrogen Council	For shipping we think that the categories are not well defined : All the mentioned fuels (e.g., methane, ammonia) are used in liquid form onboard. It may be helpful to either introduce a new aggregated fuel category or explicitly list each fuel type. The term "carbo liquids" used in the Excel file remains ambiguous: LNG, methanol, biofuels, and even captured CO_2 could fall under this label. Could you clarify which liquids are included? Is it primarily biofuels? The international shipping sector, under IMO, have stated they will be net-zero in or near 2050. With the Net-Zero Framework the IMO aims to create the right policy based incentive to start with this decarbonisation trajectory, punishing the use of fossil fuels and promoting net and near zero technology and fuels consumption. It is not clear if the proposed scenario and fuel mix is in line with this ambition (depends on what is meant by 'liquids'. **Onboard carbon capture**: There seems to be growing interest in onboard carbon capture within the shipping sector, especially as infrastructure for both temporary and permanent storage continues to mature. Is this development reflected in any of the scenarios? **Fuel mix and ammonia adoption**: In many studies and scenarios that are being delivered worldwide, ammonia is highlighted as a promising maritime fuel due to its scalability and lower projected costs compared to other alternatives. The 17% share mentioned in the slide seems conservative, as most sources suggest a

	significantly higher adoption rate, around 40-50% of the fuel mix by 2050. **RED III considerations for 2030 targets**: Are the transport and shipping ambitions outlined in RED III, including sub-targets and associated fuel volumes for 2030, integrated into the scenario development.
Alfaport VOKA	De verordening betreffende de uitrol van infrastructuur voor alternatieve brandstoffen (AFIR) bepaalt dat België uiterlijk op 1 januari 2030 moet zorgen voor een minimumlevering van walstroom voor zeegaande container- en passagiersschepen in zeehavens. Concreet betekent dit dat er bij de 22 AFIR-plichtige kaaien in de haven van Antwerpen de nodige capaciteit moet zijn om schepen aan te sluiten op het elektriciteitsnet. Ook cruiseschepen die Antwerpen of Zeebrugge aanlopen, vallen onder deze verordening. Als we kijken naar de cijfers voor internationale scheepvaart wordt er 0 TWh gehanteerd voor de 3 scenario's en 4 tijdshorizonten. Voor de eindenergievraag wordt voor Internationaal Transport de definitie van "Internationale Bunkers" in Eurostat gehanteerd. Voor national transport wordt de definitie "Transport" in Eurostat overgenomen. Maar Eurostat zelf gebruikt de term walstroom niet binnen haar transportdefinities waardoor de energievraag voor walstroom waarschijnlijk niet opgenomen is in dit document. Vanaf 2030 zal walstroom gebruikt worden in de haven van Antwerpen zodat de energievraag -elektriciteit walstroom voor zeeschepen moet meegenomen worden in de 3 scenario's en 4 tijdshorizonten met aanpassing van de achterliggende definitie eindenergievraag voor Transport.
BBL - Canopea	Les carburants considérés pour **le transport fluvial** n'intègrent pas le méthanol, pourtant plus adapté à la navigation que l'hydrogène.

ANSWER

Carbo liquids

Carbo liquids encompass all fuels having carbon content (methanol, e-fuels, biofuels, oil products…), and can be synthetic, bio or fossil. LNG is part of the demand for methane, since it is methane at a liquefied state.

Onboard carbon capture

Regarding onboard carbon capture, it is not considered in the scenario development. It could be included in future iterations of the process.

Ammonia adoption

The share of ammonia is corrected to 32%.

RED III

As for the RED III directive, see previous answer above (general comments about international transport).

Walstroom

Elia and Fluxys confirm that the Alternative Fuels Infrastructure Regulation (AFIR), aims to accelerate the deployment of infrastructure for alternative fuels across all transport. Regarding ships in ports, this mandates shore-side electricity supply for vessels at TEN-T network nodes. Under the Fuel EU Maritime Regulation, from 2030, container ships over 5,000 GT and passenger vessels must use OPS or equivalent zero-emission technologies when docked at EU ports. Elia confirms that discussions are ongoing with the different Belgian ports and its associated companies to enables these OPS connection requests. During the public consultation the demand for this was reported under the 'other' subsector of the' industry' sector.

Elia refined the trajectories based on direct sectoral inputs and the values are now explicitly included in the 'international shipping' sector.

Methanol

Methanol demand is not explicitly shown but is implicitly included in the "carbon liquids" energy vector.

7.4.2.3 Aviation

International aviation

Stakeholder	Feedback received
BBL - Canopea	**Demande énergétique du secteur aérien sous-évaluée ?** Ce choix semble antinomique de celui posé pour l'évolution du secteur aérien où la demande d'énergie est supposée croître de 1% par an, ce qui semble modeste par rapport aux projections de croissance du transport (voir notamment les prévisions de fréquentation des 3 aéroports belges) et aux gains d'efficacité énergétique modestes à attendre à moyen terme (en l'absence de saut technologique majeur: souvent annoncé, toujours postposé - parfois (discrètement) oublié)

ANSWER

Elia and Fluxys assumptions proposed in the public consultation are based on the TYNDP2026 scenarios for the international Transport Sector[50]. For the aviation sub-sector, the assumption made was to take the historical trends (~1%/yr) and extrapolate it until 2050.

It is true than the 3 main Airports of Belgium have stronger target compared to the assumptions of the Task Force Multi-Energy Scenarios. Brussels Airport in its strategic notes has the ambition of +3.8%/yr growths of passenger until 2040[51], Charleroi-Brussels-South airport has the ambition to have +55% of growth in 2045 [52] and Liege airport to double the numbers of flight in 2040[53].

Eurocontrol conducts projections[54] concerning international transport within Europe, with particular emphasis on specific regions, notably Belgium and Luxembourg. According to this source, the baseline scenario for the Belgium/Luxembourg region indicates an average annual growth rate of 0.7% between 2019 and 2050. This figure aligns with the estimated value of 25 TWh presented during the public consultation. As such Elia and Fluxys propose to retain the proposal outlined in the public consultation, as it closely corresponds with Eurocontrol's projections.

[50] https://2026.entsos-tyndp-scenarios.eu/
[51] https://brucard.brusselsairport.be/fr/blog/brussels-airport-d%25C3%25A9voile-sa-vision-strat%25C3%25A9gique
[52] https://neven.wallonie.be/home/communiques-de-presse/presses/bsca-un-accord-global-pour-concilier-avenir-de-l-aeroport-de-charleroi-et-respect-des-riverains.html
https://www.lesfrontaliers.lu/detente/vents-porteurs-pour-laeroport-de-charleroi-bruxelles/
[53] https://www.liegeairport.com/corporate/wp/wp-content/uploads/sites/5/2024/11/24-11-20-Presentation-de-Liege-Airport_FR.pdf
[54] https://www.eurocontrol.int/publication/eurocontrol-forecast-2025-2031
https://www.eurocontrol.int/publication/eurocontrol-aviation-outlook-2050

7.5 Industry demand

Changes since the public consultation:

- **Change of industry reference year:** the industrial useful demand of the year 2024 is taking as reference year for the period until 2035, as of 2040 the useful demand of 2021 is taken as reference
- **Update of main Elia clients:** Elia surveyed its main industrial clients, leading to slight adaptations of the trajectories
- **Inclusion of more industrial heat pumps**: in the long term, a higher share of industrial heat pumps is assumed in favour of electric boilers

7.5.1 General comments on industry

7.5.1.1 Industry production levels and reference point

Stakeholder	Feedback received
BBL - Canopea	We repeat our concern - expressed several times already - that the scenarios are exaggerating the energy use in industry. The scenarios are too strongly aligned with the status quo and aiming at maintaining this. Yet, we are not only confronted with a climate and energy crisis, but also with a pollution crisis labeled Triple Planetary Crisis by UNFCCC. Decision makers are concerned and are looking into solutions to tackle our problems with nitrogen, PFAS and plastics. We will have to reduce resource use and phase out production of toxic materials.Therefore, the real question is not how to keep everything the way it is, but how to keep a competitive industry running within the limits of sustainability. This will impact energy use. All together, we can expect energy demand to go down. The research project CEEP-IT by Energyville *[Footnote: https://energyville.be/en/project/ceep-it-climate-neutral-energy-economy-pathways-with-industrial-transformation/]* and others will certainly provide more elements on this. **Année/Niveau de référence** : Nous soulignons que la demande énergétique industrielle risque de ne pas se rétablir au niveau pré covid. Dans un contexte international qui pourrait entraîner de nouvelles fermetures, principalement dans les secteurs intensifs en énergie ou les investissements dans l'outil ont été trop peu importants. Il apparaît crucial d'étudier a minima un scénario qui maintient les niveaux de production industriels au niveau de 2023 voire 2025. (Nous comprenons évidemment la sensibilité de cette question. Mais l'objectif de l'exercice est d'envisager des scénarios les plus crédibles et non les plus souhaitables)

Essenscia

Please note that the scope of our input is limited to the content presented during the industrial demand stakeholder workshop and does not extend to the full consultation documentation. Our comments - listed below - are intended to contribute constructively to the consultation process.

[...]

- **Industry production levels**:
  - For most industries it was assumed that production levels will remain constant: while industrial competitiveness is under pressure, we believe this is the correct approach. After all, similarly to the EU net-zero ambition, the ambition of the EU is to keep its industrial fabric - pillar for our welfare - in the EU (See Clean Industrial Deal).
  - Reference point: for the chemical & petrochemical industry 2021 (before the Russian Invasion) is taken as a reference point. We believe this is the correct approach, since industrial policy and competitiveness is high on the policy agenda (e.g. clean industrial deal, affordable energy action plan, chemical industry packages, etc.) Now, urgent and targeted actions with direct impact on the competitiveness of our industry are needed as a clear signal to the chemical and life sciences sector and international investors.

Fevia

Regarding the reference point for industrial production level, **pre-crisis production** is OK.

CREG

35. La CREG remarque que certaines hypothèses divergent de celles prises dans d'autres études réalisées récemment. Plus particulièrement, concernant la demande en électricité, la CREG note que les projections pour 2030 et 2035 dans les scénarios développés sont supérieures aux données utilisées dans l'étude Adéquation & Flexibilité 2026-2036 d'Elia comme illustré ci-dessous. [Figures showing demand curves]

L'écart provient principalement du niveau de référence retenu pour la projection de la demande industrielle d'électricité. Les hypothèses présentées pour ce nouveau Plan de Développement Fédéral 2028-2038 retient actuellement comme niveau de référence la consommation industrielle de 2021, tandis que la dernière étude d'adéquation publiée en juin 2025 se base sur celle de 2024. Cette nouvelle approche semble optimiste et moins connectée à la réalité actuelle. La CREG recommande par conséquent d'aligner les scénarios de demande pour l'élaboration du plan de développement fédéral avec les hypothèses de l'étude d'adéquation. La CREG recommande dès lors d'utiliser les niveaux de consommation industrielle de 2023/2024 comme point de départ pour les projections de consommation industrielle.

	En effet, employer les niveaux de consommation de 2021 comme hypothèse de départ pour les projections de consommation industrielle induit une hausse de la demande industrielle d'environ 5 TWh entre les hypothèses de l'étude Adéquation & Flexibilité 2026-2036 d'Elia et les hypothèses proposées pour le Plan de Développement Fédéral 2028-2038.
FEBELIEC	Febeliec supports the use of historical industrial utilisation rates as a reference point. However, an additional scenario assuming partial, permanent demand destruction with limited recovery would provide valuable insight.
EDORA	**Section 2.8 : Industry demand** L'hypothèse retenue, d'un retour aux niveaux de production de 2021 (avant la crise énergétique), nous semble prudente et appropriée dans le cadre d'un scénario « BASE ». Cela permet de garantir que les plans de développement des réseaux tiennent compte d'une demande de base plus que plausible en évitant de sous-estimer les besoins en capacité de réseau pour l'avenir, dans la perspective d'une sortie de crise(s) permettant à notre industrie de retrouver une certaine compétitivité. En plus d'un tel scénario central, selon lequel l'activité industrielle reviendrait à son niveau d'avant crise, il nous semble qu'il serait prudent de prévoir l'une ou l'autre variante tenant compte d'une éventuelle réindustrialisation de l'Europe, que ce soit à la faveur d'une évolution positive de la croissance économique mondiale, d'un regain de compétitivité de l'économie belge ou européenne ou de politiques commerciales plus favorables à notre industrie.
Gouvernement wallon	Il s'agit ici de définir quel sera le pourcentage d'utilisation de la capacité disponible par l'industrie manufacturière. En effet, depuis la crise énergétique, ce pourcentage a fortement diminué, passant de 80% en 2021 à 74% en 2024 (la diminution est encore plus forte pour le secteur de la chimie). Cette décroissance est liée en partie à la fermeture de certaines entreprises, mais principalement à une réduction d'activités. Notons que sur cette question, les chiffres spécifiques à la Région wallonne ne nous ont pas été fournis. Elia propose deux options pour définir les niveaux de production industrielle de référence (au niveau belge) : • **Option 1 : Retenir les niveaux de production de 2021** (avant la crise énergétique), en supposant un retour à la capacité d'avant-crise à moyen/long terme.

• **Option 2 : Retenir les niveaux de production de 2023/2024** (réduits), en supposant une capacité d'utilisation durablement inférieure.

L'option 2 reflète la réalité actuelle post-crise. Cependant, partir sur cette option pourrait impliquer un sous-dimensionnement du réseau pour les besoins futurs. Inversement, partir sur l'option 1 fait le pari d'une reprise économique et de redéploiement industriel et pourrait impliquer, si cette reprise ne se réalise pas, un surinvestissement dans le réseau. Il est important de noter que l'option 1 a été retenu au consensus lors de la concertation par Elia.

Question reformulée : La région choisit-elle l'option 1 (optimiste) quitte à surinvestir dans le réseau ou sur l'option 2 (prudente) quitte à ne pas atteindre un tel niveau de production industrielle.

Réponse: Le 17 juillet dernier, le Gouvernement wallon a engagé une démarche ambitieuse de réindustrialisation afin de renforcer la compétitivité économique du territoire et d'y ancrer durablement l'emploi industriel. Cette démarche, qui s'inscrit dans le cadre de la Déclaration de politique régionale 2024-2029, a pour objectif d'accélérer le redéploiement de filières industrielles stratégiques, d'attirer de nouveaux investissements et de soutenir l'implantation de projets à haute valeur ajoutée technologique, tout en veillant à la cohérence territoriale et environnementale des politiques menées. Pour concrétiser ces ambitions, le Gouvernement entend remobiliser 1.500 hectares de terrains d'ici 2029, prioritairement via la reconversion de friches industrielles, afin d'offrir aux entreprises des sites immédiatement exploitables, connectés aux grands réseaux logistiques et énergétiques. La simplification des procédures administratives, la dématérialisation des démarches et la coordination accrue des outils publics doivent permettre de lever les freins à l'investissement industriel. Cette stratégie vise à faire de la Wallonie une région à nouveau industrielle, innovante et durable, capable de conjuguer attractivité économique, transition énergétique et création d'emplois qualifiés.

Dans cette optique, la Région wallonne soutient donc l'option 1.

ANSWER

The inputs received on the reference year regarding industrial output are varied. Some stakeholders argue to assume a return to 2021 (pre-crisis) levels to prepare the grids for this. Other stakeholders argue that the energy crisis will likely have lasting impacts and expect the demand reduction to become permanent (i.e. demand destruction). Finally, some stakeholders argue for a scenario considering reindustrialisation. The CREG argues that the development plans should be consistent with other studies performed by Elia such as Adequacy & Flexibility studies. Given that the scenarios assume the same useful

energy demand and vary the vector by which it is provided, it is proposed to use a single trajectory for industrial production level for all scenarios.

Taking all arguments together and to keep consistency with other studies covering similar time horizons; Elia and Fluxys therefore propose to:

- assume '2024 production' levels for the period until 2037
- assume '2021 production' levels for the period after 2037

7.5.1.2 Technology shifting

Stakeholder	Feedback received
Essenscia	Please note that the scope of our input is limited to the content presented during the industrial demand stakeholder workshop and does not extend to the full consultation documentation. Our comments - listed below - are intended to contribute constructively to the consultation process. […] **E-boilers versus Heat pumps**: in future shifts from fossil fuel-based heating towards heat pumps and e-boilers, a strong preference towards e-boilers is observed. This seems to originate from the fact that currently several companies are investigating E-boilers to be integrated on their sites to be used as a source of flexibility. However, this trend cannot just be extrapolated since – in a net-zero scenario towards 2050 - low-carbon heat production would be required in baseload. This might change the trade-off between e-boilers and heat pumps.
CREG	34. Compte tenu du nombre limité d'acteurs dans certaines industries, il a été précisé lors des workshops que certains scénarios ont été élaborés selon une approche bottom-up, c'est-à-dire fondée sur les stratégies de décarbonation et les investissements envisagés/concrets des industriels. Étant donné que les trajectoires de décarbonation varient selon les secteurs — par exemple, l'électrification pour les aciéries, les molécules vertes pour les raffineries, ou encore le captage et stockage du carbone (CCS) pour les cimenteries — et que ces technologies sont privilégiées différemment selon les scénarios, la CREG souligne l'importance cruciale d'un scénario « BASE » qui reflète fidèlement cette diversité technologique. À défaut, il existe un risque que les scénarios proposés ne traduisent pas de manière crédible le futur le plus probable.

	La CREG recommande pour valider ce scénario 'BASE' d'utiliser les données disponibles fournies par les industriels suivant une approche 'bottom-up' grâce aux outils existants comme, par exemple, le 'Load management tool' développé par Elia. Cet outil permet d'évaluer les probabilités de réalisation de différentes trajectoires de décarbonation suivies par les industriels sur base des informations qu'ils fournissent [...] 36. La CREG estime qu'une partie de l'électrification industrielle pourrait ne pas se matérialiser ou être retardée si des conditions favorables à cette électrification ne sont pas assurées. De telles conditions favorables comprennent notamment la disponibilité d'électricité à bas coûts, l'accès à des capacités sur le réseau de transport d'électricité, un contexte économique et de compétitivité mondiale favorables, etc. Ce risque est également mis en évidence par McKinsey *[Footnote : https://www.mckinsey.com/industries/energy-and-materials/our-insights/global-energy-perspective]* qui estime dans son étude « Global Energy Perspective 2024 » qu'en Europe près de 40% de l'augmentation de la demande en électricité prévue entre 2023 et 2030 pourrait ne pas se matérialiser. Ce chiffre monte à 55% dans le cas spécifique de l'industrie. Alors que le développement du réseau de transport d'électricité constitue un prérequis à l'électrification pour de nombreux acteurs, nous soulignons ici les liens étroits et bidirectionnels entre le réseau de transport et ses utilisateurs, chacun des deux reposant sur l'autre pour son propre développement.
CREG	37. Pour les pompes à chaleur industrielles (chemical & petrochemical, Agriculture - forestry & fish), les documents soumis à consultation mentionnent un coefficient de performance de 2,5 sur base d'une étude réalisée par Agora. Cette valeur semble conservatrice et ne semble pas se baser sur les technologies de pompes à chaleur les plus récentes pour des applications industrielles. Un exemple de pompe à chaleur industrielle dans une raffinerie de sucre à Tirlemont pour générer de la vapeur jusqu'à 160°C présente un coefficient de performance moyen de 3 à 5 *[Footnote :* 'First-of-its-Kind' 4MW Pentane Heat Pump Installed at Belgian Sugar Factory: https://naturalrefrigerants.com/first-of-itskind-4mw-pentane-heat-pump-installed-at-belgian-sugar-factory*/]*. De manière générale, plusieurs documents font référence à des coefficients de performance saisonniers compris plutôt entre 3,5 et 5 pour les pompes à chaleur industrielles *[Footnote : https://www.bpa.gov/-/media/Aep/energy-efficiency/emerging-technologies/202403-industrial-heat-pump-marketstudy.pdf https://www.ehpa.org/wp-content/uploads/2022/11/Large-heat-pumps-in-Europe-and-industrial-uses_2020.pdf*] pour des différences de température entre 40 et 50°C entre la source froide et la source chaude.

	La CREG recommande de revoir à la hausse le coefficient de performance considéré pour ces applications, au minimum à un niveau de 3,5. Des coefficients de performance différents pourraient être employés en fonction du niveau de température à atteindre en vue d'augmenter la finesse de l'analyse. La CREG souligne que l'exploitation de chaleur résiduelle sur un site industriel comme source froide d'une pompe à chaleur a une influence significative sur son coefficient de performance.
CREG	39. L'étude de S. Madeddu & al. (2020) *[Footnote : Silvia Madeddu et al, The CO2 reduction potential for the European industry via direct electrification of heat supply (power-to-heat), 2020 Environ. Res. Lett. 15 124004]* mentionne que 78% de la consommation d'énergie dans l'industrie européenne peut être électrifiée avec des technologies qui existent déjà. Un taux d'électrification de 99% pourrait être atteint avec des technologies qui sont actuellement en développement. Une analyse approfondie de cette étude pourrait permettre de contribuer à confirmer les hypothèses prises dans les différents résultats.
FEBELIEC	In the food and beverage sector, Elia and Fluxys present a technology shift across the three scenarios. Yet, even for low-temperature heat (<100°C), the assumed uptake of heat pumps remains minimal. This is highly implausible. Uptake should be increased substantially—not only in the Base scenario but also in the Molecules and Electricity scenarios. If not, Elia and Fluxys should explain why, and how Belgium can credibly achieve net-zero or even a 90% reduction without electrifying low-temperature heat. This observation applies not only to the food and beverage sector, but also to other industries.

ANSWER

Regarding the construction of the scenarios

When it comes to the shorter-term projections (2030 and 2035), Elia and Fluxys would like to clarify that indeed bottom-up information was used as much as possible. Elia continuously surveys its direct clients when it comes to load projections (load management exercise) and also has information regarding contracted and requested connection capacities. This information is enriched by survey data which Fluxys in turns receives from their clients regarding the expected offtake of hydrogen and CCUS uptake. For DSO-connected industries, the Energiegrip study forms a basis for quantification as well as Plan de Puissance (still ongoing).

These scenarios are then expanded until 2040-2050 based on assumptions derived from other publications, bilateral discussions with industrial players and sectoral federations and the workshop on industry during the Task Force Multi-Energy Scenarios. The uncertainty in speed and final goal of the transition is large, an ELEC and MOL scenario were added to explore two reasonable extremes next to the BASE scenario.

Assumptions on industrial heat pumps

Following the comments from Essenscia and Febeliec, the share of heat pumps within the overall electrification mix (which includes both heat pumps and electric boilers) has been increased across all sectors.

For the following sectors: i) food, beverages and tobacco, ii) pulp, paper and printing, iii) agriculture, forestry and fishing, iv) non-ferrous metals, v) other small sectors, this increase of heat pumps for low temperature needs has been adapted as follows: after 2035, electric boiler deployment no longer grows, and any additional electrification is assumed to be covered only by heat pumps. Level of electrification by electric boilers is thus kept constant from 2035 till 2050 and no longer grows.

For the chemical and petrochemical sector, electric boiler shares decrease in the low temperature range after 2040. Therefore, all additional electrification below 200°C is assumed to be covered by heat pumps.

Regarding the efficiency, a value of 2.5 for the COP is considered. In the study Fraunhofer ISI (2024)[55] "Direct electrification of industrial process heat. An assessment of technologies, potentials and future prospects for the EU." on behalf of Agora Industry, it is stated that *while the theoretical COP (Carnot cycle) of a heat pump having a heat source of 60°C and heat sink of 160°C is 3.8, they typically reach a COP of 1.9-2.3*. Moreover, feedback during the workshops was that a COP of 3 was too high. For these reasons, a COP of 2.5 is kept.

7.5.1.3 Concrete development of new projects, brownfield sites, new locations

Stakeholder	Feedback received
Gouvernement wallon	Ici, Elia n'a pas présenté d'hypothèse, mais cherche à identifier des projets ou zones prioritaires pour le Gouvernement wallon pour adapter son plan de développement du réseau électrique. *Réponse* : Pour répondre à cette question, une première réunion de la Task Force « Puissance et flexibilité énergétique » s'est tenue le 29 septembre dernier. L'objectif principal de cette réunion était d'identifier les besoins actuels et futurs des entreprises et, plus largement, de l'économie wallonne.

[55] A-IND_329_04_Electrification_Industrial_Heat_WEB.pdf

Plan de puissance

Elia a été conviée à cette réunion, aux côtés d'ORES et de RESA, afin de présenter l'état d'avancement des travaux de l'initiative « Plan de puissance ». Cette présentation a confirmé que les travaux étaient bien en cours et que de premiers résultats devraient être disponibles avant la fin de l'année 2025.

Comme rappelé dans le courriel de suivi de la réunion, plusieurs éléments d'information demeurent néanmoins manquants pour permettre à la Région d'avoir une vision d'ensemble des besoins futurs des entreprises existantes — notamment en ce qui concerne la puissance et l'énergie couvertes par les clients concernés par cette initiative, ainsi que les modalités selon lesquelles les GRD s'assurent que leurs plans d'investissement reflètent correctement les besoins des clients non-couverts par cette initiative.

Le *Plan de puissance* se concentre sur les besoins futurs des entreprises déjà implantées. Toutefois, il est essentiel d'élargir la réflexion à l'ensemble de l'économie wallonne, en incluant également les besoins énergétiques des activités et installations à venir.

Cet exercice est complexe, puisqu'il est impossible de prévoir avec certitude quels types d'industries choisiront de s'installer demain en Région wallonne. Une première étape consiste néanmoins à recenser les terrains disponibles pour ce développement futur.

C'est dans cette optique que la réunion du 29 septembre a également rassemblé :
- les ADT, venues présenter la situation de leurs PAE ;
- la SOWAER, pour exposer les perspectives de développement de ses zones d'activités économiques ;
- et Wallonie Entreprendre, qui coordonne la reconversion de nombreuses friches industrielles.

Problème d'accès à la puissance

Les ADT et la SOWAER disposent aujourd'hui d'environ 1 400 hectares de terrains équipés et immédiatement mobilisables. Or, dans de nombreux cas, ces zones ne peuvent plus accueillir de nouvelles entreprises, y compris celles déjà prêtes à s'y implanter. Cette situation a mis en lumière la nécessité d'une meilleure anticipation des besoins et d'une coordination renforcée entre gestionnaires de réseau et ADT. Les démarches récemment engagées pour améliorer ces échanges constituent à cet égard une évolution positive.

Besoins ADT

Les ADT ont été invitées à fournir une estimation de leurs besoins actuels et futurs en puissance. Des données détaillées par ADT seront disponibles aux alentours du 17 octobre. Ceux-ci nous ont néanmoins fourni une estimation de besoins moyens de 280 kVA/hectare pour une surface totale disponible de 1400 hectares.

Par ailleurs, deux ADT nous ont déjà fourni des éléments de précision sur leur besoin.

Ainsi, à horizon 2030, Igretec a estimé les besoins en puissance des sites suivants :
- Ancien site Caterpillar et Aéropole: 80 MVA, dont 50 MVA pour l'ancien site de Caterpillar.
- Porte Ouest (> 100 hectares) : 100 MVA (dont 7,1 MVA pour le Quartier du Futur de la Défense, 20 MVA pour le parc d'activités économiques du District Cleantech et 7 MVA pour une enceinte multifonctionnelle.
- Ecopole (> 150 hectares) : 50 MVA, dont 15 MVA déjà réservé aujourd'hui pour un data center de Google.

Ideta a evalué ses besoins en puissance (en MVA) par PAE à horizon 2030 et 2035 :
- Tournai-Ouest: 14 et 24
- Polaris: 12 et 26
- Leuze-Europe: 10 et 18
- Orientis (Ath-Lessines): 5 et 33
- Qualitis: 3 et 4
- Tournai Cleantech Park: 3 et 3
- Pecq Pont Bleu: 5 et 5 - Sucrerie de Frasnes: 1 et 6
- Antoing Delta Zone: 0 et 15

Besoins SOWAER
La SOWAER, pour sa part, a déjà partagé plusieurs chiffres :

- sur le site de Liège, les besoins annuels s'élèvent actuellement à 14 GWh et devraient atteindre 38,5 GWh en 2050. Le diUérentiel de 24,5 GWh est réparti comme suit : 5 GWh pour la décarbonation de l'existant, 7,5 GWh pour l'électromobilité et les e-GSE, 7,5 GWh dans le cadre du master plan et 4,5 GWh pour les pistes et le balisage. Le pic de puissance annuel moyen (hors production locale) passerait de 2,5 MW à 9 MW ;
- sur le site de Charleroi, les besoins passeraient de 16 GWh à 19,5 GWh d'ici 2030, pour un pic de puissance moyen de 3,1 MW à 3,8 MW.

La SOWAER indique par ailleurs que ces évolutions nécessiteront un renforcement du bouclage interne alimentant actuellement les installations.

Besoins friches (Wallonie entreprendre)

Wallonie Entreprendre reconvertit, de son côté, plus de 550 hectares de friches industrielles, répartis sur une petite dizaine de sites :

- Chertal (Oupeye) – 186 ha
- Duferco (La Louvière) – 120 ha
- Ex-Caterpillar (Gosselies) – 93 ha
- Porte Ouest (Charleroi) – 85 ha 17
- HFB + Cokerie (Seraing) – 68 ha
- Durobor (Soignies) et TDE – Fonderie du Lion (Couvin) – <10 ha chacun

Ces chiffres correspondent aux surfaces totales des friches, mais pas forcément aux surfaces utilisables pour du déploiement économique.

Wallonie Entreprendre travaille actuellement à une estimation des besoins en puissance par hectare et par type d'industrie pour chacun de ces sites, accompagnée d'une ligne du temps détaillée des appels à projets et des phasages de réhabilitation.

La Région wallonne accorde une importance stratégique à la réussite de ces reconversions, en particulier sur les sites de Chertal à Liège et Caterpillar à Charleroi, qui les considère comme des leviers essentiels de reconversion économique. Dans cette perspective, elle demande au gestionnaire de réseau de transport Elia de réserver dès à présent les capacités nécessaires sur ces sites afin d'assurer leur réhabilitation et leur réindustrialisation, en lien avec la transition énergétique, l'électrification de la société et la création d'emplois locaux.

Nous invitons Elia à collaborer étroitement avec Wallonie Entreprendre pour garantir la cohérence entre les lignes du temps de développement du réseau et celles des projets de reconversion. Nous demandons à Elia de nous transmettre ces calendriers dès qu'ils seront établis.

Projets spécifiques

Enfin, au-delà de ces considérations globales, nous souhaitons attirer l'attention sur plusieurs projets spécifiques à prioriser dans les plans d'investissement des GRD et d'Elia :

- Les aéroports de Liège et de Charleroi, dont les besoins énergétiques sont en forte croissance ;

[...]

- Le télescope Einstein : La Wallonie est engagée aux côtés des partenaires flamand, fédéral, hollandais et allemands, dans la candidature pour l'accueil du Télescope Einstein. Les travaux d'infrastructure sont envisagés à partir de 2028,

	dans un territoire proche de la gare de Montzen (commune de Plombières). La puissance nécessaire au fonctionnement du Télescope, ainsi que pour quelques activités connexes qui pourraient se développer dans son sillage, peut être estimée à environ 50 MVA.Finalement, la Région wallonne attend qu'Elia maintienne un contact régulier avec les autorités locales et régionales afin de garantir la cohérence des projets et d'assurer leur bonne intégration territoriale. Cette approche doit permettre d'anticiper les besoins futurs et d'accompagner les projets stratégiques régionaux dans une logique de redynamisation des territoires et de durabilité.

ANSWER

Elia and Fluxys want to thank the Gouvernement wallon, as well as the above-mentioned ADTs, SOWAER and Wallonie Entreprendre, for sharing these valuable and detailed insights regarding the potential for new developments in specific zones. Regarding the inclusion of these values into the macro-scenarios, indeed, Elia and Fluxys try to take as much as possible all the information regarding new loads into account. As such, following information is used:

- Concerning existing access points, these clients are surveyed yearly regarding their expected capacity and energy needs for the coming 10 years via the Elia load management.
- For potential new clients, these are taken into account in the macro-scenarios on the condition that the connection requests are estimated to be sufficiently mature.

This information is essential in order to anticipate future grid development needs. They are particularly useful, as the capacity increases per location will allow to better assess impacts in local grid studies which will be performed during the Federal Development Plan. The redistribution of load and production to a more local level is indeed important to ensure investments are made where they are needed. In the present consultation Elia has taken a step forward with respect to previous consultations by providing a split of the load over the regions. The redistribution to local levels for the electricity related components is discussed in the framework of the Task Force Local Redistribution of Injections and Offtakes[1] which is held by Elia. In this Task Force, local redistribution methodologies are presented by Elia experts in interactive workshops, and each iteration ends with a public consultation. A separate Task Force about local redistribution methodologies has been preferred, as these methodologies not only impact the Federal Development Plan, but also the Regional Development Plans and other studies performed by Elia, such as client connection studies.

As defined in the LRIO methodology, Elia will consider the part of the announced evolutions and mentioned capacities, that are not yet covered by ongoing connection requests, as local growth potentials in these zones. As such, they will be considered in local grid development studies, where the grid reinforcements and other upgrades at local level are being defined and included in subsequent grid development plans. It must be noted that the development of grid infrastructure is subject to multiple constraints because of which no guarantees on timing can be made at this stage, further concretization of the solution and timing will be included in the relevant development plans. The set of relevant grid reinforcement projects will then be subject to the dynamic portfolio management processes, where their realization will be aligned with the expected materialization of the needs.

Finally, Elia wants to point out that it's at this moment not possible to reserve or allocate grid capacity for the mentioned evolutions. Elia will indeed, as mentioned above, investigate the required grid reinforcements, however reservation of grid capacity follows a strict legal and regulatory framework, where grid capacity is reserved and allocated during the process of grid connection studies. Elia thus calls on the parties involved to launch the relevant grid connection studies with Elia.

7.5.1.4 Localisation of industry

Stakeholder	Feedback received
BBL - Canopea	**Une meilleure planification territoriale industrielle** : Etant donné l'importance de l'électrification pour la décarbonation des procédés industriels, l'essentiel est de mieux planifier le développement et l'utilisation des Parcs d'activité économiques (PAE). (Mettre la bonne industrie au bon endroit en fonction de ces besoins en énergie, des impacts éventuels (bruits, pollution) de l'accessibilité en transport en commun, de l'intensité en emploi...) Canopea plaide pour que les régions assument d'avantage leurs rôle de chef d'orchestre et adoptent une stratégie régionale de développement des Parcs d'activités économiques (PAE). **Utilisation de données up-to-date en Wallonie.** Au niveau wallon, les audits prévus dans le cadre des conventions carbone devraient permettre d'avoir une vision claire des projets d'investissement et donc des besoins électriques à l'horizon 2035. Il apparaît judicieux d'attendre que ces chiffres soient disponibles pour déterminer la demande industrielle le plus précisément possible pour le Sud du pays.

ANSWER

Elia and Fluxys thank BBL – Canopea for the comment. While the input of the "conventions carbone" is welcomed they are unfortunately not available yet (as of October 2025) and including them in the scenario rapport is as such not possible. Secondly, the identification of desirable locations for industrial activities is out of scope for the present exercise.

7.5.2 Food, beverages and tobacco

Food, beverages and tobacco

Stakeholder	Feedback received
Fevia	As **Belgian food industry association**, it is quite difficult to provide specific answers to these general questions. Here are our *high-level* reactions: **Biomass** use: consideration of biomass competition (limited supply and cascading principle of biomass use) as well as contradiction with legislation (incl. contradictory EU objectives on food waste and renewables; biomass used as energy is considered waste but if valorized as organic matter no). **Electrification** is the direction for the food industry. Temperatures up to max 300°C could be possible with e-boiler and/or heat pump. Attached [file can be found in the files submitted for consultation] is the European roadmap for our sector, which outlines several decarbonization/electrification scenarios. **CHP** certainly still has a use in the first few years.
FEBELIEC	In the food and beverage sector, Elia and Fluxys present a technology shift across the three scenarios. Yet, even for low-temperature heat (<100°C), the assumed uptake of heat pumps remains minimal. This is highly implausible. Uptake should be increased substantially—not only in the Base scenario but also in the Molecules and Electricity scenarios. If not, Elia and Fluxys should explain why, and how Belgium can credibly achieve net-zero or even a 90% reduction without electrifying low-temperature heat. This observation applies not only to the food and beverage sector, but also to other industries.

ANSWER

Fluxys and Elia thank Fevia and Febeliec for their comments. In the short term some players are already installing e-boilers today, mainly building on their flexibility with traditional heat supply sources which allows a positive business case. Indeed, in the long run these traditional fuel-based heating supply might be phased out, in this case electrification through heat-pumps is more relevant than e-boilers for that temperature range, given their higher efficiency and thus much lower operating costs. The share of heat pumps within the sectors' electrification will be increased in the low temperature range (<200°C) to account for this.

7.5.3 Refineries

Refineries

Stakeholder	Feedback received
Belgian Hydrogen Council & TotalEnergies	The 0,6-1-1,4 TWh of hydrogen as publised in the data table for refineries is too low. The implementation of the REDIII transport target will be mostly realised through the use of hydrogen in refineries. The current ambitions of the sector – to be confirmed in the specific targets for refineries- are to consume 70-100 kton of H2 in refineries by 2030, which is 3-4 TWh and this can increase to 200 kton later on (6-8TWh). Also related to the use of hydrogen in refineries, we don't understand the red cross in the column of process industry p. 127. Use of decarbonised molecules in refineries is an important pathway.
BBL – Canopea	Refineries: Refineries keep running in the scenario even when Belgium is not using the production anymore. The BBL studie from 2021 established by Climact over a decarbonised industrie in Flanders ("Een groene industriële revolutie: Hoe creëren we een klimaatneutrale Vlaamse industrie?", included in the list of sources indicated by Elia/Fluxys) doesn't see any refinery running in 2050 anymore.

ANSWER

RED III and hydrogen

The values for hydrogen mentioned in the feedback (0.6-1.4 TWh) are for energy purposes. As the implementation of RED III target in refineries concerns the use of hydrogen as intermediate product, the values are accounted for in the feedstock (non-energy) sector.

From latest available information[56], the RED III ambitions for RFNBO in refineries is around 1.3 TWh LHV by 2030, which is lower than the hydrogen demand in refineries for use as feedstock depicted in the scenarios. Therefore, the scenarios are potentially compliant with the RED III directive (if the supply is RFNBO compliant).

Production levels

The assumption regarding refinery production levels follows the general production level assumptions for industry, where only known closures are taking into account.

It is true that general demand for oil products will decrease in the future, due to the phase-out of internal combustion engines in transport and energetic use of oil in buildings and industry. However, some sectors will likely still have a need for oil products until 2050, such as in feedstock (naphtha) and/or in international shipping in aviation. The two Belgian refineries are considered as one of the most performing in Europe, meaning that even in case of a strongly reduced demand for oil products these units might be one of the last supplying units remaining.

Note that a reduction in oil refinery output will be assumed in the sufficiency scenario reducing by 25% in 2040 and 50% by 2050.

7.5.4 Chemicals & petrochemicals

7.5.4.1 Non-energy (feedstock)

No specific comments were received on this subsector.

7.5.4.2 Energy

No specific comments were received on this subsector.

7.5.5 Non-Metallic minerals

Non-metallic minerals

Stakeholder	Feedback received
Gouvernement wallon	*Projets spécifiques* Enfin, au-delà de ces considérations globales, nous souhaitons attirer l'attention sur plusieurs projets spécifiques à prioriser dans les plans d'investissement des GRD et d'Elia : […]

[56] Hydrogen Europe

- Les chaufourniers et les cimentiers, dont la décarbonation nécessitera une augmentation significative de la consommation électrique (potentiellement un doublement) liée au captage du CO_2. Le calendrier actuel du développement du réseau de transport de CO_2 prévoit une mise en service des premières connexions à l'horizon 2029. Pour donner un ordre de grandeur, dans le dernier appel FTJ, cinq projets wallons ont été retenus (chaufourniers et aciéries). Ces cinq projets consomment déjà plus de 1 TWh par an et leur consommation devrait augmenter de minimum 30%.;

ANSWER

Elia and Fluxys confirm that the different initiatives that were launched in the Belgian cement and lime sectors are taken into account. Therefore, the main pathway considered for the construction of the scenarios indeed relates to the implementation of CCS for both process and combustion emissions.

A quantification has been performed and CCS quantities are now explicitly included in the scenarios. A similar approach as for the final demand in industry is followed, where the values for 2030-2035 are derived from information communicated towards Fluxys and Elia when it comes to amounts of CO2 to be captured and associated electricity demand. For the longer term (2040–2050), this data is complemented by a top-down approach, where scenario storylines guide assumptions about the share of residual emissions to be captured. Additionally, external studies[57] have been consulted to estimate the CCS potential towards 2050, helping to refine and validate the long-term projections.

As can be found in the Scenario Excel, electricity demand for the non-metallic minerals sector is assumed to increase by 1.1-2.4 TWh (range between scenarios) in the Walloon region by 2040.

7.5.6 Iron & Steel

Iron & Steel

[57] External studies:
- EnergyVille PATHS 2050: 14-20 MtCO2 captured in 2050
- Elia Blueprint study: 10-15 MtCO2 captured in 2050
- Integration study by fluxys: 25-35 MtCO2 captured in 2050

Stakeholder	Feedback received
Belgian Hydrogen Council	•What about the use of H2 in steel (DRI)? It is assumed that this will happen not earlier than 2050, but in the same table of p. 127 this should have its place in the process industry column.
BBL - Canopea	We repeat our concern - expressed several times already - that the scenarios are exaggerating the energy use in industry. […] It is particularly true for Steel and iron industry : In a given moment, Belgium might see its steel imported (whether this is desirable or not). The "imported" energy in the form of briquetted iron might not be temporary (as assumed) but lasting. Only finishing steps might remain in BE. This scenario can not be excludes, as renewable hydrogen will not be available and too expensive and CO2 abatement from fossil hydrogen too expensive and not effective. We therefore suggest to establish at least a sensitivity for such a situation.
CREG	38. Pour le secteur métallurgique, les hypothèses d'évolution de la demande en électricité semblent ambitieuses en comparaison avec une étude réalisée par un consultant externe sur l'évolution de la demande en électricité du secteur. En effet, cette étude prévoit une augmentation de la demande en électricité plus faible en 2040 par rapport à la consommation électrique prévue dans le cadre de cette consultation publique. Les évolutions de cette demande électrique dépendront notamment des décisions d'investissements réalisées (ou non) sur les différents sites métallurgiques actuellement présents en Belgique. Afin d'estimer l'évolution de la consommation en électricité du secteur métallurgique, cette étude a suivi une approche 'bottom-up' se basant sur des sites sidérurgiques existants en Belgique et prenant en compte différentes hypothèses en fonction des potentielles décisions d'investissements pour ces différents sites. Cette approche au cas par cas sembleplus pertinente que l'approche proposée dans le cadre de cette consultation publique. La CREG recommande donc d'adapter la consommation du secteur métallurgique dans les trois scénarios de sorte qu'ils restent dans la fourchette définie par cette étude.
Gouvernement wallon	*Projets spécifiques* Enfin, au-delà de ces considérations globales, nous souhaitons attirer l'attention sur plusieurs projets spécifiques à prioriser dans les plans d'investissement des GRD et d'Elia : […]

- Les aciéries qui sont également électro-intensives.

ANSWER

The table of page 127 of the report will be updated to be more specific. Indeed, H_2 is currently used in the hypothesis for the production of primary steel trough DRI in 2050 in the ELEC and BASE scenarios.

Regarding the indirect imports of energy in the steel sector, for example in the form of briquetted iron, it is assumed that this will happen temporarily. Assuming this will last is equivalent to assuming that the primary steel industry will close in Belgium. As discussed with stakeholders during the workshop on industry, the main assumption regarding production levels in Belgium concerns no additional closures that are not yet publicly known. The current assumptions are based on the latest known developments in the Belgian market as well as confidential information from the customers of Elia and Fluxys. Since no source is provided nor has been found to support the adoption of a more import-oriented market in Belgium, the current assumptions will be kept. Nevertheless, thanks notably to increased circularity in the industry sector, the energy consumption in the sufficiency sensitivity will be lower.

On the comment of the CREG regarding the bottom-up approach. Elia and Fluxys would like to emphasise that the approach followed in the development plan is also a bottom-up approach, based on the publicly available information, historical trends and confidential data shared by their customers. Indeed, when it comes to the shorter-term projections (2030 and 2035), Elia continuously surveys its direct clients when it comes to load projections (load management exercise) and also has information regarding contracted and requested connection capacities. This information is enriched by survey data which Fluxys in turns receives from their clients regarding the expected supply/demand of hydrogen and CCUS uptake. It is important to keep in mind that it is not the role of Elia and Fluxys to assume any closure of industrial companies in Belgium, which external studies might do. This can lead to a lower consumption in comparison, despite having the same hypothesis for other players.

Regarding the comment of the Gouvernement wallon, Elia and Fluxys confirm that indeed, additional electrification is assumed in the Walloon region for some (secondary) steelmaking and finishing players located in the region. The details can be found in the Scenario Excel.

7.5.7 Other industries

No specific comments were received on this subsector.

7.5.8 Agriculture, forestry, and fishing

Agriculture, forestry, and fishing

Stakeholder	Feedback received
COGEN	In chapter 2.9.1.4, the first paragraph should be amended as follows, as the availability of a sufficiently large and cheap heat source influences the choice whether a heat pump or an eboiler would be chosen: 'The emissions of this sector are due to the combustion of fuels for heat production and mechanical work. Thus, electrification of heat and agriculture machineries appears as a decarbonizing solution. Heat pumps and e-boilers are considered for heat, depending on the availability of a cheap heat source, and electric motors for machineries. The efficiencies of these technologies are summarised in the table below.'

ANSWER

Thank you for the comment.

7.6 Other elements to be considered in the consumption of electricity

7.6.1 Data centres

Data centres

Stakeholder	Feedback received
Vlaamse Nutsregulator	Voor datacenters steunen de assumpties in het consultatiedocument van Elia op het recente publieke rapport "The Power of Compute: The Effects of Data Center Growth on Belgium's Energy System" *[Footnote: The Power of Compute, the-power-of-compute-the-effects-of-data-center-growth-on-belgiums-energy-system-r.pdf]* van Boston Consulting Group. Elia geeft hierbij aan dat alle scenario's voor het federale ontwikkelingsplan uitgaan van het midden scenario uit deze BCG-studie. Dit midden scenario baseert zich op alle "aangekondigde projecten". Het is niet helder hoe deze "aangekondigde projecten" zich verhouden tot de bij Elia gekende projecten, in de verschillende stadia van maturiteit (slechts oriëntatiestudie, detailstudie of reeds getekend aansluitingscontract). Elia heeft recent meermaals de sterk toenemende capaciteitsvraag van datacenters onder de aandacht gebracht, onder meer in zijn gezamenlijk persbericht met Fluvius van 27 maart 2025 *[Footnote: https://www.elia.be/nl/pers/2025/03/20250327_congestion-management-for-businesses]* . In die zin lijkt het zinvol om verder te verduidelijken waarom Elia in elk van haar drie scenario's opteert voor het midden scenario uit de BCG-studie.
negaWatt	**Data centres – re-centering the "mid-range" and using robust Trajectories** The report bases its assumptions on BCG's "The Power of Compute", citing a range from about 10.5 to 34 TWh by 2050 for Belgian data centres. Positioning a single mid-range point (e.g. around 18.5 TWh in 2050) should be justified against this wide band and contrasted with alternative international outlooks (e.g. by the IEA, leading to more modest demands depending on the scenario). Belgium's specific context (grid capacity, siting, cooling, and limited domestic primary energy resources) further argues for a cautious central case and multiple clearly documented trajectories. We suggest: (i) presenting at least three trajectories (low/moderate/high) grounded in the cited range; (ii) reflecting governance, siting, and grid constraints in central values; and (iii)

	clarifying the link between AI-driven demand and actual project pipelines and policy frameworks.
BBL - Canopea	**Besoin de capacité des data centers** : Pour ce qui est des data center, et étant donné leur impact sur les besoins de réseaux (due à l'importance des capacité utilisées et à l'inflexibilité), il est crucial de développer un scénario Low development mieux à même de souligner l'impact du développement des infrastructures numériques sur les réseaux énergétiques, leurs coûts et d'éclairer la décision politique.
EDORA	**Section 2.10 : Other elements to be considered in the consumption of electricity** Nous n'avons pas de raison de douter des hypothèses issues de l'étude de BCG anticipant une forte **croissance de la demande d'électricité des centres de gestion des données (de 3,2 TWh en 2024 à 10,5-** 34 TWh en 2050) ou de l'opportunité de positionner la Belgique en tant que hub dans le domaine du traitement de données et de l'IA, pour autant, bien sûr, qu'un développement aussi rapide que massif des sources d'électricité renouvelable lui permette véritablement d'être compétitive sur ce marché ! Moyennant cette hypothèse, il est crucial de planifier l'évolution de ses réseaux de manière à pouvoir soutenir cette croissance significative de la demande et de la production locales d'électricité verte.
CREG	40. La CREG estime que la trajectoire de croissance projetée pour la consommation des data centers doit être nuancée, car une part importante de la croissance de consommation estimée par BCG repose sur des projets planifiés mais qui ne sont pas encore en phase de construction, comme par exemple ceux de Google. Or, la concrétisation de ces projets reste incertaine, en raison de divers facteurs (réglementaires, environnementaux et politiques par exemple) qui pourraient en ralentir ou en modifier la mise en œuvre. Cette incertitude pèse sur la robustesse des prévisions et invite à considérer ces scénarios comme ambitieux plutôt que comme acquis. La CREG recommande donc de choisir le scénario 'Low' de BCG pour la demande en électricité des data centers. 41. La CREG constate que le scénario 'Central' de BCG présente une divergence à la hausse de la demande en électricité des data centers pour 2030 et 2035 par rapport aux données utilisées dans le scénario « Current Commitments » de la dernière étude d'adéquation. Pour une consommation de 3,2 TWh en 2024 pour les data centers en Belgique (sur base des chiffres de l'étude BCG), on peut observer une divergence à la hausse de 0,8 TWh pour 2030 et 1,1 TWh pour 2035 entre les hypothèses de l'étude Adéquation &

	Flexibilité 2026-2036 et les hypothèses proposées pour le scénario 'Central' de BCG .
Gouvernement wallon	Elia s'appuie sur une étude du BCG (The Power of Compute, 2025) pour estimer la croissance de la demande électrique des data centers en Belgique. Les projections prévoient une forte augmentation d'ici 2050. BCG table sur des besoins de 12.5 TWh en 2040 et 18.5 en 2050 (pour rappel, la consommation actuelle d'électricité totale de la Belgique est autour de 80 TWh). Cette augmentation serait majoritairement poussée par l'arrivée d' « hyperscaler » pour développer l'intelligence artificielle générative (e.g. chatgpt). A noter que ces estimations sont déjà largement dépassées par le nombre de demande actuelle (13 TWh réservé + 55 TWh en étude), bien qu'ELIA estime qu'il est impossible que tous ces projets se réalisent. Par ailleurs, Elia estime qu'une part majeure des projets vont s'installer en Wallonie. L'argument principal avancé est la disponibilité de terrain supérieure en Wallonie. Sur les 12.5 TWh en 2040, ELIA suppose que 10.5 TWh seront en Wallonie. Cela correspond à près de la moitié de l'électricité consommée en Wallonie (~ 23 TWh). *Question reformulée:* - La Wallonie souhaite-elle accueillir des data centers sur son territoire, en particulier ceux qui visent à entrainer/faire tourner des IA génératives ? - Quels sont les lieux où ces data centers devraient préférentiellement être développés ? *Réponse :* La Région wallonne pourrait accepter l'implantation de nouveaux data centers ou l'extension de data centers existants sur son territoire. Cependant, celle-ci devra être conditionnée à un ensemble d'exigences garantissant leur utilité économique, sociale et 4 environnementale, ainsi que leur compatibilité avec les capacités énergétiques régionales. - Ancrage territorial et social o Le projet doit démontrer un ancrage local réel, notamment par la création d'un nombre minimal d'emplois directs et indirects sur le territoire wallon. o Le porteur de projet devra présenter un plan de contribution au tissu socioéconomique local, comprenant des initiatives en matière de formation, de partenariats éducatifs ou de soutien associatif. - Énergie, climat et environnement

- Le data center devra couvrir une part significative de sa consommation par de l'énergie décarbonée produite localement, notamment via l'autoproduction renouvelable ou le co-investissement dans de nouvelles capacités renouvelables.
- Il devra valoriser sa chaleur fatale au bénéfice d'usages locaux (réseaux de chaleur, infrastructures publiques, etc.).
- La consommation d'eau douce sera strictement encadrée ; l'utilisation d'eau non potable ou recyclée sera privilégiée chaque fois que possible.

- Réseau et flexibilité
  - L'implantation du data center se fera uniquement dans des zones identifiées par Elia comme aptes à accueillir de fortes charges sans mettre en péril les besoins des autres utilisateurs.
  - Le data center doit être flexibilisable. Il doit démontrer un niveau minimal de flexibilisation (10–20% steady pour hyperscale, 10% temporaire pour colocation).
  - Le couplage avec des installations de stockage d'énergie sera encouragé afin d'améliorer la stabilité du réseau

- Souveraineté numérique
  - La priorité sera accordée aux acteurs européens, afin de renforcer la souveraineté numérique et la sécurité des données au sein de l'Union européenne.

Le Gouvernement accorde une importance particulière à ces critères. Leur mise en œuvre concrète devra potentiellement faire l'objet d'adaptation réglementaires.

Sans disposer à ce stade d'une analyse exhaustive des projets répondant à l'ensemble des critères requis, il apparaît néanmoins que les estimations d'Elia sur ce segment devraient être réévaluées à la baisse. Il est nécessaire qu'Elia puisse préciser les projets actuellement en demande de raccordement, afin d'objectiver cette révision.
Plus particulièrement, l'hypothèse d'une consommation de 10,5 TWh dédiée aux data centers nous semble disproportionnée. Dans un contexte d'électrification rapide de l'économie, il ne serait pas cohérent que la Wallonie assume seule l'accueil et la charge énergétique de la quasi-totalité des nouvelles implantations. Une telle concentration risquerait d'aggraver les déséquilibres régionaux et de compromettre la disponibilité de puissance pour d'autres projets industriels prioritaires.

Dans cette perspective, la Région wallonne plaide également pour une approche équilibrée à l'échelle du pays, impliquant une répartition plus homogène des implantations et de la consommation entre Régions.

Enfin, elle souhaite par ailleurs examiner, dans le cadre de la réforme globale du raccordement, la possibilité d'introduire une limite maximale d'accès à la puissance pour ce type d'usage, afin de garantir une planification énergétique cohérente et soutenable.

En conclusion, la Région wallonne estime qu'une consommation de 10,5 TWh dédiée aux data centers est disproportionnée. Elle lance des travaux visant à introduire d'une part, une limite maximale d'accès à la puissance pour ce type d'usage et d'autre part, des critères dans ses outils réglementaires. Finalement, la Région poursuivra le travail d'objectivation des bénéfices et des impacts liés au déploiement des Data Centers sur son territoire.

ANSWER

On the inclusion of the 'high' and 'low' trajectories for data centers

Several stakeholders urge Elia to include also other (high and low) trajectories proposed by BCG in the scenario report. As such Elia proposes to:

- Include the low trajectory in the sufficiency sensitivity
- Include the high trajectory in an additional (datacenter+) sensitivity
- Keep the 'mid' trajectory for BASE, ELEC and MOL.

Regarding the level of data centre demand in Wallonia

It must be noted that today all directly TSO-connected data centre demand is located in Wallonia, with publicly known increases expected already in the near future[58]. Nevertheless, in the trajectory brought forward by the BCG study used as input for the creation of the scenarios, there is also some expected growth in the 'enterprise' and 'colocation' segments which are typically rather connected on the DSO grid. The majority of these are expected rather in the Flanders and Brussels Capital region. Additionally, Elia performed a deepdive into its load management results and outstanding connection requests, and as such adjusted the regionalisation of TSO-connected data centre demand based on latest information available. As such, the values of Wallonia have been revised somewhat downwards:

Data centre demand [TWh]		2024	2030	2035	2040
WL	**Public Consult.**	1.5	5.1	7.9	10.5
	After Consult.	1.7	4.3	6.4	7.2

[58] Google announces 5bn euro investment in Belgian data centre creating 300 jobs

On the comparison between known requests, the adequacy and flexibility 2026-36 assumptions and the BCG study

The VNR requests information on how the known connection requests compare to the proposed ranges. On a similar note, CREG comments that the projections for data centers of BCG might be too ambitious given the uncertainty that the stated projects will actually materialise. Elia agrees that there is uncertainty what datacenter projects will materialise. On the other hand, when it comes to the total quantity, the projections put forward by BCG are not unreasonable. For context the figure below shows the connection requests for new data centers at TSO level only. On top of the already existing consumption of 3.2 TWh for data centres that are in service today, the equivalent consumption of data centre projects with a reserved gird connection capacity amounts up to an additional +14 TWh. When considering also data centre projects that are currently in an orientation phase, the equivalent additional data centre consumption (on top of the existing 3 TWh) amounts up to +67 TWh. While Elia considers it unlikely that these projects will all materialise, the mid case of BCG (which reaches a total consumption of 10 TWh by 2035, hence +7 TWh by 2035) does not seem unreasonably low. The existing consumption being already higher than 3 TWh in Belgium.

Finally, Elia confirms to the CREG that the projections of the BCG study are slightly higher than those used in the adequacy and flexibility study. It should be noted that the BCG study was not yet published at the time the Adequacy and Flexibility scenarios were established. The Adequacy and Flexibility study was based on the bottom-up project approach followed in the 'load management' of Elia which only considers TSO-connected data centres. The BCG study accounts for projects beyond the TSO-connected ones.

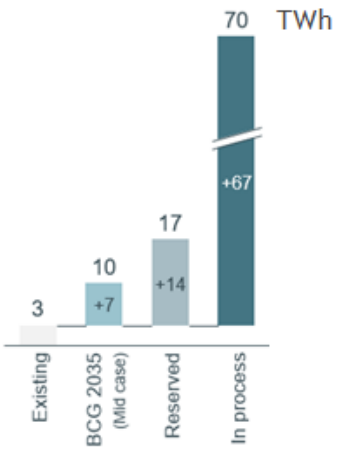


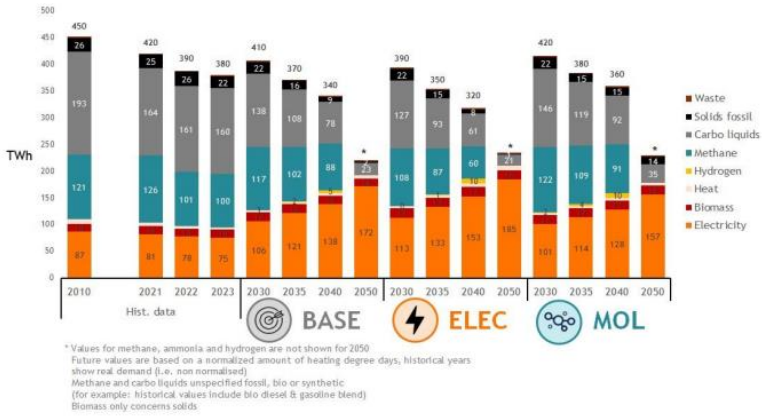
Figure 7-4 - Data centres connection requests on TSO grid only and existing consumption at all voltage levels

7.6.2 CCS demand

CCS demand

Stakeholder	Feedback received
Vlaamse Nutsregulator	Elia en Fluxys geven aan dat het finale elektriciteitsverbruik van CCS geen deel uitmaakt van de scope van de oefening, aangezien deze zal afhangen van de finale marktsimulaties. Niettemin zijn in de publieke consultatie toch een aantal ranges van indicatief elektriciteitsverbruik opgenomen voor CCS: ***Electricity demand for CCS [TWh]*** | ***2030*** | ***2035*** | ***2040*** *-0.5* | *1-3* | *7-12* Het is voor de Vlaamse Nutsregulator niet helder op basis van welke assumpties deze ranges dan wel zijn opgesteld. Gezien het "indicatief karakter" van bovenstaande tabel en het werken met verder nietgedefinieerde ranges, gaat de Vlaamse

Nutsregulator ervan uit dat deze getallen niet vervat zijn in de finale verbruikshoeveelheden van Figure 2-3 (zie hieronder). Het lijkt de Vlaamse Nutsregulator zinvol om dit verder te verduidelijken.



Figuur 7 – Publieke consultatie Figure 2-3 Final energy demand - excluding feedstock, international shipping, transformation and losses

CREG

8. Bien que le document de consultation indique explicitement exclure le recours au biométhane, aux combustibles synthétiques, aux biofuels et au CCS/CCU, la CREG observe que la section 2.6.2 du document de consultation mentionne une demande d'électricité du CCS/CCU en TWh aux horizons 2030-2035-2040. La CREG recommande de clarifier les hypothèses prises concernant ces technologies et d'identifier clairement à quoi se rapportent les chiffres mentionnés à la section 2.6.2.

TotalEnergies

The electricity consumption related to CCS is not included in the electricity demand shown figures but it potentially represents a considerable part in the future developments that will be needed, in particular in the Antwerp region that is already congested. In both Flanders and Wallonia, CCS is indispensable to decarbonize hard-to-abate sectors such as cement, steel, lime, and petrochemicals. Beyond reducing emissions, CCS delivers broad economic benefits: it anchors industrial employment, drives investment in future-proof infrastructure, and positions Belgium to help shape the continent's CO_2 transport and storage systems. Over time, this infrastructure and value chain could also serve as a foundation for developing Carbon Capture and Usage (CCU) applications and enabling a circular CO_2 economy, further boosting industrial innovation and value creation. As a conclusion, it should clearly be included.

ANSWER

Numerous stakeholders have requested an assessment of CCS (Carbon Capture and Storage) pathways, with a particular focus on estimating the associated electricity demand. In the short term (2030–2035), these pathways are informed by bottom-up data provided by Elia and Fluxys clients, reflecting their communicated intentions regarding CO_2 capture volumes and the corresponding electricity needs. For the longer term (2040–2050), this data is complemented by a top-down approach, where scenario storylines guide assumptions about the share of residual emissions to be captured. Additionally, external studies have been consulted to estimate the CCS potential towards 2050, helping to refine and validate the long-term projections. As a result, the updated scenario report proposes a single CCS pathway per scenario, integrating both internal stakeholder input and external study insights. The resulting electricity requirements per scenario is illustrated in the figure below.

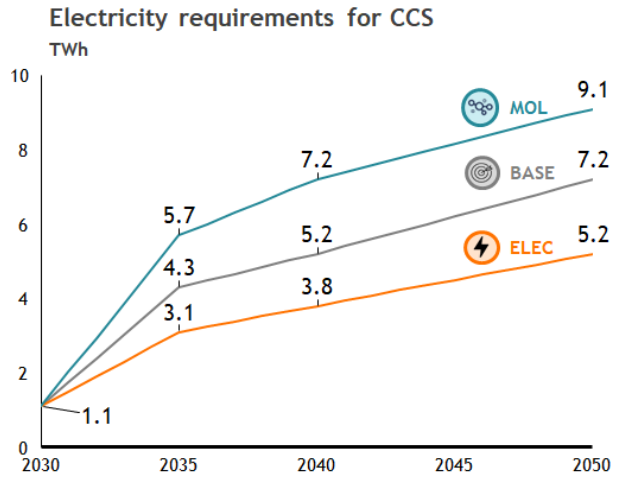


Figure 7-5 - Electricity requirements for CCS

8. Comments received on Energy supply

This section provides an overview of the reactions and concerns of stakeholders on the energy supply that Fluxys and Elia received on the documents submitted for consultation.

8.1 Electricity Supply

Changes made since the public consultation

- **Domestic offshore wind:** differentiation added between the supply scenarios. Original trajectory used in the LARGE-SCALE scenario, less ambitious trajectories in the LOCAL and CENTRAL scenario.
- **Non-domestic offshore wind:** delay in LARGE-SCALE and LOCAL scenarios as initially consulted upon
- **Nuclear:** removal of Tihange 1 extension in BASE and LOCAL scenario but kept for the LARGE-SCALE. Increased ambitions in the LARGE-SCALE scenario for new nuclear
- **Large scale storage**: uplifted trajectory, including also behind-the-meter batteries. Higher amounts of storage
- **Small scale storage**: uplifted trajectory, splitting medium-size and residential batteries. Higher amount of storage
- **Flexibility**: uplifted trajectory for V2X, updated existing DSR from industry.

8.1.1 General comments on electricity supply

General comments on electricity supply

Stakeholder	Feedback received
EDORA	Le scénario « ELEC » devrait quant à lui notamment tenir compte de l'étude « Net Zero Emissions by 2050 Scenario (NZE) » de l'IEA *[Footnote : https://www.iea.org/reports/global-energy-and-climate-model/net-zero-emissions-by-2050-scenario-nze],* selon laquelle les pays développés devraient viser une production d'électricité décarbonée à l'horizon 2035.
EV Belgium	A last important argument we want to underline, relates to the importance of locally and nationally produced energy. Where the

	energy has traditionally depended on centralized and often foreign sources, the energy transition offers a unique opportunity to decentralize production and local energy production, supporting energy independence from foreign actions and strengthening our geopolitical position in the world. Encouraging locally generated renewable energy, such as solar and wind power, offers numerous advantages. It increases Belgium's energy independence and security of supply, reduces vulnerability to geopolitical tensions and the volatility of international energy prices, and creates local economic benefits and employment. We encourage a stronger focus on strengthening local production capacity, particularly by stimulating decentralized projects that contribute to a more resilient and robust network.

ANSWER

Concerning EDORA's comment on the carbon emissions of the electricity sector

Elia would like to remark that electricity generation is part of the ETS. As such there are no intermediary emission targets for electricity in 2035. The scenarios are built to follow the existing ambitions including a carbon neutrality by 2050.

Concerning EV Belgium' s comment on putting a focus on local production

Elia would like to reiterate that it does not take a position on the desirability of one of the scenarios nor does it intend to do so. To cover a varied but credible set of possible energy futures for electricity supply three scenarios with different generation types are proposed. The LOCAL scenario in particular focuses on a wider buildout of local production capacity. To assess the import dependence of the scenarios a tentative import balance was already provided in the scenario report under consultation. The same indicators will be provided for the scenarios in the updated scenario report. Finally, it will be possible to calculate additional indicators on import dependence of both molecules and electricity in the national development plans.

8.1.2 Solar

Solar

Stakeholder	Feedback received
BBL - Canopea	Belgium is last in class in terms of deployment of RES in Europe. In order to meet EU legislation and in its own interest, the existing potential has to be developed with more determination. We therefore welcome the scenarios with a strong deployment of PV.

ODE Vlaanderen	ODE bevestigt de grote groei van meer dan 1GWp/jaar voor de periode 2020-2024 met in 2023 een recordgroei van 2GWp geïnstalleerd in dit land onder andere te wijten aan de energiecrisis en daling van de investeringsprijs. ODE onderschrijft de toekomstige aanname die gemaakt werd in het VEKP voor zonnepaneelproductie als laag scenario (11,2 GWp voor 2030). ODE vraagt om ook de zelfconsumptie van de zonnepanelen mee te nemen in de berekening van de scenario's. Het aandeel van de zonnepaneelproductie dat zelf geconsumeerd zal worden zal enkel maar stijgen door bewustwording van de zonnepaneeleigenaars en flexibiliteitsmaatregelen die zij zullen implementeren en laten implementeren. Bij verdere analyses van de scenario's zou het goed zijn om ook evolutie van kWp/kWA van de installaties mee te nemen. Zeker voor grote industriële installaties ligt die hoger dan huidige gebruikte gemiddelde waarde en zal aldus de totale elektriciteitsproductie van zonnepanelen beïnvloeden. Vermits we niet duidelijk kunnen zien of hiermee reeds rekening gehouden wordt, hernemen we deze reeds in eerdere consultatie gemelde opmerking.
TotalEnergies	As you addressed during the workshop, the potential of approximately 100 GW is based on the BREGILAB project which assessed the potential of PV on rooftops for Belgium. The Central scenario proposed assumes a growth rate of around 1 GW, while the 'Local' scenario would consider a doubling of this rate. A remark was given during the workshop that today we have an average of 4.5 kW system on each house. In 2050, we have 4 million houses in Flanders which would give for residential 18 GW. The values you are proposing are in our opinion nevertheless high. Even if there there are potential applications elsewhere (also small companies' roofs, industries, parkings…), we also think that in many cases PV's won't be possible : ○ Shadow of buildings on neighbouring roofs excluding an effective PV installation; ○ Older roofs that can't support the charges due to the PV panels and that might be damaged during installation due to the age of the rooftop. ○ Depending on ATEX zoning in chemical and other industries, installation of PV's on rooftops could be not feasible; ○ Distances between rooftops and electrical substations (transfo, cable distances,….); ○ Covering of parking lots with PV's is expensive and economically not viable seen the infrastructure costs to support the PV's that has to be build.

	A closer look at the hypotheses taken for the non residential applications is needed.
ENGIE	According to ENGIE Belgium, the likely growth of PV is probably close to the Central scenario, maybe even below the Central Scenario. ENGIE Belgium is sceptical about PV capacity going beyond the range of 30-40 GW due to technical limitations in the energy market or the grid. Already today, with PV-capacity around 12GW, we observe issues of incompressibility, negative prices, local congestions, etc… Total demand in summer can be lower than 10 GW, resulting in potential curtailment of 2 GW of PV-electricity. While some evolutions could counter this issue (uptake of EVs and smart charging, large scale storage) other evolutions are going in the other direction (increased share of renewables or baseload capacity across Europe, limiting the potential to export excess PV). Ultimately, the so-called cannibalism effect will limit the growth of PV-installations.
FEBEG	FEBEG is sceptical about projections that solar photovoltaic capacity will reach the 'very high' scenario of 98GW by 2050. Technical and market constraints, such as grid congestion and negative electricity prices, already pose challenges at current capacity levels. Therefore, FEBEG only sees the 'low' (30 GW) and 'central' (42GW) scenarios as realistic and can understand a 'high' scenario (66GW) to be included to simulate an exceptionally high outlook.
EDORA	**Section 3.1 : Solar** Les trajectoires proposées pour les filières photovoltaïques devraient être plus ambitieuses. Le scénario Local, qui vise 66 GWp d'ici 2050, devrait être considéré comme la nouvelle référence, ou du moins comme une hypothèse de base solide. Le rythme de croissance atteint en 2023 (2 GWp) démontre en effet la faisabilité d'une accélération. Or, de nouvelles normes de déploiement en toiture entreront bientôt en vigueur dans les trois régions du pays, à la faveur de la directive PEB4. Et le PV hors toiture, qqi présente encore, lui aussi, un potentiel très important, n'en est encore qu'aux balbutiements dans notre pays. qll est donc crucial que la planification du réseau s'aligne sur ces potentiels de croissance considérables, pour éviter de devenir un goulot d'étranglement dans ce domaine.
EDORA	Enfin, rappelons que l'électrification du parc de véhicules n'est pas seulement un moteur de croissance essentiel pour la demande

	d'électricité. Elle devrait aussi jouer un rôle essentiel dans la progression du photovoltaïque décentralisé dans les toutes prochaines années. Il conviendra donc de veiller à la bonne articulation entre ces deux gammes d'hypothèses.
Vlaamse Regering	**<u>Assumpties bij PV en wind</u>** De assumpties over solar PV en onshore wind in het BASE-scenario zijn in lijn met de verwachtingen van Vlaanderen op dit vlak.
ORES	Les projections de solaire et éolien onshore sont dans les ordres de grandeurs de celles prises en compte par ORES. (GW) — ORES 2030 — 7 2035 — 8,2
Gouvernement wallon	Les projections d'Elia s'appuient sur : • Le Plan National Énergie-Climat (PNEC). • Les études Elia Blueprint 2024 et Adequacy 2025. 1. <u>Photovoltaïque (PV)</u> • Objectif wallon actuel : 5 GW en 2030. • Projection Elia : o 6,5 GW en 2035 (extrapolation linéaire, rythme de 0,3 GW/an). r o Scénario alternatif : Elia envisage un déploiement plus rapide du PV. 2. […] Bien que les objectifs wallons en GWh soient traduits en GW, ils correspondent bien à ce qui est prévu dans le PACE (soit 5100 GWh en PV – avec facteur de charge ~ 10%, et 6200 en éolien avec facteur de charge ~ 50%). Les scénarios alternatifs font également sens étant donné que l'installation du photovoltaïques tourne plutôt autour 0,45 GW/an et celui de l'éolien autour de 0,1 GW/an. *Question reformulée : - Est-ce que les objectifs en PV et en éolien pour 2030 sont maintenus ? - Quel est la vision post-2030 ?* *Réponse* : S'agissant de l'éolien et du solaire, la Région wallonne confirme à ce stade les objectifs par filière fixés dans le PACE. Toutefois, si l'objectif global de 28 à 29 % d'énergie renouvelable

produite à l'horizon 2030 n'est pas remis en question, une révision des objectifs par filière sera menée à la lumière des travaux de la stratégie inter-vectorielle et étendue à l'horizon 2050.

Les premiers résultats, attendus pour le premier trimestre 2026, permettront de redéfinir les objectifs à l'échelle régionale. À ce stade, des cibles spécifiques seront également établies pour les sous-filières (par exemple : agri-PV, PV en toiture, PV sur parking, etc.). Par la suite, le modèle énergétique sera affiné spatialement afin d'aboutir à des objectifs par zone géographique (en-dessous de l'échelle régionale), dans une logique de planification territoriale plus fine de la production d'énergie renouvelable.

Pour garantir cette planification territoriale, il est indispensable que la Région dispose d'un modèle précis du réseau de transport, tant dans son état actuel que dans sa configuration future. Cela suppose de disposer de données détaillant le maillage du réseau et les capacités des différentes interconnexions. Ces données devront être mises à disposition de la Région wallonne dans les meilleurs délais.

ANSWER

Elia agrees with EDORA that a significant evolution in installed PV capacity has been observed in recent years, partially driven by decreasing PV panel prices, the energy crisis and policy frameworks (green certificates, net metering…). The inclusion of the LOCAL sensitivity aims to capture a future where these trends continue for PV. A similar trend is also observed across Europe, not only in countries with the highest amount of sunshine hours on the continent.

Regarding the potential of PV, as referred during the workshop, several studies were made and the BREGILAB project indeed calculated a potential around 100 GW of PV in Belgium. This potential includes residential rooftops but also buildings not used for residential purposes. In any case none of the sensitivities proposed assume such a high installed capacity.

Inversely, Elia also recognises the potential effects which could results in a dampening of the growth of PV. However, Elia would like to recall that the trajectory submitted to consultation was based on regional data, discussed with DSOs, aligned with official regional targets, considering latest governmental agreements. This trajectory is the one considered for the CENTRAL supply scenario.

On self-consumption of solar photovoltaics, this is considered in the assumptions on decentralised end-user flexibility of electric vehicle charging, heat pump and home batteries. Self-consumption incentives are accounted as local optimisation, impacting the consumption of profiles of these technologies. The pdf named 'Additional

assumptions and methodologies to be used for the modelling of the electricity network…', which was submitted to this consultation, shows illustrative profiles of such profiles optimised for self-consumption (local optimised profiles based on PV self-consumption).

Regarding the kWp/kVA ratio, Elia explained in the previous public consultation[59] that this ratio is used, when needed, to translate the regional targets into MWp. However, it is not clear to Elia which share of industrial versus residential PV is assumed in the regional targets, therefore the use of an averaged ratio.

Finally, Elia welcomes the confirmation of ORES and the Vlaamse Regering that the proposed trajectories for the CENTRAL scenario are aligned with their expectations. Based on the comments above, discussions in the workshops, it is proposed to keep the initial values submitted to consultation and work with different scenarios of supply (CENTRAL and LARGE SCALE would use the same value, and LOCAL a different one).

8.1.3 Onshore wind

Onshore wind

Stakeholder	Feedback received
ORES	Les projections de solaire et éolien onshore sont dans les ordres de grandeurs de celles prises en compte par ORES. (GW) — ORES 2030 — 7 2035 — 8,2
BBL - Canopea	Onshore wind remains indeed more difficult due to spacial planning issues and lack of support in the population. However, benefits of wind energy in terms of resilience, independence and security of supply are obvious, and the situation might improve considerable
EDORA	**Section 3.2 : On-shore wind** Le potentiel estimé par EnergyVille pour cette filière est de 18 GW. Moyennant certaines évolutions technologiques, on pourrait peut-être aller plus loin. L'éolien onshore est en effet moins cher que

[59] 20241104_Public consultation on the methodology the basis data and scenarios

	l'éolien offshore. Et le potentiel pris en compte, tous segments confondus, reste bien inférieur au mix électrique optimum. Nous proposons donc de pousser ce potentiel au maximum, au moins dans un des scénarios, en testant une capacité de 20 ou même de 25 GW, à l'horizon 2050. Les hypothèses du scénario FLEX+ en matière d'installation éolienne devraient par ailleurs être au moins les mêmes que celles du scénario LOCAL, partant du principe que la flexibilité devrait permettre d'intégrer plus de solaire.
Vlaamse Regering	**<u>Assumpties bij PV en wind</u>** De assumpties over solar PV en onshore wind in het BASE-scenario zijn in lijn met de verwachtingen van Vlaanderen op dit vlak.
Gouvernement wallon	Les projections d'Elia s'appuient sur : • Le Plan National Énergie-Climat (PNEC). • Les études Elia Blueprint 2024 et Adequacy 2025. [...] 2. <u>Éolien terrestre</u> • Objectif wallon actuel : 3,2 GW en 2030. • Projection Elia : o 4,6 GW en 2035 (rythme de 0,3 GW/an), considéré comme ambitieux par Elia. o Scénario alternatif : Elia envisage un déploiement plus lent de l'éolien. Bien que les objectifs wallons en GWh soient traduits en GW, ils correspondent bien à ce qui est prévu dans le PACE (soit 5100 GWh en PV – avec facteur de charge ~ 10%, et 6200 en éolien avec facteur de charge ~ 50%). Les scénarios alternatifs font également sens étant donné que l'installation du photovoltaïques tourne plutôt autour 0,45 GW/an et celui de l'éolien autour de 0,1 GW/an. *Question reformulée : - Est-ce que les objectifs en PV et en éolien pour 2030 sont maintenus ? - Quel est la vision post-2030 ?* *Réponse* : S'agissant de l'éolien et du solaire, la Région wallonne confirme à ce stade les objectifs par filière fixés dans le PACE. Toutefois, si l'objectif global de 28 à 29 % d'énergie renouvelable produite à l'horizon 2030 n'est pas remis en question, une révision des objectifs par filière sera menée à la lumière des travaux de la stratégie inter-vectorielle et étendue à l'horizon 2050.

Les premiers résultats, attendus pour le premier trimestre 2026, permettront de redéfinir les objectifs à l'échelle régionale. À ce stade, des cibles spécifiques seront également établies pour les sous-filières (par exemple : agri-PV, PV en toiture, PV sur parking, etc.). Par la suite, le modèle énergétique sera affiné spatialement afin d'aboutir à des objectifs par zone géographique (en-dessous de l'échelle régionale), dans une logique de planification territoriale plus fine de la production d'énergie renouvelable.

Pour garantir cette planification territoriale, il est indispensable que la Région dispose d'un modèle précis du réseau de transport, tant dans son état actuel que dans sa configuration future. Cela suppose de disposer de données détaillant le maillage du réseau et les capacités des diUérentes interconnexions. Ces données devront être mises à disposition de la Région wallonne dans les meilleurs délais.

ANSWER

Elia would first like to recall that the trajectory for onshore wind which was submitted to consultation was based on targets from regional energy and climate plans and aligned with the DSOs for the regions. Elia welcomes the comments of the Vlaamse Regering and of ORES that the CENTRAL scenario is in line with their expectations. The CENTRAL and LARGE-SCALE supply scenario will be based on these official targets and alignments.

For the LOCAL scenario, which focuses on an increase in electricity generation from local sources, a more ambitious trajectory is proposed. This more ambitious trajectory sees a growth rate in installed capacity of roughly double what was observed historically.

Elia recognises EDORA's point that the technical potential for onshore wind is higher than the proposed 14.6 GW in the LOCAL scenario for 2050 nevertheless given the low recent installation rates of onshore wind it seems unlikely that the growth rate will surpass by much the one envisioned in the regional energy and climate plans (which is the basis of the current proposed numbers).

Finally, while Elia agrees with EDORA that flexibility can help integrate additional renewables the goal of the FLEX+ sensitivity to assess the impact on the development plan if more flexibility (both large and small-scale) would be developed isolated from other changes.

Given the above comments, and the discussions during the workshops, it is proposed to keep the initial proposal.

8.1.4 Domestic offshore wind

Domestic offshore wind

Stakeholder	Feedback received
Belgian Offshore Platform	[...] BOP agrees with the proposed scenario for the PEZ I and II, as this is in line with the new planning of the federal government: • PEZ I: offshore wind park with a 695-735MW capacity • fully operational by summer 2032 • PEZ II: offshore wind park with a 1225-1400MW capacity fully operational by 2033 Regarding PEZ III, BOP is convinced that, in the interest of the Belgian society and considering the significant investments made by the TSO in the energy island, a grid connection solution can be developed and realised by 2035. With all the work already done for the PEZ developments, a period of 10 years for realising this connection is already far stretched. Postponing the grid connection development to period of 2035-2040 introduces an unnecessary delay of 5 years in the required buildout of large-scale renewable. • PEZ III: offshore wind park with a 1225-1400MW capacity fully operational, ideally concomitantly with PEZ II but at the latest by 2035, provided that a solution giving unrestricted access to the domestic market must be found, i.e. no offshore bidding zone setup. **BOP fully agrees with the necessity to reach for the 8 GW ambition by 2040:** • BOP supports the assumption for a new development zone(s) is to be defined and developed between 2035 and 2040. BOP identified areas where the new developments are feasible within the Belgian EEZ and proposed these areas to the DG Environment (FPS Public Health, Food Chain Safety and Environment) during the process for updating the Marine Spatial Plan. • According to the current concession agreements, repowering of the existing zone is to start from 2039. Concessions are currently provided until 2048. Given the current concession agreements, this implies that the repowering of the wind parks will have to be performed in the period 2038 to 2048. BOP therefore supports the assumption for the refurbishment of the grid connection to be planned in the period 2035-2040, to avoid delays caused by late grid connections. • As indicated in the consultation note, during repowering, the capacity in the Eastern Zone will be partially reduced. The exercise to optimally repower the zone considering the continuity of production is still to be detailed. Also the legal framework for the redevelopment is to be defined, ideally 10

	years before the end of the concessions to ensure an optimal and, to the maximum extent possible, uninterrupted, utilization of the scarce areas dedicated to offshore wind. • Following completion, BOP expects a limited incremental impact from the repowering on the total installed capacity of offshore wind in the Eastern zone. The total capacity after repowering will be defined by the density (MW/km^2). Given the sheer size of our EEZ, Belgium has chosen to develop the zone with a high density, in order to maximize the electricity output, albeit against a slightly higher LCOE. Redeveloping at a higher density is not expected. Technological innovation drives the turbines to grow in capacity in order to reduce costs, but also in turbine spacing. • As the available area of the Eastern zone is optimized (in the update of the Marine Spatial Plan 2026-2034), the proposal might even be slightly improved to find an extra ~75km^2, bringing the total area of the Eastern zone at ~300km^2 (compared to 238km^2 today). We propose to calculate with a density of 10MW/km^2, bringing the total capacity of the Eastern zone at 3000MW after repowering
BBL - Canopea	Belgium has a potential of 6 GW domestic offshore wind energy. It's deployment is crucial for the security of supply and we therefore strongly recommend to keep this figure in the scenario. A further developement remains highly questionable as not compatible with nature protection. The coalition 4Sea has developed extended argumentation on this in the past.
CREG	42. De CREG acht het voorgestelde scenario voor de verwachte capaciteit van domestic offshore wind tegen 2040 als onrealistisch. De CREG stelt overigens vast dat de doelstelling om 8 GW domestic offshore wind in de Belgische EEZ te realiseren tegen 2040 niet werd opgenomen in het definitieve FEKP. Dit is een wijziging ten opzichte van het voorlopige plan waarin deze doelstelling wel nog werd geformuleerd. Ten eerste is het onzeker dat de volledige 3,5 GW zal gerealiseerd worden in de Prinses Elisabethzone gegeven de densiteit van de zone. De geformuleerde doelstelling voor de zone was namelijk om tussen de 3,15 en 3,5 GW te ontwikkelen, afhankelijk van de uitkomst van de aanbestedingsprocedures. Met deze sensitiviteit werd geen rekening gehouden. Als bijkomend element stelt de CREG ook vast dat deze doelstelling niet meer werd vermeld in het definitieve FEKP, zoals goedgekeurd door de federale regering op 20 juli 2025, in het plan worden enkel kavel 1 en 2 met een totale capaciteit van 2,1 GW opgenomen en dus formeel onderschreven. 43. Het is ook zeer onwaarschijnlijk dat de repowering van de oostelijke zone voor extra capaciteit zal zorgen tegen 2040. Met

	name omdat verschillende van de lopende concessies kunnen verlengd worden tot na 2040. Daarnaast is er ook tijd nodig voor de herontwikkeling van de zone, dit houdt namelijk in dat de oude capaciteit dient afgebroken te worden waarna vervolgens de nieuwe capaciteit kan gebouwd worden. Dit betekent dan ook dat er tijdelijk minder capaciteit ter beschikking zal zijn, hier lijkt geen rekening mee gehouden te zijn. Bovendien is een capaciteitsverhoging door repowering zeer onwaarschijnlijk gegeven het feit dat de densiteit in de oostelijke zone al tot de hoogste ter wereld behoort. Met betrekking tot een additionele zone acht de CREG het ook onwaarschijnlijk dat deze in 2040 operationeel zal zijn gegeven de huidige vertragingen bij de uitbouw van de Prinses Elisabethzone, recente wijzigingen met betrekking tot bijhorende aansluitingscapaciteit en de beschikbare plaats in de Belgische EEZ. Er zijn tot op heden nog geen voorbereidingen getroffen om nog een additionele zone te ontwikkelen. Samenvattend komt de CREG tot de conclusie dat een geïnstalleerde capaciteit van 8 GW domestic offshore tegen 2040 onrealistisch is.
ENGIE	While the assumptions used for domestic offshore wind are ambitious, particularly in terms of timing, ENGIE Belgium supports maintaining this high level of ambition.
FEBEG	FEBEG supports ambitious targets for domestic offshore wind, recognising its importance for the energy transition.

ANSWER

Concerning the repowering of the existing zone

CREG and Belgian Offshore Platform comment that the repowering of the first zone will not add significant capacity of offshore wind generation on the same surface area. Nevertheless, Belgian Offshore Platform comments that in the update of the Marine Spatial Plan 2026-2034 the zone for offshore energy production can be optimised to bring the capacity of the existing zone up to 3 GW in line with the earlier proposal. This is aligned with the initial proposed trajectory. As such, Elia proposes to keep the assumptions on repowering identical to the ones consulted on.

However, Elia asks the authorities to provide a more detailed planning on when such repowering would take place in order to update the timing considered in the scenarios, if this would not align with what could be foreseen.

On the ambitions and final scenarios

Elia would first like to state that it based itself on the latest known governmental targets to create their trajectory. However, as the stakeholders mention, Elia recognises that

reaching 8 GW by 2040 could be ambitious, especially given the current uncertainty. Ultimately the choice as to how much domestic offshore wind should be integrated is up to the authorities. Setting a clear target is essential to ensure that the required grid can be developed on time.

Following the stakeholders' comments, the following changes are proposed:

- The CENTRAL scenario would contain
  - Eastern zone for 2.3 GW (existing capacity)
  - Princess Elisabeth Zone I (PEZ I, 2032) and PEZ II (2033) for 2.1 GW
  - PEZ III to be added by 2040 for a capacity of 1.4 GW
  - Repowering of the first zone (MOG 1) would deliver an additional capacity of 700 MW by 2040
  - Development of an additional zone with total capacity of 1.4 GW by 2050

For the LARGE-SCALE sensitivity, it is proposed to assume the CENTRAL scenario with a faster development of the additional new zone of 1.5 GW by 2045 instead of by 2050.

Conversely, for the LOCAL sensitivity, it is proposed to follow the CENTRAL scenario except that no new zone is developed on top of PEZ and repowering before 2050.

The proposed trajectories are shown below.

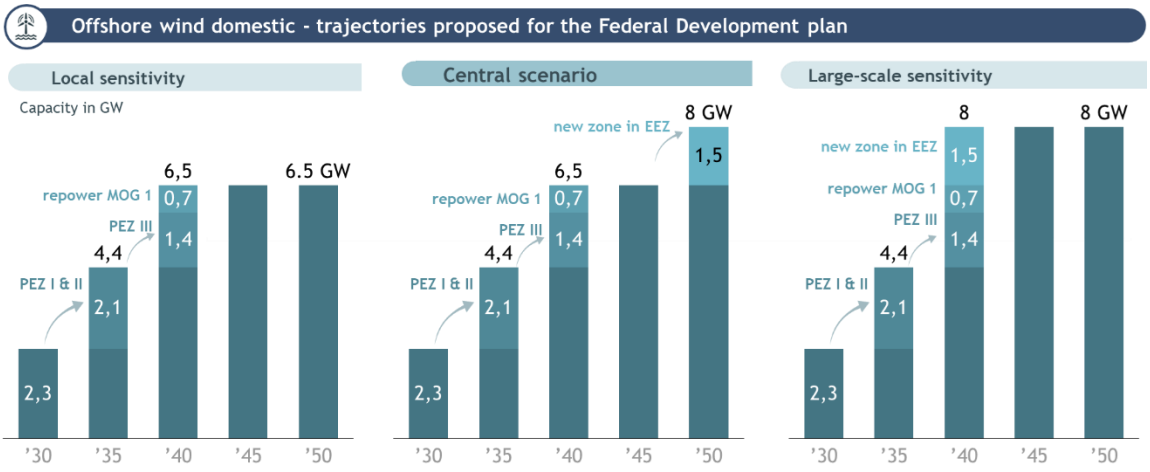


Figure 8-1 - Offshore wind domestic - trajectories proposed for the Federal Development Plan

8.1.5 Non-domestic offshore wind

Non-domestic offshore wind

Stakeholder	Feedback received

Belgian Offshore Platform	To the extent the domestic potential is insufficient to reach the climate ambitions, BOP supports the possibility of adding non-domestic offshore wind into the Belgian energy mix, provided however that priority is to be given to connecting and developing the full potential of domestic projects, which are the lowest hanging fruits. Although they may contribute to diversify the wind resource risk in the long run, foreign offshore wind projects will inherently come at a higher price due to the larger distance from shore, the seabed lease, risk premiums in hybrid set-ups etc... They cannot be seen as equivalent alternatives to domestic projects because, ultimately, they will contribute less to the Belgian economy. Moreover, regulatory frameworks for cross-border (radial) projects are under development and agreements with (neighbouring) countries are to be initiated for a timely realisation.
negaWatt	**Decouple "nuclear" and "non-domestic offshore wind" sensitivities** The consultation defines supply sensitivities where ambitions for nuclear and non-domestic offshore wind move in tandem. To understand their distinct system impacts, these options should be assessed independently as well as jointly. Decoupling them will provide clearer insights into network adequacy, flexibility needs, price effects and import dependencies.
BBL - Canopea	We welcome that non-domestic offshore is present in the scenario as sensibilities, as this is an important option to make energy supply resilient.
CREG	44. De CREG stelt vast dat er binnen het kader van NSEC ambitieuze politieke doelstellingen zijn geformuleerd voor het ontwikkelen van grensoverschrijdende offshore windprojecten. Er is evenwel nog geen duidelijk kader waarin deze windparken en de bijhorende netinfrastructuur kunnen ontwikkeld worden. Deze onduidelijkheid is er zowel op vlak van het niveau van organisatie als de financiering van projecten. Het voorziene tijdskader, met name om de eerste capaciteit van 2 GW in dienst te nemen in 2038, is dus zeer ambitieus om elk van deze aspecten in orde te krijgen om op tijd de beoogde capaciteit te realiseren. De CREG erkent echter wel de voordelen van het ontwikkelen van non-domestic offshore. Met name is de oppervlakte van de Belgische EEZ zeer beperkt waardoor de densiteit van de windparken die worden ontwikkeld hoog is en dit dan ook ten koste gaat van de rendabiliteit. Daarnaast zullen de non-domestic windparken moeten aangesloten worden in DC aangezien ze op een grotere afstand van de kust liggen. Hoewel dit momenteel een duurdere technologie is, geeft ze meer flexibiliteit met betrekking tot de aanlandingspunten op het net op het vasteland.

FEBELIEC	Elia assumes non-domestic offshore wind could be deployed by 2035. This timeline appears unrealistic, particularly given Elia's own estimate of a 10–15 year lead time (BluePrint study). Febeliec would support inclusion of such a scenario if the deployment horizon were shifted to 2040–2045.
ENGIE	Regarding non-domestic offshore wind development, ENGIE Belgium supports the overall approach. Nevertheless, we would appreciate greater clarity on the sources Elia relied upon to define the scenarios, together with insight into the political ambitions and the countries with which initial contacts have already been initiated.
FEBEG	FEBEG supports the development of non-domestic off-shore. However, for offshore wind projects outside Belgium, there should be more clarity about the sources of information, the political context, and which countries are involved.

ANSWER

Elia understands that while stakeholders support the inclusion of non-domestic offshore, the timings proposed in the initial scenario report are seen as ambitious, especially for the first set. As such, Elia proposes a new development timeline as described below:

- CENTRAL supply assumptions reach 6 GW by 2050
  - first 2 GW block is assumed to be connected between 2035 and 2040
  - a second 2 GW block to be installed between 2040 and 2045
  - a third set of 2 GW to be installed between 2045 and 2050
- LOCAL reaches 4 GW by 2050
  - A first installation of 2 GW block is assumed between 2040 and 2045.
  - a second 2 GW block to be installed between 2045 and 2050
- LARGE-SCALE reaches 8 GW by 2050
  - first 2 GW block is assumed to be connected between 2035 and 2038
  - a second one between 2038 and 2040
  - a third 2 GW block to be installed between 2040 and 2045
  - a fourth set of 2 GW to be installed between 2045 and 2050

Elia would like to remark that the earliest timing of the first 2 GW set of non-domestic offshore wind (in the LARGE-SCALE scenario) is set between 2035 and 2038 similarly to the original trajectory. This implies an ambitious yet not unrealistic (10 to 13 year) lead

time. The proposed trajectories as well as changes are shown in the figure below.

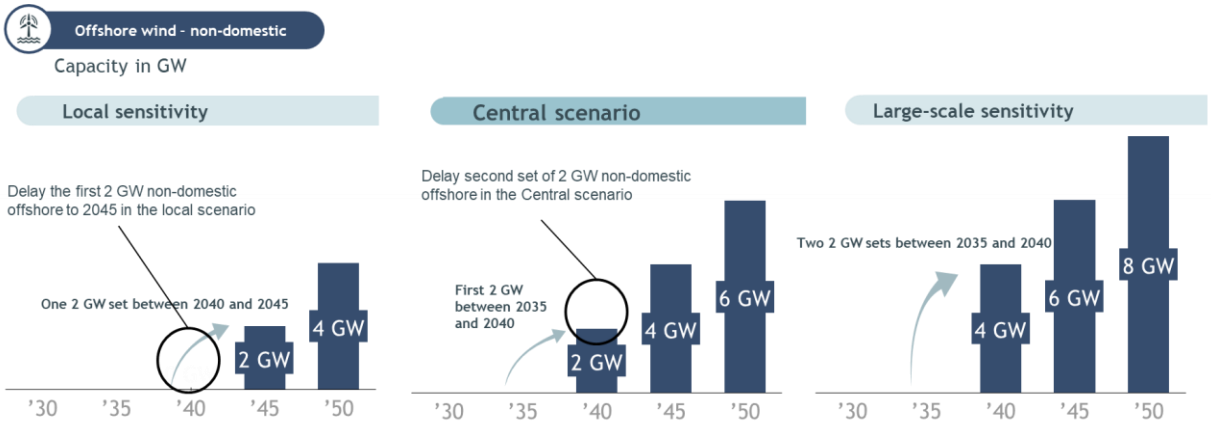


Figure 8-2 - Offshore wind non-domestic - trajectories proposed for the Federal Development Plan

8.1.6 Nuclear

Nuclear

Stakeholder	Feedback received
BBL - Canopea	**Incertitudes créées par une intégration irréaliste du nucléaire** L'évolution la plus notable depuis les dernières projections réalisées sur le développement du réseau électrique est clairement le maintien et le développement de capacités nucléaires importantes et très centralisées. S'il est évidemment compréhensible d'intégrer le nouveau calendrier politique dans ce travail de scénarisation énergétique, nous estimons que les projections envisagées demeurent très incertaines aussi bien techniquement que financièrement ou en matière de gouvernance. Cet ajout renforce grandement l'incertitude autour du scénario BASE au minimum quant à son timing. Nous nous demandons comment une telle incertitude pourra être gérée pour la réalisation des plans de développement des réseaux énergétiques crédibles. **De sérieuses études de sensitivité semblent manquer pour envisager des retards voire des annulations des projets nucléaires envisagés et leur impact sur les besoins de réseau.** [...] **La prolongation de Tihange 1 jusque 2040 et de D4/T3 jusque 2050 sont tout simplement non crédibles sur base des données existantes**: **Viabilité économique ds projets nucléaires :** Take into consideration the dynamic of the markets: The ongoing success of PV, in combination with complementary wind, flexibility in off-take

and fast developing storage solutions will put more and more pressure on the business case for nuclear - existing and to an even stronger degree for new nuclear.

Respect des normes Wenra pour les réacteurs prolongés. Le rapport d'avril 25 de l'AFCN rappelle que les prolongations eventuelles requièrent des investissements massifs pour respecter les normes de sécurités), d'acceptation sociale et politique (en cas de nouvel incident nucléaire notamment qui mettra le glas sur le retour en grâce nucléaire) ou en terme de cout (vu les incertitudes importante sur les couts liés à la prolongation). Ce constat vaut encore davantage pour Tihange 1 qui ne respecte pas les normes de sécurité WENRA notamment en cas de chute d'avion gros porteurs, ou d'un avion militaire.

Questions sur les coûts et la faisabilité des prolongations soulevées par l'opérateur historique. Dans une interview en janvier11, l'opérateur Engie estimait « Le coût effectif des travaux (de remise à niveau de, NDLR) de Doel 4 et Tihange 3 n'est pas encore connu, mais l'estimation se situe entre 1,6 et 2 milliards d'euros » « Pour les autres réacteurs (dont Tihange 1) c'est complètement différent, les travaux seraient gigantesques et cela coûterait beaucoup plus d'argent. Est-ce que ce serait raisonnable économiquement ? D'autant qu'il n'y aurait pas de continuité opérationnelle. Il faut compter un délai d'au moins cinq ans pour prolonger. Ces projets sont juste impensables maintenant, ce n'est pas sérieux. »

Le développement de nouveau nucléaire demeure un scénario peu crédible : La construction d'un réacteur de **500 MW dès 2040 puis de 3,5 GW entre 2040 et 2050** dans le scenario BASE (et jusqu 5,5GW dans le scénario large scale) est extrêmement improbable au vu des développements récents de ces technologies. A minima, le timing est très incertain.

L'incertitude autour de la possible prolongation ou de l'hypothétique développement nucléaire est néfaste pour assurer la nécessaire visibilité en terme de développement du réseau électrique de l'ensemble de l'infrastructure électrique étant donné l'hyper centralisation des productions d'électricité nucléaire. L'impact de cette incertitude sur les facteurs de charges des autres opérateurs et donc sur leur attractivité financière notamment doit être évalué.

- Nous estimons donc qu'en cas de maintien d'un scénario aussi incertain, de sérieuses **études de sensitivité** doivent être conduites pour envisager l'impact sur les besoins en réseau (mais aussi plus largement sur l'impact économique) d'un retard dans la prolongation ou le développement nucléaire.

	• **Maintien d'un scénario NO nuke**: Being aware that there is a strong political will to inject new life to the nuclear industry in Belgium, we ask to also take into considering a scenario with an entire phase out of nuclear. **Impact économique du scénario nucléaire** : Nuclear is not the most ideal solution for the few days of *Dunkelflaute* in the winter months. In the summer, the baseload that a nuclear plant is supposed to deliver will contribute to negative powerprices and incompressibility, with the known negative effects on the business case for renewables.
negaWatt	**Nuclear timelines and costs – ensure realism and transparent sensitivities** Timelines assumed for new nuclear capacity appear unrealistic in the Belgian context. For reference, in France the indicative commissioning dates discussed for new EPR2 units are already stretched: Penly around 2035, Gravelines around 2038, and Bugey around 2042 in optimistic cases. Belgium has no comparable mature pipeline yet, and first-of-a-kind projects are prone to significant delays (e.g. Hinkley Point C). A first lead-cooled SMR by 2040 (as announced by SCK) would also be highly speculative given the current TRL and licensing realities. We recommend sensitivity analyses on nuclear overnight costs that acknowledge the technology's observed negative learning. As central references, recent EPR projects indicate very high specific costs (order of magnitude: ~€14,000/kW for Flamanville, ~€16,000/kW for Hinkley Point C, 2023 euros). Deviations around such a central value should be explored explicitly in the modelling, with transparent impacts on LCOE, CRM needs, and consumer prices.
TotalEnergies	**Nuclear :** ○ A recent report indicates that the Tihange 1 nuclear reactor does not meet Belgian safety standards, making its extension nearly impossible. Engie has no willingness or intention to prepare a plan to make the extension of the Tihange 1 nuclear reactor possible. ON the contrary, they introduced a demande to the FNAC to stop and dismantle Tihange 1. While there's an agreement to prolong Tihange 3 and Doel 4 for ten years, there are no current plans for any further extensions beyond that. ○ It is up to the authorities to indicate what scenario to use for developing the grid. ○ Considering developments in other countries, It is highly probable that Belgium will construct potentially new nuclear plants.

CREG

45. Les scénarios soumis à consultation supposent tous une exploitation des réacteurs de Doel 4 et Tihange 3 au-delà de 60 ans de fonctionnement, de sorte à ce qu'ils soient toujours en service en 2050. Sachant que la prolongation de ces réacteurs jusque 2035 a déjà été décidée et vu les délais suffisants pour la conclusion d'un accord avec l'exploitant et la réalisation des travaux requis en vue d'une prolongation supplémentaire, la CREG n'a pas d'objection particulière à l'intégration dans les scénarios d'une prolongation au-delà de 2035 de ces réacteurs. La CREG ne souhaite toutefois pas se prononcer sur le caractère réaliste d'une prolongation au-delà de 60 ans d'opération (après 2045), sachant que la période concernée (2045 à 2050) n'a pas d'influence sur l'élaboration du plan de développement fédéral (électricité) 2028-2038 et du plan de développement du réseau de transport d'hydrogène 2027-2037.

46. En ce qui concerne les autres réacteurs nucléaires existants, la CREG observe que seule la prolongation du réacteur de Tihange 1 jusque 2040 est proposée pour qu'elle atteigne 60 ans d'opération. La CREG souligne que le réacteur de Tihange 1 atteindra 50 ans d'opération au 1er octobre 2025, date à laquelle le réacteur devra être mis à l'arrêt selon la législation actuelle. La CREG déduit de ce qui précède qu'Elia et Fluxys supposent une remise en service de Tihange 1 en 2030 pour une période de 10 ans.

47. Comme mis en exergue par Elia et Fluxys dans la consultation publique, une éventuelle prolongation de Tihange 1 est soumise à une grande incertitude vu l'ambition politique affichée de parvenir à de nouvelles prolongations mais l'absence d'éléments concrets permettant d'entrevoir une prolongation à ce jour et l'absence de volonté annoncée du côté d'Electrabel pour un tel projet. Dans ce contexte, la CREG juge nécessaire d'étudier en profondeur les deux cas de figure possibles (fermeture définitive en 2025 ou prolongation de 2030 à 2040), le cas échéant à l'aide de l'analyse de sensibilités sur les scénarios.

48. La CREG considère ambitieuses les hypothèses proposées en matière de développement de nouveau nucléaire au vu du contexte actuel relatif à la construction de nouvelles centrales et le développement de Small Modular Reactors. Plus particulièrement, pour les Small Modular Reactors, le premier modèle de démonstration belge est prévu seulement d'ici 2035 *[Footnote :* https://www.sckcen.be/en/expertises/nuclear-systems/lead-cooled-fast-reactor-belgium/small-modular-reactor-smr]. La commercialisation de ce type de technologie dès 2040 pour certains scénarios semble donc ambitieuse. De plus, la puissance électrique des Small Modular Reactors pouvant aller jusqu'à seulement 300 MW devrait limiter la puissance additionnelle totale disponible dans le mix énergétique belge. La CREG recommande donc de revoir les chiffres relatifs aux nouvelles unités nucléaires à

la baisse. La CREG rappelle à cet effet l'ambition du gouvernement fédéral d'atteindre une capacité totale de 4 GW de capacités nucléaires (les unités existantes et nouvelles) dans le système électrique belge.

ENGIE

Existing nuclear ENGIE's strategic nuclear ambitions are limited to the 10-year extension of Doel 4 and Tihange 3 (2025-2035), as defined in the Phoenix agreement with the Belgian State. All other existing reactors are/will be shut down by October 1, 2025. We understand that the Belgian Government has broader ambitions in the nuclear field. However, for Tihange 1 and Doel 1/2, economic, operational, and safety factors rule out any extension (cf. FANC Report on safety). In line with this, the Phoenix agreement also confirms the decommissioning of the non-extended units (Doel 1/2/3 and Tihange 1/2). Based on these considerations ENGIE Belgium regards the assumptions that (i.) Tihange 1 could be extended until it reaches 60 years of operation and (ii.) Doel 4 and Tihange 3's lifetime could be extended for a period longer than 60 years as highly unrealistic. ENGIE Belgium recommends that the scenarios underlying the ELIA and Fluxys National Development Plans rely on existing policies, plans, and/or projects. New nuclear

- ENGIE Belgium has no intention to invest in , build or operate new nuclear units
- Assumption for SMR : 1.5 GW by 2040; COD 2036-2037

EDORA

Section 3.5 : Nuclear

La prolongation des unités D4, T1 et T3 jusqu'à 60 ans ne devrait-elle pas être considérée comme un « best case » scenario ? Il nous semble en effet y avoir encore beaucoup d'incertitudes sur la faisabilité économique et la faisabilité technique et le « timing » de ces prolongations. Quid si un de ces trois réacteurs subit un incident majeur qui le met finalement définitivement hors service ? Il ne nous semble pas prudent de retenir le « best case » dans tous les scénarios.

Et pour le « nouveau nucléaire », quel est l'impact du choix de technologie pour le développement du réseau ? Parle-t-on d'ailleurs de SMR gen III ou gen IV ? Si gen IV, une mise en service d'ici 2040 semble être l'hypothèse la plus optimiste. Mieux vaudrait donc tenir compte des risques de retard bien réels.

Quid si les SMR ne se développent finalement pas comme prévu ? Quel impact pour le développement des réseaux, en cas de recours à des unités de plus grande capacité, telle que celles des centrales de type EPR par exemple ?

Enfin, même en France, pays pourtant très pronucléaire, RTE a prévu un scénario sans nucléaire à l'horizon 2050. La Belgique ne devrait-elle pas y songer, elle aussi ?

Vlaamse Regering

Het huidige Large Scale-scenario van Elia houdt rekening met nieuwe nucleaire capaciteit in Vlaanderen vanaf 2040. Volgens bepaalde studies zouden SMR's ook voordien al commercieel beschikbaar kunnen zijn. Om die reden lijkt het aangewezen dat Elia de commerciële evoluties van nabij opvolgt en er desgevallend ook rekening mee houdt in capaciteitsplanning.

Gouvernement wallon

- Nucléaire existant :
  - o 3,1 GW en 2040 (prolongation partielle des réacteurs existants).
  - o 2,1 GW en 2050 (fermetures progressives).

- Nouveau nucléaire :
  - o Elia estime un potentiel de :
    - 0 à 0,5 GW en 2040.
    - 2 à 6 GW en 2050.

Question reformulée :

- *La Wallonie est-elle ouverte à l'accueil de nouveaux réacteurs nucléaires (grands réacteurs ou SMR) ? La Wallonie est-elle plus favorable à des grands réacteurs ou des SMR ?*
- *Sous-couvert des ambitions fédérales qui doivent définir la capacité de nouveaux nucléaires ainsi que la taille de ces réacteurs, dans quels endroits la Wallonie serait-elle prête à accueillir ces centrales ?*

Réponse : Le Gouvernement souhaite premièrement rappeler l'intention exprimée dans la DPR: "Le Gouvernement travaillera avec l'Autorité fédérale, dans les limites de ses compétences, pour rendre possible l'implantation d'une nouvelle filière nucléaire, de préférence sur les sites nucléaires existants ou en extension de ceux-ci."

Le nucléaire reste une compétence fédérale mais son déploiement dépend d'un ensemble de compétences régionales — notamment en matière d'aménagement du territoire, d'économie et d'emploi.

L'enjeu stratégique consiste donc à assurer une coordination étroite entre les différents niveaux de pouvoir, les positions régionales étant nécessairement conditionnées à la qualité de cette coordination.

De premiers échanges ont déjà eu lieu entre les cabinets wallons des ministres Dolimont, Desquesnes, Jeholet et Neven et le cabinet

du ministre Bihet. Ces échanges ont permis de clarifier plusieurs éléments et d'écarter certaines options.

S'agissant du « grand nucléaire », il ressort que la volonté du Gouvernement fédéral est de viser une capacité totale d'environ 4 GW, combinant la prolongation des réacteurs existants et la construction de nouvelles unités nucléaires. Ces nouvelles installations devraient, dans la mesure du possible, être implantées sur les sites nucléaires belges historiques.

Parallèlement, 4 GW de petits réacteurs modulaires (SMR) devraient être développés sur de nouveaux sites. La Région wallonne soutient cette stratégie et veillera à apporter sa contribution en fonction de ses besoins.

Le Gouvernement wallon ne dispose toutefois pas, à ce stade, de l'ensemble des critères nécessaires pour évaluer de manière adéquate les emplacements propices à un tel développement. Il entend, pour ce faire, s'appuyer sur l'expertise fédérale en la matière.

Il est néanmoins important de noter que, s'agissant des SMR, la faisabilité de tels projets dépendra également de la disponibilité en puissance sur le réseau. Pour que la Région wallonne puisse se positionner sur le déploiement et la localisation de ces réacteurs, il est impératif qu'Elia fournisse un inventaire détaillé de la disponibilité actuelle et future du réseau sur l'ensemble du territoire.

À titre d'exemple, la friche de Chertal pourrait constituer un site pertinent. Une emprise d'environ 30 hectares pourrait y être mobilisée à cet effet. Toutefois, selon les informations partagées lors de la Task Force « Puissance et flexibilité énergétique », un renforcement de la ligne à haute tension serait probablement nécessaire. Il est donc urgent de réaliser les études pour voir si cette friche pourrait répondre aux critères requis pour l'installation de SMR.

Par ailleurs, la Région wallonne envisage la possibilité d'implanter ces SMR sur des parcs industriels, en combinaison avec des lignes directes.

Au-delà de la coordination entre entités fédérées, il est donc essentiel qu'un dialogue régulier et approfondi s'instaure entre les différentes entités et Elia afin d'assurer la disponibilité effective des raccordements au moment opportun.

ANSWER

Elia thanks the stakeholders for their input regarding nuclear in Belgium.

On nuclear in general

Elia wants to start of by urging the authorities to provide clear signals of their ambitions regarding the extension of existing nuclear and the integration of new nuclear. This information is essential to enable Elia to provide the necessary connection capacity in a timely fashion at the lowest cost to society. The trajectories proposed for in the consultation are based on the government ambition to reach 4 GW of nuclear in Belgium. As such, all scenarios include at least 4 GW nuclear. In the Large-scale scenario a more ambitious scenario reaching 8 GW is followed, in line with the recent study of the Federal Planning Bureau but also with previous studies of Elia as the Blueprint study which also considered such scenario. In this aspect Elia would like to stress that it is not its competence to define the target amount of nuclear for Belgium. Finally, concerning the comment of non-relevance of later time horizons by the CREG Elia would like to reiterate its earlier comment that given the long lifetimes of transmission assets assessing later time horizons does give valuable information on whether their benefits outweigh their costs.

Concerning the extension of Tihange 1:

BBL, Canopea, Engie and CREG comment that there is a lot of uncertainty regarding the extension of the nuclear plant Tihange 1 and that it might this be seen as not realistic. This uncertainly is related to both the willingness of the operator as well as the required work to reach the Belgium's safety standard. In addition, recent press releases released concerning Belgium's new NECP also allude to a potential extension of only Doel 4 and Tihange 3. As such the extension of Tihange 1 has been removed from the CENTRAL and LOCAL scenario but kept in the LARGE-SCALE scenario.

On the other hand, the government has stated the ambition to prolong 4 GW of existing nuclear, which would entail an extension of Doel 1 and 2 and Tihange 1 on top of the already foreseen extensions. To cover this possibility an additional extension of Doel 1 and 2 was foreseen in the Large-scale scenario (on top of the Tihange 1 extension already foreseen in the public consultation for that scenario).

Concerning the comment of the CREG on the exact timing of the extension of Tihange 1 Elia would like to comment that the proposal to include it in the target years 2035 and 2040 does not constitute the definition of an exact timing. Rather, as the target years also cover other years close to it, it is to be understood as a 10 year extension starting in the years around 2030 (it could be 2 years earlier or later for instance).

Concerning new nuclear capacity

The Vlaamse Regering comments that care must be taken to consider the potential commercial operation of new SMR's before 2040. A new SMR as of 2035 was therefore considered in the Large-Scale scenario.

Several stakeholders comment on the timing, siting and the technology which is to be used for new nuclear Elia would like to mention that it started a study with an external consultant (Tractebel) to clarify these aspects as well as other aspects which are needed for the market dispatch simulations (marginal cost, production of modulation potential…). The results of this study are provided as an attachment to the present consultation response as well as to the updated scenario report.

Elia wants to highlight that the trajectories put under consultation were adapted to ensure they conform to the timings and technical characteristics as described in the report prepared by Tractebel for Elia for this purpose. A short non-confidential version of Tractebel's report is available as an attachment to this consultation report.

The proposed trajectories are shown below.

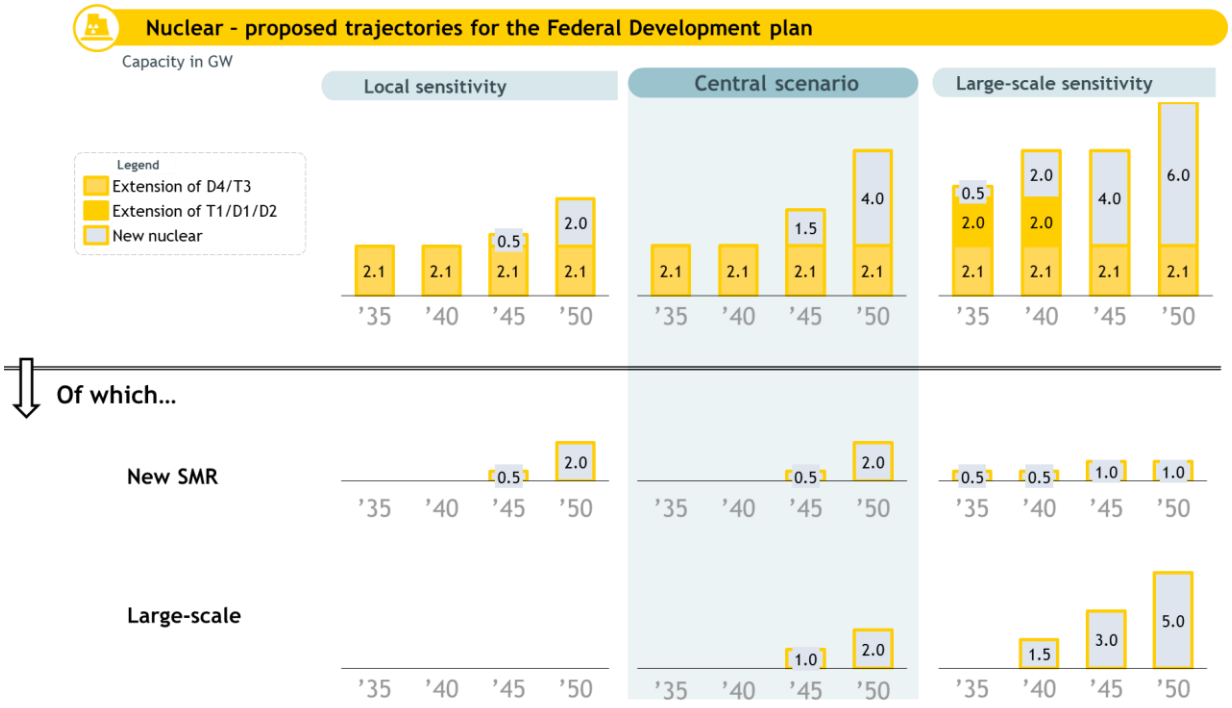


Figure 8-3 - Nuclear - proposed trajectories for the Federal Development Plan

8.1.7 Biomass, waste and run-of-river

Biomass, waste and run-of-river

Stakeholder	Feedback received

BBL - Canopea	Biomass and waste-fired power production should be phased out in all scenario's. Biomass is a scarce resource. Biomass should be reserved for uses in hard to abate sectors. Waste reduction is decided policy and therefore less waste will become available for power production. Power generation from waste should go down in all scenario's.
ODE	ODE verwacht een daling van de capaciteit uit vaste biomassa door een gewijzigd Vlaams beleid rond het certificeren van biomassa-installaties. Ook het verder doorzetten van de circulaire economie zal de biomassabron voor energieproductie beperken. Het Vlaamse beleid, zoals vermeld in het VEKP, vermeldt biomassa ook meer als een bron voor warmteproductie.
COGEN Vlaanderen	As previously mentioned during the public consultation on the most recent Adequacy and Flexibility study, there are currently several trends in (Flemish) energy policy that would rather imply a decline: • Flemish certificate support: The removal of several representative project categories for new or significantly modified ('ingrijpende wijziging') biomass cogeneration installations with a start date from 1 January 2023. • Circular economy: By evolving towards a more circular economy, historical waste streams or more and more being turned into feedstocks, hereby reducing the volumes being energetically valorised (principle of Ladder of Lansink). • VEKP: During the previous term of office, Flemish policy shifted towards the use of (biomass) waste for heat production rather than electricity production, which can be interpreted as a prioritisation of the energetic use of (biomass) waste to cover ESR emissions, despite the more energy/exergy-efficient use of cogeneration (see Annex 1). • Biomethane: The emergence of biomethane projects, since the rational use of biomethane through cogeneration is not yet being encouraged at the Flemish level. Reports indicate that some new biomethanisation projects are replacing biogas CHP plants for which the business case has become less financially attractive, partly due to the phasing out of certificate support. More information can be found in chapters 2.2 and 2.3 of our previous reaction (link) on the Elia consultation considering the Adequacy & Flexibility Study 2026-2036.

ANSWER

Elia thanks COGEN Vlaanderen, ODE and BBL - Canopea for their comments. Elia agrees the future is also unclear, given reduction in support for biomass cogeneration, a shift in policy focus towards heat production and the limited availability of biomass in Belgium.

It is however hard to deviate from the current installed capacity, without quantified information from the VEKP in terms of biomass capacity trajectory (VEKP does consider a small decrease in GWh of electricity produced, about 10 GWh reduction per year, but no clear view on the installed capacity), and without clear announcements of closures and abandon of the advanced stage projects via the data shared with DSO (PISA database). Regarding large-scale biomass installations, Elia clarifies that Rodenhuize 4 is now used as backup unit to Zelzate Knippegroen (for burning steel gas) when the latter is not available. In addition, the unit is considered to be able to run at Pmin simultaneously with Knippegroen in case of scarcity situations.

8.1.8 CCGT's, OCGT's, turbojets and new gas-fired thermal capacity

CCGT's, OCGT's, turbojets and new gas-fired thermal capacity

Stakeholder	Feedback received
BBL - Canopea	**All the grid scenarios used by Elia in developing the Network Development Plan still envision significant installed gas capacity by 2035** – the year by which Belgium has committed to decarbonise its electricity system as part of the Pentalateral Forum in 2023. This could hold back investment in the grid enhancing upgrades that can support the rapid integration of renewables and threaten the achievement of the commitment. Analysis by Aurora Energy Research *[Footnote:* https://auroraer.com/media/aurora-belgium-will-need-to-maximise-on-renewables-to-meet-33 -demand-increase-by-2040-cut-costs-even-in-a-high-nuclear-scenario/*]* warns that Belgium must scale up domestic renewable energy deployment to ensure energy independence, reduce electricity costs, and support long-term industrial decarbonisation – even with the new government proposing to extend additional reactors in a high nuclear scenario.
TotalEnergies	**Combined Cycle Gas Turbines, Open Cycle Gas Turbines and Turbojets :** The old capacity should also be hydrogen-fired in a net-zero context.

CREG	50. La CREG lit ce qui suit dans le document de consultation : • Toutes les CCGT et OCGT existantes sont maintenues dans le système jusque 2035. • Après 2040, les CCGT et OCGT qui seraient décommissionnées sont remplacées par de nouvelles centrales. • Après 2040, de nouvelles centrales thermiques à l'hydrogène sont ajoutées au système lorsque la norme de fiabilité n'est pas respectée. La CREG considère que le document de consultation entretient une ambiguïté sur les règles applicables aux années 2035 et 2040 et s'interroge sur les hypothèses prises pour ces années. La CREG s'interroge également sur la manière dont Elia et Fluxys comptent respecter la norme de fiabilité avant 2040 si elle n'était pas rencontrée. 51. La CREG souligne également que l'installation automatique d'unités thermiques alimentées à l'hydrogène lorsqu'un besoin de capacité est identifié pour garantir la sécurité d'approvisionnement est critiquable. Ce besoin de capacité doit normalement être comblé sur base du 'merit-order' économique des différentes technologies existantes sur le marché. Cette approche permet de retenir les solutions les plus efficientes et les moins coûteuses pour le système dans son ensemble, tout en assurant la sécurité d'approvisionnement. Imposer automatiquement une technologie particulière, comme des unités thermiques à hydrogène, sans passer par cette évaluation comparative, risque de conduire à un surcoût pour les consommateurs et d'influencer de manière artificielle le développement du réseau électrique.
FEBELIEC	Plans for additional gas-fired capacity rely on hydrogen. Elia and Fluxys should clarify the source of this hydrogen, the required infrastructure, and expected cost ranges.
ENGIE	It is important to maintain existing gas capacity, as it plays an essential role in Security of Supply (SoS). In this regard, the Capacity Remuneration Mechanism (CRM) is the main tool to ensure that these assets are properly remunerated. It is therefore crucial to make the CRM fully functional. Key points to consider: avoid under-calibrating the price caps (IPC); ensure that derogation mechanisms are functional and workable; and design eligibility criteria—including CO_2 requirements—so that gas-fired power plants, especially CCGTs, are not excluded. Notably, the recent adequacy and flexibility study for Belgium (2026–2036) highlights the importance of the CRM both for maintaining existing gas thermal capacity and for attracting new capacity to close the gap expected between 2029 and 2035.

FEBEG	Maintaining existing gas-fired power plants is essential for ensuring a reliable electricity supply in a system that relies more on intermittent sources. The mechanism for remunerating capacity must be fully functional, with appropriate price caps and eligibility criteria, so that these assets remain attractive for investment and operation. FEBEG points out that the primary objective of CRM is to ensure security of supply through steerable generation, storage, and demand response. However, CRM does not aim to make generation greener. For this reason, it is important not to exclude certain technologies that contribute to security of supply—such as gas-fired power plants in Belgium—based on restrictive CO2 criteria. In any case, the operating hours of these power plants—and consequently their CO2 emissions—will naturally decrease over time, given the influx of renewable production. Nevertheless, the capacity they provide (MW) must remain present in the electricity system.

ANSWER

On keeping capacity for Security of Supply

Elia and Fluxys agree that keeping thermal generation in Belgium will be essential to be able to meet the reliability standard for adequacy in Belgium. Indeed, there is currently over 8 GW of thermal generation (large and small scale) and there is a CRM in place which aims to ensure that the reliability standard is met. Within the CRM both existing and new capacities can participate. Given the horizon that is assessed in this study, it is impossible to assume what kind of mechanism or market design will be in place to ensure adequacy, however all forward-looking studies demonstrate that a certain level of thermal capacity is required to keep the lights on… mainly during winter months when there is low wind output. The exact amount will depend on the development of flexibility and other generation facilities, interconnections and news technologies such as long duration energy storage (in heat for instance).

For the assessment of the electricity grid more particularly an assumption needs to be made on the location of thermal generation. The one proposed assumed that existing locations would remain in use, meaning that if a new unit would be built, it would simply replace an existing one. Therefore, this assumption actually leads to the lowest cost approach as the grid does not need to be further expanded to new locations to accommodate new capacities. The fuel of that unit does not really matter for the development of the electricity grid as it would come late in the merit order (whether it is methane (synthetic, bio, fossil), or hydrogen). Considering the comment of the CREG: if it is deemed necessary a simple net-cone calculation could be made to define the technology to be added.

The exact amount of necessary thermal generation will be determined once the simulations are performed to evaluate the adequacy level of Belgium. If this is not met, then additional thermal generation would be added to the system. Other technologies such as batteries could also be considered but their low derating factors in long-term scenarios with a lot of other storage already present would mean very large volumes would need to be installed. The number of batteries is therefore also part of the scenario proposal and defined ex-ante as is done for flexibility.

Such approach is also used by other development plans such as the ENTSO-E one or the previous one developed by Elia.

On the assumptions taken between 2035 and 2040

Concerning the comment of the CREG on the ambiguity of assumptions between 2035 and 2040 Elia and Fluxys would like to clarify the assumptions for the existing fleet as follows:

- Turbojets are assumed be fully decommissioned by 2035 in all scenarios (approximately 100 MW);
- All existing CCGT's and OCGT's capacity is assumed to remain in the market until 2035;
- As from 2035-2040, old OCGT plants not compliant with the CO2 rules of the CRM (approximately 400 MW) are closed. Other existing CCGT's and OCGT's are assumed to remain in the market.

8.1.9 CHP (Combined Heat and Power)

CHP (Combined Heat and Power)

Stakeholder	Feedback received
TotalEnergies	• **Decentralised CHPs, biomass and waste CHPs :** Why decrease the capacity of CHP if you still consider it in the demand scenarios? And e-boilers running in parallel with CHPs is a good combination so not so much decrease in the CHP capacity in the near future.
COGEN	**Remark 1** As already mentioned in previous reactions, COGEN Vlaanderen currently expects a decline of CHP capacity in Belgium as a result of the current implemented policies (combination of European, Federal and Regional elements) and its resulting driving forces.

Therefore, assuming an incline of the operational capacity between 2025 and 2030 does not align with our observations and expectations. Furthermore, the current proposal to assume no additional decommissioning of decentralised CHP installations until 2030 “due to the fact that these capacities can participate to CRM auctions or for some still get certain form of subsides”, will most likely result in an overestimation of CHP capacity within that timeframe. Illustrations of several driving forces, such as how cogeneration is currently treated in the CRM versus large scale electricity production (e.g. CCGT), are given below this textbox.
[…]
At this moment in time, COGEN Vlaanderen does not have quantitative numbers of the expected future decline. This expectation is based on current implemented policies (European, Federal and Regional combined), its resulting driving forces, as well as the feedback we receive on our yearly survey of the cogeneration sector (WKK-barometer 2024). However (as it is clear from all the developed demand simulations performed by Elia) energy vectors other than electricity will remain an important energy source, even in 2050, independent of the scenario’s, as illustrated in figure 2-3 on page 23 of the main consultation document. Therefore, should the efficient use of these energy sources (i.e. cogeneration) regain increased attention and support, the estimated evolution of CHP capacity could remain constant or even increase.

Remark 2
As cogeneration installations transform energy sources in both electricity and useful heat, these installations are typically located in the vicinity of an end-user for the produced heat (directly on site of the end-user, or indirectly through a district heating network). Therefore, it is important that the assumed parameters to simulate the final energy demand (chapter 2 of the consultation report) are consistent with those made for CHP on the electricity supply side of each scenario (chapter 3 of the consultation report). As such, assumptions made regarding the electrification of heat production impacts the capacity of operational CHP’s in Belgium. An end-user may choose to decommission a CHP installation and fully replace the heat production by one or more power-to-heat technologies, or the end-user may place the technologies side-by-side offering flexibility (and market opportunities) to switch between technologies. Consequently the electricity, heat and CO2 (when combusting carbon-based fuels) production profile of a CHP installation will be impacted when the end-user invests in powerto-heat technologies which are placed next to the CHP, for example giving the end-user the possibility to consume electricity from the grid when prices are low. COGEN Vlaanderen is available to Elia to provide Elia with more insights into cogeneration where possible. For example, underneath this text box an overview is given related to the distribution of cogeneration plants in Flanders, based on information available to COGEN Vlaanderen.

Remark 3

In chapter 2 of the main report Elia mentions the efficiency of CHP, such as in table 2 on page 54. In order to avoid misconceptions, the thermal efficiency of CHP should always be mentioned as a combination of thermal and electrical efficiency. After all, the input power of the energy source is divided between the electricity and the heat vector(s). The electrical efficiency is strongly dependent on the underlying technology (fuel cell, gas turbine, ICE, ORC, steam turbine, CCGT, etc.) as well as the seize of the installation, with the total energy efficiency (~ electrical + heat) varying between 85% and 100% (when condensating technologies are being applied). COGEN Vlaanderen developed a 'Cogeneration Feasibility Tool' (link). In this document, reference values are given for the electrical efficiency of CHP units based on ICE or turbine technology as a function of their nominal electrical capacity. These figures are based on a market survey conducted by COGEN Vlaanderen among its members

ANSWER

Elia thanks the stakeholders for the comment. Elia understands that the CHP situation is affected by the current implemented policies.

The trajectories have been updated by considering:

- Flat evolution until 2030
- 3 different trajectories depending on the Demand scenario

Following the feedback from COGEN Vlaanderen, the increase in CHP capacity for the short-term (see remark 1), which was based on information from a shared database with DSOs, is no longer considered. It will be assumed that the CHP capacity will remain flat for the short-term. Given the current uncertainties concerning new projects (e.g. new projet participating to the CRM) and/or closure of existing units (e.g. stop after asset failure), it is assumed that the net capacity will not evolve until 2030 (some might close, some new might come).

As mentioned by TotalEnergies, e-boilers running in parallel with CHPs could provide options for consumers to optimise their supply. When electricity prices are low the e-boiler could be used and inversely when electricity prices are high the CHP could be used to generate both electricity and heat. Without incentives, it is expected that CHPs, once failed will not be replaced by new ones. With the ageing of the fleet, more failures are expected to come after 2030. Therefore, the BASE scenario assumes a decrease of the capacity after 2030.

In order to account for a scenario where CHP regain increased attention and support, as mentioned by COGEN Vlaanderen, the MOL scenario assumes a constant capacity, assuming new CHP units will keep being installed to replace failed ones.

Finally, to account for a scenario where the replacement of CHP's with other technologies is accelerated, the ELEC scenario assume a further decrease of the capacity over the time.

The proposed trajectories are shown below.

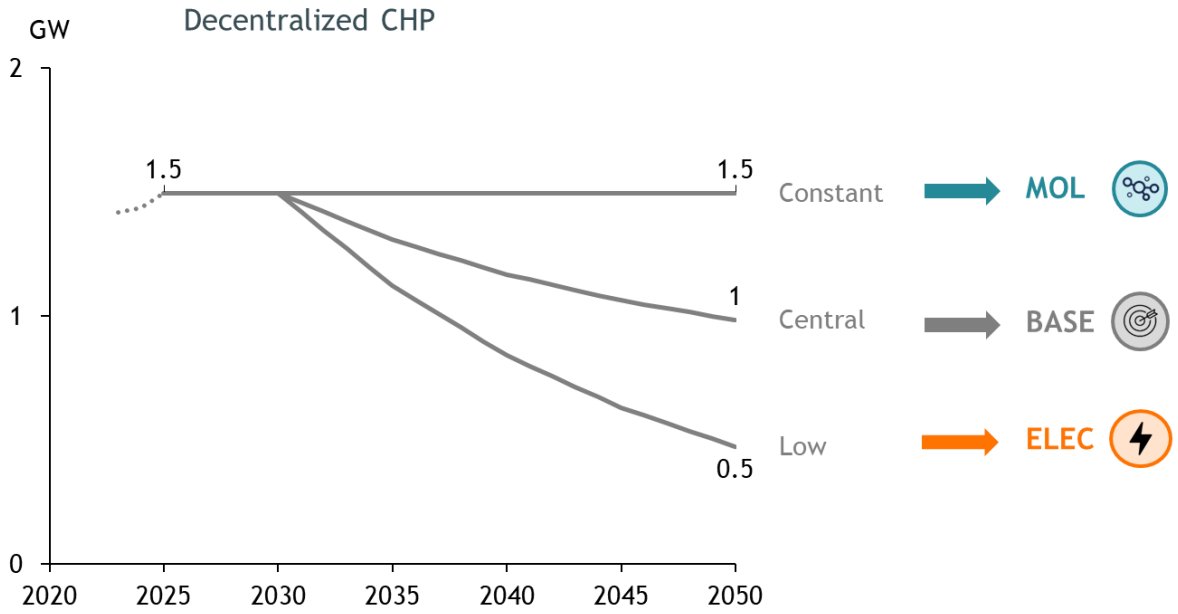


Figure 8-4 - Decentralised Combined Heat and Power (CHP) : proposed trajectories for the Federal Development Plan

Regarding the CHP efficiency, COGEN Vlaanderen points out that the total efficiency (heat + electricity) should be considered. This approach aligns with Eurostat's methodology for final energy consumption accounting. Therefore, an efficiency of 80% will be applied, partially based on EnergieGRIP data.

8.1.10 Large-scale storage

Large-scale storage

Stakeholder	Feedback received
BSTOR	BSTOR understands that the proposal is to design an electrical grid capable of catering 9.3 GW of large scale storage by 2050. This includes 1.3 GW of existing pumped hydro and 1.5 GW of "existing + contracted under CRM" large scale batteries meaning that the

Federal Development Plan would target creating only 6.5 GW of additional capacity for large scale projects by 2050.
On the most recent version of the grid hosting capacity map, Elia however reports a total reserved and allocated capacity for BESS of 9.6 GW by 2034 (9.4 GW additional).
In other words, BSTOR understands that Elia proposes to develop a grid by 2050 that cannot even host the capacity that Elia reserved or allocated to BESS projects by 2034, while it is fully certain that the reserved capacity with targeted energization by 2034 will even further significantly increase between now and 2034.
In BSTOR's opinion, this evidences that Elia massively underestimates the hosting capacity for large scale batteries that needs to be foreseen

- Both on a long run in the context of a net zero European grid ;
- As on the short run, to enable the exponential growth of battery projects that is expected to happen in Belgium, as it happened in countries where BESS development started earlier, and to unleash the benefits of such development, both from a grid and system cost perspective as from an economic value creation perspective.

This also stresses that, as BSTOR repeatedly stated, current assumptions and simplifications for modelling grid-scale BESS in grid studies fundamentally fail to capture the role that BESS can play in grid development and congestion management, by focussing exclusively on additional constraints caused by BESS on grid capacity and not on the benefits of those, although such benefits are very well documented. BSTOR therefore requests:

- To fundamentally review and improve such methodology to better consider the additional constraints but also advantages that BESS projects create on grid flows and infrastructure capacity needs, by among others, relying on return of experience of systems with existing multi-GW BESS capacity and/or assuming that the necessary market incentives will be created to trigger such "congestion relieving" impact from BESS; and
- To fundamentally increase the ambitions in terms of "hosting capacity" for large scale BESS in the power grid towards 2050, but also already by 2035 – 2040 to avoid that Belgium would miss the potential and benefits from "the next big thing in the energy transition". 10-15 GW capacity by 2035-2040 and 30-40 GW capacity by 2050 seem very reasonable targets for not hindering the development of BESS potential and its benefits.
- To also foresee adequate and sufficient "local redistribution" of the targeted capacity for avoiding that reservation above a certain local (or total) potential in a certain area would prevent development in other areas.

On the point of the capacity to be targeted, BSTOR recommends splitting the question in two sub-questions:

- long term-projections, for horizon 2050, top down, based on the needs in a European context ; and
- short term-projections, for 2035-2040, bottom up, based on the connection requests currently received by Elia.

Long-term Projections:

The long-term assumptions for the grid development plan should enable materialising European and specifically Belgian climate and energy commitments. [...] Taking into account a potential economic room for large scale batteries by 2050 of 5-10 GW for adequacy purposes and 10-15 GW for flexibility purposes, this would mean a total 15-25 GW large scale BESS for the Belgian needs only. And this is for an optimally run system, without taking into account the hedging and opportunity value of batteries that are kept as an "insurance" for BRPs to exit from a long/short situation "if something even worse" happens. And this is for an optimally run system, without taking into account the hedging and opportunity value of batteries that are kept as an "insurance" for BRPs to exit from a long/short situation "if something even worse" happens. In the UK for instance, Modo energy had evidenced that the BESS park was never operated at a load factor (computed on 15 min block) higher than 50% (and even close to 25% for 4h BESS) even under extreme price conditions. Taking this component into account, this means that to capture Belgian needs only, a hosting capacity for 30-40 GW of BESS at least should be created by 2050, and ideally more if Belgium wants to position itself to supply flexibility services to much larger surrounding systems

This is a multiple of the value proposed by Elia. BSTOR understands that with current methodologies used to model impact from BESS on grid capacity needs, this figure is "out of this world". Therefore, BSTOR urges Elia to:

- improve those methodologies to also account for benefits from BESS on grid capacity needs, assuming that appropriate triggers would be created to generate such benefits (and that in any case, there is no economic incentive to cause congestions or other grid instability with BESS); and
- target for 2050 a (much) higher capacity than the proposed 8 GW. BSTOR proposes a target in a 30- 40GW range and suggests to work in a more bottom up approach by looking at additional margins that could be realistically, or in any case "at the least cost", created on top of the target value (consider installing cables/transfos with a higher capacity, substations with sufficient spare bays, pylons with double terns, etc.), instead of extrapolating current capacity requests per locations.

Short-term Projections:

[...] Using such assumptions of doubling the BESS capacity every one to two years and based on publicly available information about projects under development, BSTOR estimates that a 4 GW capacity that Elia plans to make available by 2035 could already be

	reached by 2028-2030. It is therefore essential that Elia foresees a significantly higher hosting capacity. BSTOR believes at least 10- 15 GW large scale BESS (again, with adequate network integration methodology and relying on bottom-up definition of places where capacity can be created at least cost in the system) should be made available by 2035-2040 for not hindering further growth of BESS. […] • As for the other questions raised by Elia in the consultation document BSTOR does not believe it makes sense to foresee specific capacity for pumped hydro. Should project emerge (which BSTOR doubts) it should be using the capacity foreseen for large scale storage. • BSTOR recommends assuming an average 3h storage duration for the future large-scale BESS, in line with global trend, where you see the coexistence of 2h and 4h systems in equal proportions.
TotalEnergies	• **Large scale storage :** There is engineering ongoing to create new capacity of pumped storage in Belgium. The pump storage capacity will not stay flat. It will at least have a 50% increase.
CREG	Bien qu'il soit mentionné que la source des informations relatives aux larges scale batteries est la dernière étude d'adéquation, la CREG note que les hypothèses prises pour l'étude d'adéquation dans le scénario 'Constrained transition' sont supérieures aux hypothèses soumises lors de cette consultation publique [Figure showing battery capacities] 52. La CREG souhaite recevoir davantage d'informations concernant les divergences observées entre les hypothèses mises en avant dans la consultation publique et les résultats de la dernière étude d'adéquation. A défaut, tenant compte du nombre de projets en cours d'élaboration actuellement et des estimations des différentes études pour 2030, la CREG estime que les hypothèses prises pour 2030 devraient s'aligner pour le scénario de base sur les hypothèses de l'étude d'adéquation dans le scénario « Constrained transition ». La CREG note par ailleurs une inversion des intitulés dans le fichier Excel relatif aux 'Large scale batteries' entre les scénarios 'High' et 'Central'.
FEBELIEC	First and foremost, Febeliec is of the opinion that the scenarios presented significantly underestimate the potential of battery storage. In Elia's latest "Adequacy and Flexibility" study (June 2025), it was noted that flexibility for balancing purposes remains a true

challenge—not because of a lack of flexible assets (which are expected to be sufficient, mainly through batteries in the form of home storage, EVs, and large-scale), but rather because of the difficulty in unlocking this potential and bringing it to the market. Febeliec fully agrees with this analysis and stresses that removing barriers to entry and implementing effective price signals should be treated as top priorities.

However, Elia appears overly cautious regarding the deployment of batteries. By 2035, Elia foresees only 4–5 GW of large-scale 4-hour batteries and 1–2.4 GW of 2-hour home batteries.
[..]

In the June 2025 adequacy and flexibility study, Elia assumes battery costs remain largely flat until 2036. This is questionable, as market trends point towards further reductions. These assumptions should be reassessed.

ENGIE

ENGIE Belgium is convinced that large-scale, TSO-connected storage will be crucial for the energy transition. The benefits of TSO-connected storage include extremely fast reaction times (for balancing the grid) and relatively short lead times compared to other technologies such as onshore wind or thermal capacity. However, storage differs fundamentally from production and should therefore be addressed with specific consideration. Given this, ENGIE Belgium is very concerned about the multiple 'red flags' currently affecting the Belgian market, which are negatively impacting investments in storage:

1. Lack of connection capacity and problematic 'Flex' connections
2. Lengthy connection procedures with significant uncertainties
3. Geopolitical uncertainty affecting suppliers and raw material costs

These negative elements, however, can be countered by regulatory incentives, which ENGIE Belgium considers essential to sustain investment in storage at sufficiently high levels:

1. Further improvement of the CRM system

Continuation of the exemption from grid costs Technological advances in storage will reduce installation costs. Nevertheless, the cannibalisation effect will eventually emerge. A balanced regulatory framework will therefore be vital to keep investments on track.

EDORA

Section 3.9 : Storage

La révision à la hausse des hypothèses retenues pour les batteries à grande et petite échelles nous semble aller dans la bonne direction. Une croissance soutenue des énergies renouvelables

	intermittentes comme le solaire et l'éolien rend une telle croissance de la flexibilité essentielle. Nous nous interrogeons néanmoins sur les hypothèses adoptées en matière d'impact du stockage sur le réseau ? En effet, en fonction de l'organisation du marché et des incitants, le stockage peut avoir un impact négatif (plus de congestion), neutre ou positif (moins de congestion) sur réseaux et donc sur les besoins de renforcer ceux-ci. Contrairement aux autres technologies, le développement des batteries à l'horizon 2050 n'est pas contraint par un potentiel technique donné (si on fait ici abstraction du réseau) ; Il dépend essentiellement du business case et donc du besoin de flexibilité. Pour cette raison, la quantité de batteries ne devrait pas être considérée comme une des données d'entrée du modèle, mais plutôt résulter d'une optimisation, dans le cadre de chaque simulation. En fonction des évolutions possibles des prix sur le marché de l'électricité, il pourrait être pertinent d'évaluer des scénarios anticipant une certaine généralisation des infrastructures de stockage couplées aux grands parcs de production renouvelable.
EDORA	Les hypothèses PV du scénario FLEX+ devraient par ailleurs être au moins les mêmes que celles du scénario LOCAL, partant du principe que la flexibilité devrait permettre d'intégrer plus de solaire.
FEBEG	Large-scale storage connected to the transmission grid is crucial for balancing renewable energy sources. However, investment in storage is currently hindered by regulatory and market barriers, such as limited connection capacity and lengthy approval processes. FEBEG believes further improvements in the CRM mechanism and sustained exemption from grid tariffs are very important to allow the necessary further development of large scale batteries.
Gouvernement wallon	2. Batteries à grande échelle · Capacité actuelle : Environ 2 GW en Belgique. · Projections 2035 : 4 à 5 GW.

· Projections 2050 : 8 à 12 GW.

Actuellement, 30 GW de projets sont déjà annoncés ou en étude en Belgique (dont 9 GW réservés), mais peu réalistes (contraintes réseau, acceptabilité sociale).

Ici, bien qu'Elia ne donne pas de chiffre spécifique à la Région wallonne, il y a un potentiel important en Wallonie (en témoigne la problématique qui a mené à l'introduction d'un cadre flexible en prélèvement dans le décret-programme).

Question reformulée:

· La Wallonie souhaite-t-elle accueillir les projets de batterie sur son territoire ? Quelle capacité estime-t-elle admissible ?

· Doit-elle favoriser les batteries directement reliés aux réseaux ('front-of-the-meter') ou celles associés à un raccordement existant ('behind-the-meter', e.g. couplé à un parc solaire) ?

Réponse : Les batteries à grande échelle constituent des composantes indispensables du réseau électrique. Elles permettent d'absorber l'arrivée massive des énergies renouvelables intermittentes, de maximiser leur injection dans le réseau – et donc l'utilisation de l'énergie produite – tout en garantissant sa stabilité.

Elia a, à plusieurs reprises, évalué les besoins du réseau en matière de stockage, notamment dans ses études d'adéquation. Elia et les gestionnaires de réseaux de distribution (GRD) nous semblent être les acteurs les plus à même de déterminer la quantité de batteries nécessaire pour atteindre les objectifs de décarbonation du système électrique, une fois les objectifs d'électrification et de production renouvelable fixés. Parallèlement, la Région wallonne élabore actuellement la première version de son modèle énergétique, qui visera à définir le mix optimal et, par conséquent, le niveau de stockage requis. Les premiers résultats de ce modèle sont attendus pour le premier trimestre 2026.

Dans un contexte où les demandes de projets de stockage dépassent largement les estimations issues des études d'Elia, la Région wallonne souhaite éviter que le raccordement de ce surplus ne se fasse au détriment d'autres usages. À cette fin, elle a instauré un cadre pour la flexibilité en prélèvement, qui prévoit d'imposer des conditions de flexibilité dans la quasi-totalité des cas d'installation d'unités de stockage.

Nous parlons de "quasi-totalité" car un cas spécifique mérite une attention particulière : celui des industriels souhaitant installer des batteries pour lisser leur profil de consommation, en déplaçant leur demande vers les moments où l'électricité est plus abondante – et

	donc moins coûteuse. Bien que ces modifications de profil puissent avoir un impact sur la congestion du réseau, elles ne se mettent pas en concurrence avec d'autres activités industrielles, puisqu'elles visent au contraire à fonctionner en synergie avec une installation existante. Dans ce cadre, la Région wallonne invite Elia et les GRD à faire preuve de pragmatisme dans les conditions contractuelles proposées, afin de permettre le développement de projets de batteries qui soutiennent et pérennisent l'activité économique.
Gouvernement wallon	3. Pompage-turbinage · Capacité: 1,3 GW (Coo + Plate-taille) *Question reformulée : Faut-il lancer un plan wallon pour de nouvelles centrales de pompage-turbinage ? Si oui, quels sites prioritaires explorer (ex. : extensions à Coo, nouveaux projets) ?* *Réponse :* Bien que la Région wallonne ne puisse pas, à ce stade, se positionner objectivement sur une éventuelle augmentation de la capacité de pompage-turbinage, les résultats de l'étude menée par le Cluster TWEED en 2024 ont révélé un potentiel de développement de nouveaux sites. Ce potentiel fera l'objet d'analyses approfondies dans le cadre du projet StepInBel, sélectionné via le fonds fédéral de transition. Ce projet permettra non seulement d'établir un mapping à l'échelle belge, mais aussi de réaliser quatre études de pré-faisabilité sur les sites wallons les plus prometteurs. Il apparait par ailleurs pertinent que la Région wallonne examine l'opportunité d'une extension des sites existants, notamment à Coo et au lac de l'Eau d'Heure.

ANSWER

Elia would like to thank the stakeholders for the received feedback. Before answering the feedback, it should be clarified that there was indeed an inversion of the values in the Excel workbook assumption between the CENTRAL and FLEX+ assumptions, as seen by the CREG. The FLEX+ scenario will assess the impact of higher values.

On improvement of the regulatory framework (e.g. exemption from grid tariffs, CRM mechanisms) and the connection request process in itself, Elia takes note of the comments that fall beyond the scope of this consultation.

Update of the assumptions

Following the discussion during the workshop, the proposed capacity was increased to 8 GW by 2050. After this consultation and the comments received, the new trajectory will also include an assumption for behind-the-meter batteries, connected at TSO-level. Assuming 2 GW of behind-the-meter large-scale storage by 2050, this leads to a total of 11.3 GW large-scale storage (including existing pumped-storage plants for 1.3 GW). Potential new capacity for pumped-storage plant falls under the same 'large-scale storage' trajectory.

While the assumptions for the CENTRAL scenario are increased, the FLEX+ scenario has largely been increased, doubling the assumed battery capacity and reaching more than 21 GW by 2050. This scenario will be able to assess the impact of such large numbers, as suggested by BSTOR.

The updated trajectory, including:

- TSO-connected front-of-meter storage (both batteries and hydro pumped storage)
- TSO-connected behind-the-meter batteries

The proposed trajectories are shown below.

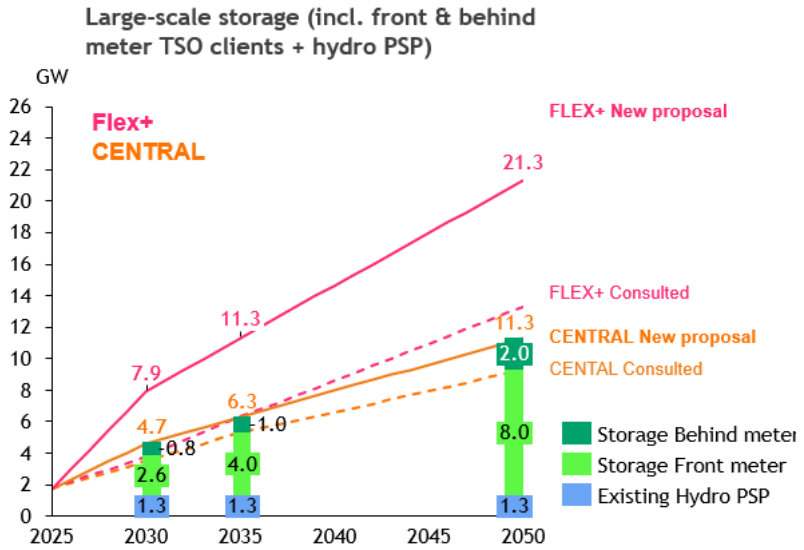


Figure 8-5 - Large-scale storage (including front and behind the meter TSO clients + hydro PSP)

Amount of capacity

Regarding the amount of capacity to be considered in the scenario, Elia understands that, given the current reserved or allocated capacity and the number of projects under study, there is room for discussion. While it is clear that grid system operators are facing a rapid increase in the connection requests, it is also clear that not all of these projects will materialise. Elia welcomes all initiatives to allow for a grid-friendly integration of storage

units – allowing for more optimal utilization the existing infrastructure. Contractual conditions under the new framework for flexible connections in offtake for storage in Wallonia will make the needed trade-off with the benefits for the grid. Nonetheless Elia would like to stress the importance to provide good locational incentives for new connections.

On the future installed capacity, compared to the current number projects, Elia would like to bring forward the following arguments:

- First, it happens that several connection requests are done by one actor / for one concrete project, while it is not their ambition to realise all the projects. The reasons behind can be multiple. It is a way to secure its connection to the grid, while analyzing the pros and cons of the different locations, etc.
- Secondly, the surge in batteries requests will continue, but will however be hindered by the cannibalisation of the projects. The profitability analysis (the 'business case') for batteries will be the main influencing factor of the future capacity. A greater battery storage penetration means the business case for new battery storage projects will decline. Not all reserved or allocated capacity will have a positive business case and therefore be realised.

Applying the UK's large-scale battery storage study to Belgium does not make sense due to fundamental structural and market differences:

- The UK grid spans a much larger geographical area, creating significant challenges in balancing supply and demand across regions. For example, offshore wind generation is concentrated in the north, while major load centers and export points are in the south, requiring more flexibility and storage.
- The UK has a higher share of offshore wind and variable renewables, which increases the need for large-scale storage to manage intermittency.
- The UK is an island with limited interconnection capacity compared to Belgium, which is highly interconnected with continental Europe. Belgium can rely on cross-border exchanges for flexibility, reducing the need for domestic large-scale batteries.

The long-term capacity that was submitted to consultation (8 GW by 2050) is also in line with the values observed in other studies, like the PATHS2050 EnergyVille study where between 6 to 7.2 GW of batteries storage are assumed by 2050.

Comparison with AdeqFlex

On the comparison with the AdeqFlex study scenario, as questioned by the CREG, Elia would like to recall that the capacity described in the AdeqFlex scenario is including additional 'potential' capacity that is submitted to economic viability assessment. It is not a target value to be used in the Federal Development Plan.

Optimal capacity

Regarding the determination of an optimal capacity, as suggested by EDORA and indirectly suggested by BSTOR asking for a top-down approach of the required flex capacity in Europe, it is not the goal of the development plan to determine such optimal capacity. These scenarios aim to reflect the political ambitions, while covering the existing uncertainties with additional sensitivities.

Batteries behavior

Regarding the market incentives, there is currently no existing market design that will ensure that batteries will behave differently and will mostly have a positive impact on the grid. If Elia agrees that for long-term horizon, such mechanism could be there, it is clear that it is not the case today, and that no such assumption can be taken.

On the modelling of the batteries in market studies, the assumptions for the modelling are the same in all market studies (including in adequacy studies). It is assumed that large-scale batteries are fully dispatched by the market, being therefore dispatched to lower the overall system costs. Based on available historical data of batteries in Belgium, most of the batteries do reach their maximum nominal capacity in both injection as consumption. However, Elia acknowledges that it is worth to further analyse the modelling of the batteries under existing market design and will further investigate the topic together with stakeholders.

CAPEX of batteries

On the CAPEX of large-scale batteries, as commented by Febeliec, Elia did account for a decrease in cost in the AdeqFlex study for the 2h and 4h large scale batteries. It should be however noted that the batteries cells are only a limited part of the total cost of a battery installation. The costs in AdeqFlex includes all the electrical equipment costs needed for the operation, as well as connection costs, land (those are not only EPC costs or battery cell costs) etc. It is however important to remind the reader that no CAPEX costs are used in this exercise given that the amount of batteries is set ex-ante in the scenarios.

Combination of FLEX+ with PV

On EDORA's comment to combine the FLEX+ sensitivity with more PV, such combination is currently not foreseen. The LOCAL sensitivity already looks at more PV with more decentral renewable energy production together with lower ambitions for nuclear and non-domestic offshore. The FLEX+ sensitivity aims to focus on the flexibility part.

Concerning additional capacity for pumped storage

Elia thanks the Gouvernement Wallon and Total for their comments regarding potential new pumped storage capacity which could be developed in Belgium. This potential is taken into account in the overall trajectories for large-scale storage.

8.1.11 Small-scale battery storage

Small-scale battery storage

Stakeholder	Feedback received
ORES	En ce qui concerne le stockage, les chiffres fédéraux repris dans le fichier XLS sont tirés de l'Adequacy and Flexibility ainsi que du Blueprint study : [GW] Scenario | Unit | Used in what supply scenario | 2030 | 2035 | 2040 | 2050 low | All | / | 0,8 | 1,0 | 1,3 | 1,8 central | All | All supply scenarios except FLEX+ | 1,1 | 1,4 | 2,3 | 4,0 high | All | FLEX+ | 1,6 | 2,4 | 4,7 | 9,2 Si on ramène ces chiffres au niveau wallon, suivant la règle empirique des 70/30 : [GW] - RW Scenario | Unit | Used in what supply scenario | 2030 | 2035 | 2040 | 2050 low | All | / | 0,24 | 0,3 | 0,39 | 0,5 central | All | All supply scenarios except FLEX+ | 0,33 | 0,42 | 0,69 | 1, high | All | FLEX+ | 0,48 | 0,72 | 1,41 | 2,7 Comme communiquer à ELIA (via les processus CAPAC), en juin 2025, nous avions 90 MW de batteries qui ont introduit une demande de raccordement et 600 MW de marque d'intérêt (demande d'information ou d'avis préalable). Or, ces dossiers sont pour beaucoup bloqués du à un manque d'accès à la puissance au niveau du poste. Nous nous retrouvons dans une dichotomie (à tout le moins pour l'horizon 2035): soit l'accès à la puissance est possible, et le scénario de raccordement de batterie nous semble faible par rapport aux marques d'intérêt reçu. Soit l'accès à la puissance n'est pas possible, et le scénario de stockage est trop important.
Bnewable	**1. Onvoldoende inschatting van het potentieel aan industriële en** **BTM-batterijen** De scenario's houden momenteel slechts in beperkte mate rekening met de snelle groei van behind-the-meter (BTM) batterijoplossingen, met name op industriële sites. Op basis van onze eigen projectportefeuille zien wij voor België alleen al op DSO-niveau een potentieel aan opslagcapaciteit in de grootteorde van 10 GWh (of 2.5GW @4h) tegen 2035. De huidige assumpties onderschatten dit groeipad aanzienlijk, zelfs in de meer ambitieuze scenario's.

	2. Co-locatie is een hefboom voor efficiënt netgebruik De grootschalige uitrol van batterijen op bestaande industriële aansluitingen (co-located BTM) laat toe om bestaande netcapaciteit optimaal te benutten, zonder bijkomende netbelasting of investeringsnoden. Dit aspect wordt in de scenario's onvoldoende uitgelicht, terwijl het net een cruciale hefboom is voor kostenefficiënte elektrificatie van de industrie.
TotalEnergies	• **Batteries :** ○ The average size for home batteries will increase. The average size of the installations in the future will be higher than 4,5 kW. Probably 9-10 kW for all batteries. There's a link with dynamic pricing: the stipulations will be much higher than a linear assumption increase. You are underestimating by keeping that installation size by 2050.
FEBELIEC	Belgium already has 0.6 GW of home batteries installed. Elia projects this to rise to only 1.1 GW by 2030, assuming a linear trajectory. This appears conservative, especially given falling battery costs which are likely to accelerate uptake. If these assumptions are not revised upwards, Elia should explain why.
EDORA	Enfin, s'agissant des batteries domestiques ou de plus faible capacité (small scale batteries), 4GW correspond à moins de 1kW par ménage belge. Cela nous paraît peu, dès lors que cela inclut certaines batteries industrielles, en plus des batteries domestiques.
ENGIE	ENGIE Belgium agrees with Elia's observation that the business case and market uptake for small-scale batteries largely depend on policy measures. Elia refers to the subsidy in Flanders that has now been terminated. Another important factor that could stimulate investment in home batteries is the evolution of the regulatory framework impacting electricity bills (e.g., taxes, DSO tariffs). ENGIE Belgium considers the current capacity tariff to be a hurdle for investment in batteries, whereas Time-of-Use (ToU) DSO tariffs (such as in Wallonia) or ToU electricity contracts (such as ENGIE Belgium's "Empower Flextime" contract) could act as drivers. That said, the expansion of EVs, together with the uptake of vehicle-to-home and vehicle-to-grid technologies, could significantly reduce the appetite for home batteries, since EVs could effectively serve as 'batteries on wheels'. Elia has three scenarios for small-scale battery deployment, which are quite extreme: in the Low scenario, only 1.8 GW is installed by 2050, while in the FLEX+ scenario, capacity reaches as high as 9.2 GW. Given the above, the Low scenario appears more realistic, as ENGIE Belgium is more

	convinced of the role of EVs in providing flexibility, in addition to larger TSO-connected batteries.
FEBEG	Current assumptions about how much small-scale battery capacity will be available to the market may however be too optimistic as EVs are expected to fulfil the role of home batteries via V2H, V2L or V2G technology in addition to grid-scale batteries connected to the transmission grid.
Gouvernement wallon	1. Petites batteries (domestiques) • Capacité actuelle : Moins de 1 GW en Belgique. • Projections 2030 : Entre 0,8 et 1,4 GW. • Projections 2050 : 1,8 à 9,2 GW. Elia table sur un développement principalement en Flandre à horizon 2035 pour plusieurs raisons, notamment : - L'absence de compteur qui tourne à l'envers en Flandre (ce qui augmente l'incitant à l'autoconsommation). - Les subsides flamands pour les batteries domestiques. *Question reformulée : La Wallonie doit-elle mettre en place un subside pour les batteries domestiques afin de stimuler leur déploiement, comme en Flandre ?* *Réponse* : La subvention de batterie domestique n'est pas prévue dans la DPR. Une subvention comme en Flandre n'est actuellement pas à la réflexion au cabinet de la Ministre Neven. En effet, certains acteurs du secteur estiment que les solutions de stockage individuelles au niveau des bâtiments ne sont pas les plus adéquates et qu'il faut plutôt privilégier les solutions collectives. Dès lors, une analyse techno-économique par les experts des gestionnaires de réseau devrait permettre d'en évaluer la pertinence pour le réseau et ses utilisateurs.

ANSWER

In order to facilitate the discussion, Elia will improve the granularity of the small-scale batteries and will now split it in two categories:

- Medium-size batteries, connected at DSO-level, including front of the meter, but also behind-the-meter at DSO-clients;
- Residential batteries, connected at DSO-level behind-the-meter.

Both trajectories have been revised upwards, following the comments received. The CENTRAL scenario now assumes 6.5 GW by 2050 (total for both medium-size and residential batteries) compared to 2.5 GW in the public consultation.

Regarding comments on V2H/V2M, those are also considered in the assumptions and are discussed in the section on 'Electricity consumption flexibility' of this document.

For medium-size batteries:

- Following information received from the DSOs, there is an increase in requests of DSO-connected medium-size batteries, as mentioned by ORES. Elia has now applied a similar approach as for the other categories (e.g. for the large-scale batteries): based on the amount of reserved capacity, a trajectory is assumed, considering that not all the projects will materialise. The reasons are multiple, and similar to one of large-scale batteries: it might not be the goal of the project owner to realise all his projects (several request for one single project to materialise), it is expected that the more batteries there are, the less profitable they will be, etc. limiting the amount of realised projects.
- On top of the medium-size batteries assumed to be connected 'front-of-the-meter', Elia will now also assume a part of 'behind-the-meter' batteries at DSO-connected clients, as mentioned by Bnewable.

For residential batteries:

- While looking at the recent evolution, there is currently a decrease in the installations of residential batteries in Flanders (see below the monthly installed capacity in Flanders, based on Fluvius OpenData). During the past years, a record in registration was observed during the last months of the year (Nov., Dec.) given the bonus that was in place with a granted amount that was decreasing each year. Since 2024, no more bonus is in place in Flanders. Since then, a clear decrease in installation can be observed.

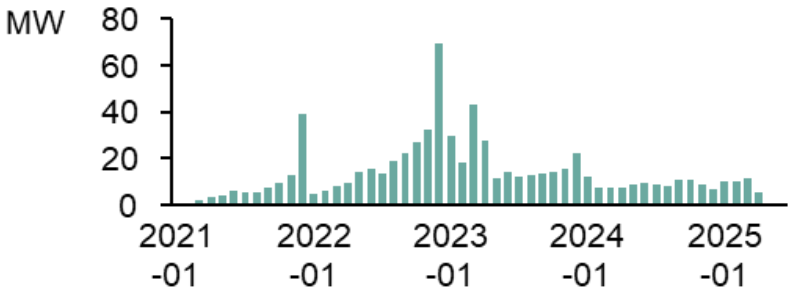


Figure 8-6 - Monthly installed capacity in Flanders. Source: Fluvius OpenData.

- Even though, Elia agrees that the costs of such batteries are expected to further decrease, and that the business case could be better in the future years. Therefore, the scenario is now updated, with a stronger uptake. This uptake

includes the potential increase in capacity per installed residential battery. The capacity is increased from 2.5 GW in 2050 in the CENTRAL scenario to 6.5 GW in 2050.

- A FLEX+ scenario assuming yearly growth rate 2x faster is also considered.

Regarding the modelling of small-scale batteries, those are partially dispatched by the economic dispatch model (i.e. reacting to prices, for the one 'in-the-market'), while a part is optimised ex-ante (based on local incentive and tariffs). This ex-ante optimisation of 'out-of-market' batteries will help flattening the load curve. This echoes with the comment from Bnewable on considering co-location.

The proposed trajectories are shown below.

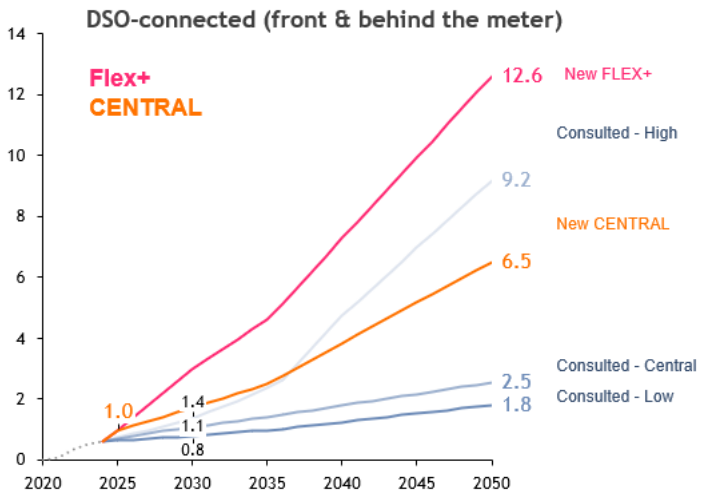


Figure 8-7 - DSO-connected (front & behind the meter)

Concerning subsidies for batteries in wallonia

Elia welcomes the input of Wallonia concerning an analysis on a potential introduction of subsidies for residential batteries. However Elia would like to note that it is not in scope of the current exercise to perform a techno-economical analysis regarding the desirability of subsidy mechanisms for domestic batteries.

8.1.12 Electricity consumption flexibility

8.1.12.1 General

Stakeholder	Feedback received
negaWatt	**Integrated energy system modelling and thermal storage** Limiting flexibility to a narrow set of end-uses (EVs, heat pumps, small-scale batteries) risks underestimating system integration benefits. The full range of cross- sector flexibility should be accounted for: power-to-heat (industrial e-boilers, high-temperature heat pumps), district heating coupling, short- and long-duration thermal storage for buildings and industry, process-level modulation, and logistics flexibility in transport. These options can materially reduce curtailment, peak residual load and balancing needs. We ask that integrated thermal storage (short- and long-term) be explicitly modelled and reported, alongside sector coupling levers in industry, residential and transport sectors, with clear assumptions and sensitivities.
Vlaamse overheid	Bij de opmerkingen die hieronder nader worden toegelicht, dient het BASE-scenario telkens als uitgangspunt. **Algemene opmerkingen** Een eerste bemerking betreft de nood aan investeringen. Er wordt beleidsmatig op diverse niveaus en in de elektriciteitssector, actief gewerkt aan het ontwikkelen van flexibiliteit(sdiensten) (bv. Time of Use tarieven, dynamische prijscontracten, technische – en marktflexibiliteit) om piekbelasting van het net te vermijden. Dankzij flexibiliteit wordt het net efficiënter benut en kunnen investeringen uitgesteld dan wel (deels) afgesteld worden. Omdat het aannemelijk is dat in de toekomst de technische - en gedragseffecten van flexibilisering verder zullen evolueren, is het nuttig om die in te calculeren bij toekomstige netuitbreidingen.
BBL-Canopea	**8. Storage and demand flexibility** **We are happy with the chosen approach**

ANSWER

Elia thanks negaWatt, BBL-Canopea and the Vlaamse Regering for their comments. Next to EV, heat pumps and small-scale batteries, the power-to-heat flexibility in industry is also accounted for, with industrial e-boilers, e-oven and heat-pumps being also modelled. A large share of these technologies is assumed to be operated in parallel with

(traditional) heat systems such as gas boilers and CHPs. Those sector coupling levers in the industries are thus explicitly modelled.

The study takes also district heating into consideration with a growing share of the heating demand in residential and tertiary sectors being supplied by district heating. Its flexibility is however not modelled as such within the electricity model, given the heat demand is not modelled explicitly. The same can be said for thermal storage (short and long-term storage of heat in district heating systems) which is not included in the electricity model. However, Elia and Fluxys recognise that there is potential for this technology and are willing to implement it in future studies once more sources for assumptions become available.

Regarding the need to account for flexibility, Elia fully agrees. In order to account for a growing flexibility in the system, the scenarios consider a growing share of the different fleet being flexible over the time horizon. This is the case for the EVs, HPs, small-scale batteries, but also in the industry. For the residential & tertiary flexibility, local incentives such as self-consumption of solar PV or local tariffs (such as time of use and dynamic contracts) are also considered, on top of dynamic tariffs (fully reacting to prices)

7.1.12.2 End-user flexibility (V2G and residential batteries)

Stakeholder	Feedback received
FEBELIEC	[...] For EVs, the assumptions are even more conservative: only 1% of EVs are expected to be bidirectionally capable (V2G) by 2035, and just 3% by 2040 (and 4% V2H) —even in the "high flex" scenario. Such assumptions, especially in a "high flex" scenario, are unreasonably low and, in Febeliec's view, unacceptable. At the very least, the high-flex scenario should incorporate assumptions an order of magnitude higher. This conservatism overlooks the reality that V2G initiatives are already being deployed. [...] To illustrate the importance of accurate assumptions on EV numbers and their V2G capabilities, consider the following orders of magnitude. [...] Febeliec has the impression that this enormous potential of distributed storage is not sufficiently reflected in the current scenarios. Failing to do so risks leading to massive overinvestment in grid infrastructure—an outcome that is not only inefficient, but also risks slowing down electrification and hindering the energy transition.

	Elia should explain how it sees this expected massive uptake of distributed storage will impact congestion management and the need for investments. Also in the case Elia doesn't think this will have a big impact, Elia needs to explain why this is. Of course, uncertainties remain regarding the speed of battery storage deployment. A scenario with lower uptake should indeed be included in the network development plan. However, the contrast between such a conservative pathway and the immense benefits of high EV/V2G uptake (and distributed storage in general) would then become clear—a potential which Febeliec is strongly convinced will be realised. Febeliec asked that assumptions of flexibility offering and of the prices in the different scenarios should be revised, so that they reflect realistic scenario's – especially in the high uptake scenario.
ENGIE	Electric Vehicles (EVs) • Elia's assumption: Starting from 69% V0-natural charging and 30% V1H-local charging today, Elia assumes that by 2050, EV charging will consist of 46% V1H-local charging, 15% V2H-vehicle-to-home, 29% V1M-smart charging, and 10% V2M-vehicle-to-market charging • Current market observations and ENGIE Belgium's comments: Today, some local charging and very little smart charging are observed across the market. ENGIE Belgium emphasizes the importance of moving away from "V0-natural" charging as soon as possible to prevent evening peaks, which could worsen winter peak issues. To support this transition, ENGIE Belgium is introducing new supply contracts (Empower Flex) to incentivize EV drivers to charge during nighttime or midday. Local charging is particularly attractive for households with PV systems, while smart charging can provide significant value in a B2B context. Batteries • Elia's assumption: By 2035, 100% of battery usage will be directed to the market (B2M). • ENGIE Belgium's refers to the above comments () and notes a potential error in Table 11, where the current share of battery-to-market (B2M) is indicated as 92%, which is likely significantly overestimated. •
EDORA	**Section 3.10 : Electricity consumption flexibility** 47% de recharges de véhicules électriques "non smart" en 2030 et 28% en 2035 est peut-être plausible, vu le contexte actuel, mais devrait être considéré comme un échec. Il nous semble essentiel de voir quel serait l'impact sur les investissements dans le réseau, si on passait par exemple à 90% de smart charging en 2030 (ce qui serait en réalité déjà possible aujourd'hui, moyennant les bons

	incitants tarifaires et les bonnes infrastructures de recharge). Il nous semble nécessaire d'étudier des scénarios ou des variantes plus optimistes ou plus volontaristes en la matière.
EV Belgium	One of the most crucial aspects that, in our view, deserves more attention in the study is the development of flexibility services, particularly those that can be provided by electric vehicles. The amount of battery capacity represented by the growing fleet of EVs offers an unparalleled potential for providing Vehicle-to-Grid (V2G) services. EVs can serve as mobile energy storage systems that can help stabilize the grid by absorbing power during overproduction of renewable energy and feeding it back during peak moments. This reduces the need for expensive investments in additional grid capacity and traditional energy storage systems. However, it is essential that a clear and stimulating legal and regulatory framework is created to enable the participation of EVs in these flexibility markets. The uncertainty surrounding this framework hinders the necessary investments today. We therefore urge that the plans provide more room for considering this possibility and need for policy measures, in close cooperation with the government and the industry.
FEBEG	FEBEG notices that there might be an error in Table 11 as it shows current battery-to-market share of 92% which is not the case as far as we know. Flexibility in electricity consumption, especially through smart charging of electric vehicles and dynamic tariffs, is key to managing peak demand and integrating renewable energy. FEBEG members are already bringing products on the market to incentivize charging at moments that are beneficial to the system and for the integration of renewables.
TotalEnergies	• **Batteries :** ○ Part of the EV to perform V2G should be included. First tests are being realised.

ANSWER

Elia thanks the stakeholders for the feedback.

Elia would like first to clarify that there was indeed an inversion in Table 11 of the document for the 2024 values on the share of flexible home batteries. Today, most of the residential batteries are locally optimised (B2H) and not directly reacting to market prices (B2M).

Elia agrees on the importance of unlocking the flexibility at the end-user's side and push for optimised charging instead of natural charging. In this context, Elia is regularly evaluating the share of unlocked flexibility. The measured shares of unlocked flexibility in 2025 have fallen below expectations compared with the previous assumptions. The slower-than-expected growth of dynamic contracts is impeding the ability to fully unlocked residential e-assets.

Regarding the Vehicle-to-X (V2Home and V2Market) technology, there are today still several barriers for the deployment of V2X that limit its widespread adoption:

- Many manufacturers allow V2X functionality only on their proprietary charging stations and under specific contractual agreements, which reduces flexibility for users.
- There is a significant fear of wearing down the battery, particularly for leasing vehicles, where owners are concerned about long-term battery health and residual value.
- Implementing V2X often requires an expensive adapted charging station, making the initial investment a major obstacle for individuals and businesses.
- To make V2X attractive, innovative contract and pricing schemes are needed. Current models can be discouraging, especially when issues like double VAT charges or unclear responsibilities (e.g., employer paying for V2H) arise.
- Finally, V2X technology is not widely known or accepted by the public, which slows down adoption and market penetration.

However, following the feedback received from the stakeholders, the share of V2X amongst the EV fleet is now increased in all scenarios:

- Slightly increased for the short-term, reaching 3% in 2035, aligning with RTE study (Bilan Prévisionnel);
- Increased up to 30% of the fleet in 2050.

Next to the CENTRAL scenario, a FLEX+ scenario, with ambitious penetration is also determined.

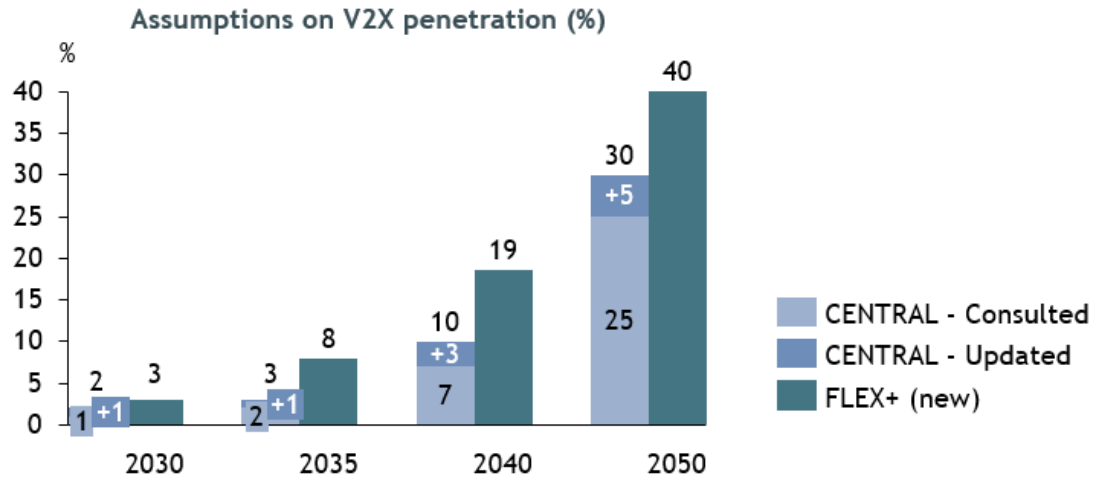


Figure 8-8 - Assumptions on the V2X penetration [%]

Given the increased share of V2X, the share of EV following a natural charging (V0) will be decreased until 2040. In 2050, given that the share of V0 was already zero, the increased share of V2X will be compensated by a decrease in the share of V1H and V1M.

7.1.12.3 Industrial flexibility

Stakeholder	Feedback received
CREG	53. Pour les usages existants de l'électricité au niveau industriel, la CREG s'interroge sur l'hypothèse de considérer comme constant à 1,7 GW l'effacement de la demande jusqu'en 2050. Le potentiel d'effacement de la demande pour les usages existants devrait augmenter dans les années à venir grâce à des incitants économiques valorisant la flexibilité des usages existants. Par exemple, le développement de tarifs capacitaires et dynamiques devrait inciter les consommateurs existants à flexibiliser davantage leur consommation. Les mécanismes actuels (CRM) et futurs (Non-fossil fuel flexibility schemes) rémunérant entre autres la flexibilité devraient également inciter une plus grande flexibilité des consommateurs existants dans le futur. La CREG remet également en question le fait de considérer une valeur constante pour le DSR sur l'horizon temporel étudié étant donné que le volume estimé de DSR ne cesse d'augmenter d'année en année (cf. l'étude réalisée par N-Side présentée au WG Adequacy du 28 août 2025 *[https://www.elia.be/en/users-group/wg-adequacy/20250828-meeting]*), même si la demande d'électricité diminue. 54. Pour les nouveaux usages de l'électricité, la CREG observe qu'Elia et Fluxys proposent de réduire, a partir de 2035, d'un tiers tous les 5 ans la part de la capacité flexible de ces usages sur base d'une suppression progressive des « back-up fossiles". La CREG remarque que l'étude BluePrint ne considère pas une telle

	diminution progressive de la flexibilité des nouveaux usages de l'électricité et souhaite recevoir davantage d'informations quant aux raisons qui sous-tendent ces divergences.
EDORA	**Section 3.10 : Electricity consumption flexibility** Enfin, nous nous demandons sur quelle base on considère qu'il n'y a plus de flexibilité industrielle à aller chercher dans les usages existants ?

ANSWER

Existing usages

Regarding the flexibility from existing usages of the industry, the value submitted to consultation (i.e. 1700 MW) was aligned with the AdeqFlex'25 study, which was based on the latest available Market Response study realised by N-SIDE. In the meantime, N-SIDE realised an update of the Market Reponse study concluded to 800 MW of existing DSR, as presented during the WG Adequacy of 28/08/2025[60]. End September 2025, in the framework of the CRM[61], the Minister choose to consider 1200 MW of existing DSR. The same value is thus proposed to be considered in the framework of the Federal Development Plan, i.e. 1200 MW.

Given the lower value (800 MW) that was found in the latest Market Response study performed by N-SIDE, it seems very ambitious to assume additional capacity on top of the existing one.

New usages (electrification)

Regarding the flexibility from new usages of the industry, as highlighted in the EnergieGRIP study, additional e-boilers or heat pumps are assumed to serve as backup for the existing heating systems. However, in line with net-zero targets, the primary heating device is expected to be phased out. As a result, the inherent flexibility of switching between electricity and other fuels will also disappear. This was also a comment made by industry stakeholders during the workshops. This aspect was not considered in the Blueprint study, as it only emerged during the EnergieGRIP analysis conducted for Flanders after the study was published. A similar explanation is provided in the most recent AdeqFlex report, although its time horizon does not extend beyond 2036 and hence the flexibility values were kept constant for the entire study horizon (until 2036 as covered by the study).

[60] 20250828 meeting
[61] Moniteur belge

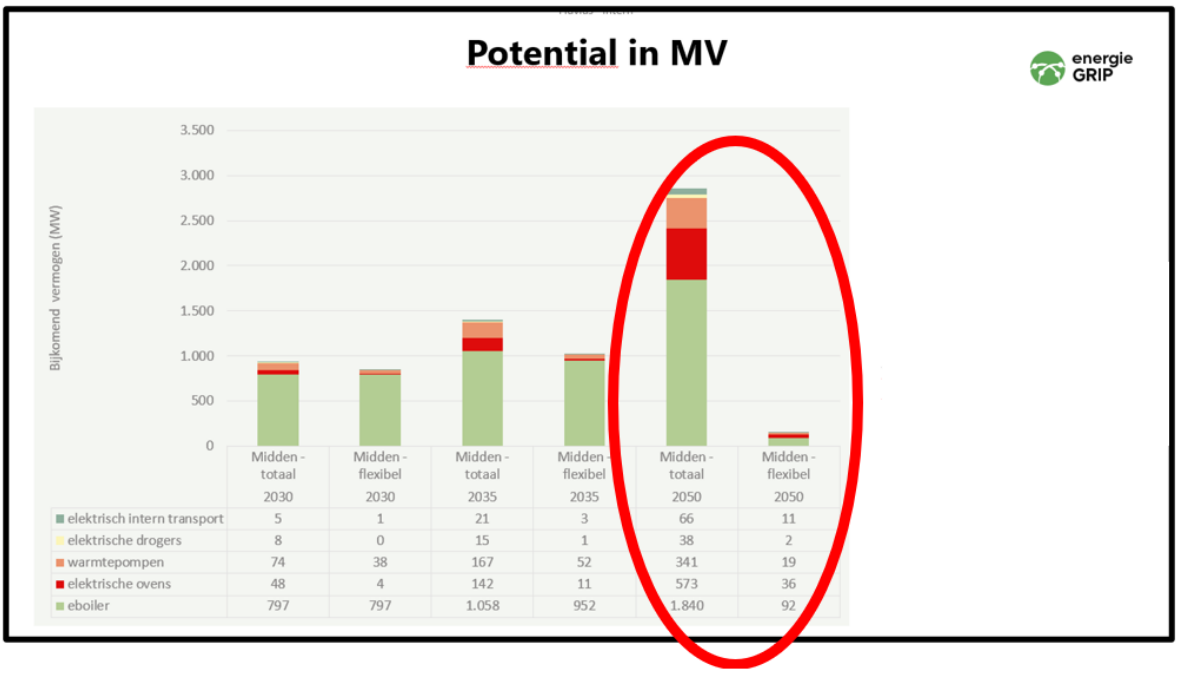


Figure 8-9 - Industrial flexibility considered by EnergieGrip

8.1.13 Indicative supply-demand balance

No specific comments were received on this subsection.

8.2 Molecule Supply

Changes since the public consultation:

- **Ammonia capacities** were **realigned** (downwards) with known future projects
- **Electrolysis efficiencies** were taken into account

8.2.1 Fossil methane

No specific comments were received on this subsection.

8.2.2 Biomethane

Biomethane

Stakeholder	Feedback received
BBL - Canopea	**Biomethane:** The source used for the scenario is biased and completely overestimating the potential of biomethane. The biomass used for its production is a scarce resource. Overreliance on biomass is not the way forward for a sustainable energy system.
COGEN	The reported Belgian biomethane potentials in the main document mentions the values of 3,2 TWh/year in 2030 and 6 TWh/year as of 2040, referring to the Gas for Climate study of 2022 available on the website of the European Biogas Association (link). However, during Workshop 3 the same reference was depicted on the presented slides and mentioned a potential of 15 TWh/year in 2050 (slide 42). As the reported source only mentions 2030 and 2050 potentials, it is unclear how the 2040 value mentioned in Elia's report was obtained.
ENGIE	In previous publications (Valbiom – Gas.be) estimation of local production was 6 TWh in 2030 with a global potential of +/- 15 TWh (under re-estimation). The current consultation, however, postpones the local production target by a decade (from 2030 to 2040). Why is this delay proposed, given that the regulatory framework has not significantly changed and EU targets remain ambitious (35 bcm)
FEBEG	

	FEBEG notes that the targets for local biomethane production have been delayed by a decade (Compared to "Green gas, an opportunity for the future", Gas.be presentation to FEBEG 09/2023), leaving stakeholders uncertain about the reasons for such a delay.
BBL Canopea	Nous préconisons l'intégration du biométhane dans les émissions principalement dans l'ETS (car le biométhane doit être utilisé en priorité pour les besoins en haute température dans l'industrie et éventuellement à la marge pour la production d'électricité.)

ANSWER

Fluxys thanks the stakeholders for their comments. The source used is published by Gas for Climate which is recognised as a reliable source of biomethane potential. It mentions a potential for biomethane in Belgium of +-6 TWh in 2030 and +- 15 TWh in 2050. More realistic estimations, from internal data based on market interest, re-adjusted this potential for 2030 downwards to be more aligned with the market. The value for 2040 is also derived from internal data.

8.2.3 Hydrogen

Hydrogen

Stakeholder	Feedback received
Belgian Hydrogen Council	Since electrolysis is only estimated to play a limited role in Belgium (238MW in 2040) there is no interaction between the electricity and hydrogen flows as such. There is no role for H2 assumed in this paper to stabilize the grid or avoid congestion or provide long term storage through H2. The question is whether that is justified, given the increase of renewable energy in the electricity mix.
BBL - Canopea	**Hydrogen:** The expectations in renewable hydrogen as a way to achieve net zero are strongly exaggerated. BBL published in December 2023 on the necessary recalibration of the hydrogen policies ("Voorbij de hype. Een realitycheck rond waterstof"). Among others, we also warned of too high expectations on importing hydrogen and its derivatives, including the issues of importing ammonia (see publication p. 22 ff). We are not alone with this call for a recalibration, especially as the market for green hydrogen is not developing as foreseen.

Les 50 TWh de capacité d'importation de NH3 représente le haut de la fourchette 35TWh-50TWh définie par le lobby de l'hydrogène en Belgique. (P5 rapport ''belgium as an hydrogen import hub'') sans que ce choix ne soit expliqué.

TotalEnergies

- **Haber-Bosch potential additional capacity & energy production :**

Even in the long term, shipping ammonia from other countries will be much more economically interesting than using Haber-Bosch from low carbon H2.

CREG

55. Les images aux pages 122 et 123 mentionnent une demande en hydrogène qui varie entre 2 et 6 TWh en 2030 et 12 TWh et 22 TWh en 2040. Dans le scénario « MOL », le plus optimiste pour la demande finale en hydrogène, les valeurs reprises dans l'Excel de consultation sont de 2 TWh en 2030 et 10 TWh en 2040. Selon une étude de Deloitte pour le SPF Economie, la demande en hydrogène en 2021 s'élevait à ~15 TWh *[Footnote : SPF Economie/Deloitte, Le rôle des vecteurs énergétiques gazeux dans une Belgique climatiquement neutre », p.21, mai 2021.]*. La CREG s'interroge sur les valeurs reprises dans les scénarios qui semblent faibles eu égard aux valeurs actuelles. Compte tenu du fait que l'hydrogène peut être produit localement et qu'il y a déjà un réseau d'hydrogène opéré par un acteur privé en Belgique, la CREG demande à Fluxys H2 de confirmer qu'il s'agit des volumes transportés dans le réseau du HNO et, le cas échéant, adapter ces valeurs en fonction des résultats de leurs Open Seasons.

56. Het aanbod van waterstof wordt naast locale productie vooral geleverd door het saldo van invoer- en uitvoerstromen van waterstof. Het is te verwachten dat vooral de grensoverschrijdende waterstofstromen bepalend zullen zijn voor een dynamiek in de voorziening van waterstof voor de Belgische grootindustrie gevestigd in clusters startende te Gent en Antwerpen. De CREG is van mening dat scenario's voor de Belgische waterstofmarkt en de ontwikkeling van het bijhorende netwerk, mede rekening dienen te houden met mogelijke invoer- en uitvoerstromen van waterstof.

57. Quelle que soit la technologie considérée pour la production d'hydrogène (NH_3 cracking, SMR avec capture de CO_2, électrolyse, etc.), un facteur de charge de 100 % est systématiquement retenu (voire supérieur dans le cas du SMR + CCS). La CREG estime qu'il conviendrait plutôt d'appliquer un facteur de charge réaliste et différencié par technologie. À défaut, l'offre de molécules est surestimée. À titre d'exemple, le site d'H2BE indique une production annuelle de 210 kt d'hydrogène pour une capacité installée de 1 GW, soit environ 7 000 GWh PCI. Le document de consultation considère une production de 8 800 GWh pour une capacité installée de 1GW, soit une surévaluation de 25%.

58. Concernant l'hydrogène renouvelable, deux hypothèses (complémentaires) peuvent être envisagées :

- Le facteur de charge de l'électrolyseur est aligné sur celui de l'installation électrique qui l'alimente. Cette donnée est alors exogène au modèle.
- Le facteur de charge correspond au nombre d'heures où le prix de l'électricité est inférieur à un certain seuil. Il s'agit alors d'une donnée endogène au modèle.

59. Enfin, au-delà du facteur de charge, il est nécessaire de tenir compte de l'efficacité énergétique des procédés. Dans le cas des électrolyseurs, le TYNDP 2024 retient une efficacité d'environ 70 % *[Footnote : ENTSO-E // ENTSOG TYNDP 2024 Scenarios Methodology Report – Final Version – January 2025, p.51]*.

60. En appliquant ces deux facteurs, l'offre d'hydrogène est significativement inférieure à celle calculée dans le document de consultation. Avec un facteur de charge de 3 000 heures (à affiner) et une efficacité de 70%, la production de 118 MW d'électrolyseurs est de 248 GWh, soit 25% des volumes présentés dans le document de consultation. La CREG est d'avis que cela doit être modifié, spécifiquement aux pages 117 à 123.

61. Enkele promotoren voorzien de bouw van ammoniakterminals in met name de Antwerpse haven. Deze projecten zijn momenteel kandidaat voor het verkrijgen van een PCI-status (PowerBI link - HI WEST) en beogen dus een status van gemeenschappelijk Europees belang. De CREG is van mening dat zowel de weerhouden capaciteiten als de kalender optimistisch zijn en vraagt om de cijfers meer te detailleren op basis van de projecten. Momenteel zijn er geen ammoniakterminals met installaties om ammoniak te kraken tot waterstof operationeel en is geen infrastructuur beschikbaar voor aansluiting op het waterstofnet waarvan de bouw van de eerste fase is opgestart. De mate waarin ammoniak gekraakt wordt tot waterstof ofwel rechtstreeks bestemd zal worden voor de ammoniakmarkt is medebepalend voor de nuttige capaciteit van de kraakinstallatie. Het is daarom van belang om de gewenste injectiecapaciteit in het waterstofnetwerk als referentie te nemen om een redelijk beeld te vormen van de potentiële injectie van waterstofvolumes. Veel zal eveneens afhangen van de exportscenario's naar met name de Duitse markt en de opportuniteit om de grensoverschrijdende vervoersinfrastructuur aan te leggen. Vandaar het belang om eveneens invoeren uitvoerscenario's van naderbij te bekijken. De CREG is voorstander van de bouw van een waterstofnetwerk naargelang de vraag voor aansluitingen en het gebruik van het waterstofnetwerk zich manifesteren opdat redelijke benuttingsniveaus van het netwerk begroot kunnen worden.

ENGIE	[On blue hydrogen] Steam Methane Reforming (SMR) is not the only technology that can generate low-carbon (i.e. blue) hydrogen. With their H2BE project, ENGIE and Equinor aim to develop low-carbon hydrogen production from natural gas in Belgium. When referring to H2BE, it should be noted that the envisaged technology is Auto-Thermal Reforming (ATR), not Steam Methane Reforming (SMR). Both technologies should be mentioned Especially also because ATR is proclaimed to achieve higher capture rates compared to SMR, 90-95% for ATR versus 60-70% for SMR. In many cases, SMR is used as a base case and ATR is added to show how higher capture rates can be achieved (Fraunhofer study) ENGIE Belgium understands that, for modelling purposes, the 1 GW hydrogen production capacity corresponding to the H2BE project is scheduled to become operational in 2030. In practice, several months of delay may occur. ENGIE Belgium emphasizes the need to coordinate infrastructure developments — for both H2 and CO2 — together with low-carbon hydrogen and Carbon Capture and Storage (CCS) projects, in order to kick-start the H2 and CO2 value chains and minimize overall costs for society. [on electrolysis] ENGIE Belgium notes that assumptions relating to the potential for electrolysis have been revised downward in Elia's Adequacy & Flexibility 2026–2036, which foresees 118 MW of electrolysers in 2030 and 238 MW in 2040. This compares to Elia's earlier Adequacy & Flexibility 2024–2034, which considered 447 MW in 2030 and 743 MW in 2034. In line with its most recent ADEQ-FLEX study, Elia & Fluxys now assume electrolyser capacities of 118 MW in 2030 and 238 MW in 2040 in their scenarios under consultation. In line with CREG's view (cf. study (F)2761, §17) that, "given its limited renewable electricity potential, Belgium has no ambitions to produce green hydrogen locally," ENGIE Belgium welcomes the lower electrolyser capacities assumed by Elia. However, based on recent announcements of delays or cancellations of renewable hydrogen production projects in Europe (cf. European Hydrogen Index 2025, in which quantitative analyses are centred on renewable hydrogen and that states that 98% of the 142 GW project pipeline remains at the concept or feasibility stage)and globally, ENGIE Belgium recommends that Elia adopt an even more prudent approach in the short term (2030) by considering even lower capacities. As a side note, ENGIE Belgium has doubts about the validity of the electricity consumption and hydrogen production volumes presented in Figures 4.8 and 4.9, given the announced capacities. ENGIE Belgium therefore recommends that the calculation methodology be clarified in the published scenarios.
ENGIE	2. Hydrogen demand 'hidden' under methane balances • From the consultation report and the detailed final demand assessed by industrial sector, ENGIE

Belgium understands that part of the industrial hydrogen demand is represented under the methane vector, to account for Steam Methane Reforming (SMR).

- In the molecules-supply balances, the consultation report indicates 11 TWh methane demand in 2030 and 22 TWh in 2040 for SMR.
- Assuming an SMR efficiency of 65–75% and that the hydrogen produced is used domestically, this would add 7–8 TWh in 2030 and 14–17 TWh in 2040 to final hydrogen energy demand. However, the consultation report is unclear about the role of this SMR-generated supply in meeting domestic demand.

3. Unclear treatment of ammonia cracking
    - The consultation report indicates 32 TWh methane demand in 2030 and 70 TWh in 2040 for ammonia (NH3) cracking.
    - Assuming a cracking efficiency of ~76% (cf. Giddey, Badwal, Munnings, and Dolan), this would imply significant additional volumes of hydrogen final demand, but it is not clear to what extent this is accounted for in the national demand figures. However, it is unclear to what extent this is reflected in the national demand figures, and the consultation report does not clarify the role of NH3- cracking–derived hydrogen in meeting domestic demand.

EDORA

S'agissant de l'hydrogène, nous nous interrogeons sur les hypothèses retenues ou qui seront retenues en termes de priorisation de l'électricité en usage direct par rapport à la production d'hydrogène, sachant que l'usage direct de l'électricité réduit les émissions de CO2 2 à 9 fois plus que via sa conversion en hydrogène *[Footnote : https://media.licdn.com/dms/image/v2/D5612AQHNEnLQLdmBpw/article-inline_imageshrink_1500_2232/B56Zf0XbNSHoAY/0/1752151471374?e=1759968000&v=beta&t=2eEb1b5PhULutTcbTJ3kgqjTc2RTtqQQXUuyxZWqQk.]*.

FEBEG

Hydrogen supply scenarios should recognise a broader range of production technologies, including those that offer higher carbon capture rates (such as Auto-Thermal Reforming, the technology considered for the H2BE project, which the consultation incorrectly associates with SMR technology). Infrastructure for hydrogen and carbon dioxide should be developed together to enable the growth of new value chains. Assumptions about electrolyser capacity

should be cautious, reflecting recent delays and cancellations of projects in Europe. In the context of the consultation, it would be beneficial if the methodology is published on how the electricity consumption and hydrogen production are calculated.

ANSWER

Role for H2 to stabilise grid

Concerning the consumption of H2: the H2 values mentioned in the demand scenarios only relate to final energy demand and feedstock. Potential use of hydrogen in power plants, for example to compensate for electricity shortage, has not yet been taken into account and will be analysed during the grid simulations. In addition, electrolysers will be modelled including flexibility, allowing them to react to prices and thus congestions in cross-border flows.

Too high expectations for hydrogen (supply)

Fluxys believes that the molecule scenario – including the H2 demand and supply - is based on reliable sources and not unrealistic. Moreover, hydrogen capacity supply is aligned with interest from the market. Therefore, the scenario must be included in order to analyse the impact on the infrastructure network.

For the molecule supply (including ammonia), It has been chosen not to define specific supply scenarios due to the high level of uncertainty, but rather to indicate a maximum capacity. The values are aligned with market interest, published analysis and values used for the ENTSOE/G TYNDP 2026 process.

Regarding the annual supply volume, we propose not to use a best estimate, but to represent a maximum value based on a hypothetical full load factor of the capacity to indicate the full potential of molecules supply.

The part of the supply potential that will be used to balance with demand (and possible transit) will be determined later in the process in order to perform simulations to check the design of the identified infrastructure.

Haber-Bosch

Indeed, Haber-Bosch potential was not taken into account in the documents subject for public consultation, after insightful comments from Total during the supply workshop.

Hydrogen demand in document figures and Excel

If you select the energy and feedstock amounts for hydrogen in the excel data visualisation, the values are 2-6 TWh (2030) and 12-22 TWh (2040) as shown on the document figures.

About existing H2 demand

There is indeed an existing hydrogen demand in Belgium, mostly as feedstock for refineries and chemical and petrochemical sectors, transported through a local network by a private stakeholder. The hydrogen demand in the documents subject to public consultation refers to the low carbon and green hydrogen that will be consumed directly or, in compliance with the legislation, be transported through a specific network. In this analysis, note that the existing demand of hydrogen is implicitly accounted for in the "methane" energy vector, as hydrogen today is produced via steam methane reforming. For refineries, hydrogen consumed today is accounted for in "carbo liquids" energy vector since it is currently obtained as by-product. The values for H2 demand are aligned with recent market consultations.

Taking into account import-export capacities of hydrogen

Import and export capacities with other countries are definitely an important driver for the future of hydrogen in Belgium. The scenarios were established to determine the total demand and feedstock in Belgium.

As already explained (chapter 6), the dimensioning of the hydrogen network will not only be determined by H_2 transport for final demand and feedstock (22 TWh/year in the molecule scenario for 2040), but also for the production potential of e-fuels (ammonia, methanol, synthetic methane, …) and for transit to neighboring countries.

Capacity factors and efficiencies

The choice of taking a 100% capacity factor was to estimate the full potential of molecules supply. Capacity factors will be determined by internal simulations and further analysis of the interest of the market. The efficiency of electrolysis however should be taken into account and therefore volumes will be adjusted in the updated scenario report.

Ammonia import and cracking

We will take into account of possible delays in the future depending on the market evolutions regarding the import of ammonia.

The ammonia cracking capacities will be revised in the updated scenario report. Internal values updates are indeed showing a delay in estimated capacity.

On blue hydrogen

Thank you for the information of using Auto-Thermal Reforming (ATR) instead of Steam Methane Reforming (SMR), it will be taken into account. Possible timing issues have been noted.

The SMR/ATR-generated supply will clearly contribute to meet the global hydrogen demand. However, the load factors will be determined by further simulations.

On electrolysis

The estimated capacities for electrolysis for 2030 and 2040 are already low, compared to other studies[62] and are aligned with internal data. Therefore, it is reasonable to assume such capacities for the domestic production of hydrogen.

To analyse the corresponding hydrogen volumes and electricity consumption, a capacity factor of 100% (even though not realistic) was used (meaning electrolyser working 8760h per year). The purpose here is to show the maximum potential. Capacity factors will be determined by further optimisation simulations. The efficiency of electrolysers was not yet taken into account. This will be corrected in the updated scenario report.

Hydrogen demand "hidden" under methane balances

Indeed, as the hydrogen consumed today in Belgium is exclusively grey hydrogen produced from SMR, the current demand is "hidden" under methane balances. The projected demand of hydrogen is the low carbon/green hydrogen that will be consumed directly or, in compliance with the legislation, be transported through a specific network.

Unclear treatment of ammonia cracking

The consultation report indicates an ammonia potential of 32 TWh in 2030 and 70 TWh in 2040 for NH3 cracking, resulting in additional 28 TWh and 61 TWh of hydrogen (efficiency of 87%[63]). So, this would imply additional volumes of hydrogen supply. As for the SMR/ATR, this additional supply will help meet the global domestic demand of hydrogen and possible transit to other countries.

Please also note that these amounts will be realigned with internal data.

Direct electricity use or hydrogen conversion

While for some sectors, electrification is a promising and realistic solution for decarbonisation, some hard-to-abate industries like iron & steel and (petro)chemicals will still require molecules (including hydrogen) to provide efficient high temperature heating. Also, hydrogen molecules will play a significant role for feedstock.

Grid simulations

[62] https://www.creg.be/sites/default/files/assets/Publications/Studies/F2761FR.pdf
[63] S&P 2024 - Hydrogen transportation cost analysis — V4.1

The proposed demand scenarios, together with the supply and transit potentials, will serve as input for the assessment of the molecule networks. The proposed demand scenarios, together with the supply and transit potentials, will serve as input for the assessment of the molecule networks by Fluxys. For the CO_2 network, the CCS scenarios will be used as input.

8.2.4 Supply-demand balance

Supply-demand balance

Stakeholder	Feedback received
TotalEnergies	• **Overview of draft proposed molecules supply scenarios for Belgium in 2030 :** Figures are low on the demand side for hydrogen in 2030. You give a view here where it seems we are oversupplied by hydrogen but that's not the case. Based on REDIII, numbers for H2 should be higher. 32% of all hydrogen is used not as energy but as feedstock must be low carbon/green."
CREG	11. De CREG stelt vast dat de levering van energie om tegemoet te komen aan de buitenlandse vraag weinig tot niet wordt opgenomen in de vraagscenario's. Dit is vooral het geval voor de potentiële vraag naar waterstof waar naast de binnenlandse vraag, de vraag in de buurlanden (bv. Duitsland) bepalend zal zijn voor de dynamiek van de Belgische waterstofsector en de bouw van een geïnterconnecteerd waterstofnetwerk. 62. La CREG est d'avis qu'au moins les volumes importés nécessaires pour répondre aux objectifs fixés dans REDIII devraient être renouvelables. En effet, les objectifs européens ne considèrent pas de l'hydrogène bas carbone. La teneur en carbone des volumes additionnels devrait être la teneur en carbone de l'hydrogène le plus compétitif tenant compte de l'augmentation du coût du carbone.
FEBELIEC	<u>Uncertainty of Net-Zero Molecules</u> Fluxys has openly acknowledged the significant uncertainty regarding which molecules will be available in a net-zero system and at what costs. Febeliec appreciates this transparency and stresses that such uncertainty must be fully accounted for in investment planning. Focus should be on "no-regret" measures, while avoiding premature commitments to infrastructure that may lock in uncertain pathways. <u>E-Gases and E-Fuels</u>

	If scenarios assume the use of e-gases or e-fuels produced with green hydrogen and carbon, the source of the carbon must be specified. Carbon from primary emission sources cannot be considered net-zero, and therefore cannot underpin a net-zero strategy.

ANSWER

Transit and demand for other countries

As already explained (chapter 6), the dimensioning of the hydrogen network will not only be determined by H_2 transport for final demand and feedstock (22 TWh/year in the molecule scenario for 2040), but also for the production potential of e-fuels (ammonia, methanol, synthetic methane, …) and for transit to neighboring countries.

RED III directive

The volumes of RFNBO required to be compliant with the RED III directive could be realised within the supply potential mentioned in the study. As RFNBO is not only about green/low carbon hydrogen, the targets could also be achieved through RFNBO ammonia and e-fuels.

The volumes described in the transposition of RED III directive for transport is calculated as 2.9 TWh (HHV) in total[64]. As multiple energy vectors can be RFNBO compliant (hydrogen, ammonia, e-liquids), the compliance with the targets will depend on the origin of the supply. For refineries, the directive recommends to specifically use RFNBO hydrogen as intermediate product. The demand for hydrogen in refineries (as feedstock) in the scenarios is higher than the targeted amounts[65] (1.3 TWh LHV), which makes the scenarios valid for a compliance with RED III.

E-gases and e-fuels

Indeed, thank you for the precision.

[64] Data from Hydrogen Europe
[65] Data from Hydrogen Europe

9. Comments received on estimated greenhouse gas emissions

Changes since the public consultation:

- Development of a **CCS pathway for each scenario** and computation of the related **impact** on the **electricity demand.**
- Quantification of **additional decarbonisation measures** (bio-methane, bio-fuels, CCS, etc) that narrow the gap with the emissions targets.
- **Greenhouse gas** emissions **quantification methodology** is **refined** and **improved**.
- The **final NECP** containing the **2030 target** has been **validated** by the federal government and the 3 regions on the **6th of October 2025**.

9.1 General comments on estimated greenhouse gas emissions

Disclaimer: All comments, feedbacks, questions, and suggestions received during this consultation were submitted prior to the final publication of the Belgian NECP on the 6th of October 2025. All those contributions were carefully reviewed and treated accordingly.

General comments

Stakeholder	Feedback received
Belgian Offshore Platform	As the summer of 2025 proofed again, with droughts, floodings and wildfires, the climate crisis continues every day and remains as urgent as never before. The European Union committed to a legally binding framework to reach climate neutrality by 2050, with progress targets for 2030 and 2040 in the European Climate Law *[Footnote: European Climate Law - European Commission]*. In this respect, the net-zero target is absolutely not questionable. Belgium has to take its fair share by aiming for the same net-zero ambition by 2050 at national level. A federal target for climate neutrality by 2050 is to remain the starting point for any scenario in the Federal Development Plans. […] Offshore wind is the no-regret technology for Belgium, as it provides the required large amounts of green energy required for climate neutrality, it is affordable due to the low LCOE and contributes to the

	energy security and independence of Europe. Therefore BOP welcomes energy independence targets at national and/or European level, as it contributes to society as well as the climate.
Essenscia	Please note that the scope of our input is limited to the content presented during the industrial demand stakeholder workshop and does not extend to the full consultation documentation. Our comments - listed below - are intended to contribute constructively to the consultation process. [...] • **Emission Scope (1):** essenscia members have substantially reduced emissions since 1990 and essenscia supports a European, society-wide net-zero ambition. • **Emission Scope (2):** Belgium is an energy-intensive region in Europe with a strong (yet often hard-to-abate) chemical industry. The realization of further emission reductions will require significant efforts, including industrial policy support.
Essenscia	• **Delayed transition scenario:** Apart from the optimistic scenarios and considering the large uncertainty ahead, we would suggest also exploring scenarios where the energy transition (and therefore the demand for low-carbon energy carriers) goes slower than hoped for due to technological and economic reasons. Such scenarios should not focus on reducing the energy demand of one or several specific sectors, but rather include a general reduction of overall demand starting from the base scenario. Potentially these could be used - together with the optimistic scenarios - to detect least-regret options in the network development plans.
Essenscia	essenscia welcomes the opportunity to respond to the public consultation on the multi-energy scenarios and associated greenhouse gas (GHG) emission trajectories. We support the ambition to align infrastructure planning with realistic energy and climate pathways. However, we would like to raise several important considerations regarding the treatment of emission targets and assumptions. In general, the goal of the study is to see what infrastructure needs will be in the future. It is crucial that this is as realistic as possible, and thus not lead to over- or underestimations. Overestimations will lead to additional costs that can and need to be avoided. Imposing targets in the study would impose a higher investment rate, and additional infrastructure, resulting in higher costs for society and consumers. However, investments are

currently already under pressure, due to the high energy costs; additional targets and increasing costs could lead to further deindustrialization. If this happens infrastructure needs will be completely different. Therefore, as the goal of the study is to estimate realistically the needed infrastructure, the only right way forward is to use a bottom-up approach based on stakeholders input which needs to be updated regularly to see what the impact of policy decisions is on their investments plans.

Below some additional feedback on specific elements:

1. **2030 ESR Emission Targets?**
    a. We support the bottom-up approach of using realistic demand projections as the basis for infrastructure planning. Overly optimistic assumptions risk misaligning infrastructure with actual needs.
    b. We are not in favor of including a sensitivity scenario that explores the impact of additional emission reduction measures and if it's done it can only work if the total additional cost for infrastructure and additional OPEX/CAPEX costs of consumers (industry and households), impact on investment decisions (e.g. de-industrialization) and other impacts are included.

2. **ETS Targets at Belgian Level?**
    a. We are not in favor of imposing these targets in the model (see general comment)
    a. It is important to clarify that there is no legally binding ETS target at the Belgian level. The EU ETS is a market-based mechanism with an EU-wide cap, and national-level targets are not defined within this framework.
    b. Belgium hosts a disproportionately high share of energy-intensive and hard-to-abate industries compared to other Member States. Applying a uniform 62% reduction assumption at national level would be unrealistic and unfair, and risks distorting the role of Belgian industry in the EU context. This means that the bottom approach should be maintained, and no 62% reduction should be imposed on the model.
    c. Last but not least, the analysis should explicitly include the role of negative emissions and flexibility mechanisms such as:
        i. CCS and BECCS
        ii. LULUCF contributions
        iii. Direct Air Capture (DAC)
        iv. GHG credit trading
        v. ....

- ➔ These are standard components in most EU and international scenario studies (including those from the European Commission), and omitting them gives a misleading picture of the actual decarbonisation potential.
- ➔ Note that the use/import of H2, bio-molecules, e-molecules and the use of BECCS is also applicable to process emissions.

3. **Belgian 2035 and 2040 Emission Targets**
    a. We are not in favor of imposing these targets in the model (see general comment)
    b. There are no Belgian emission targets for 2035 or 2040. Including such figures in the scenario risks creating confusion and setting expectations that are not grounded in policy.
    c. Introducing intermediate targets does not necessarily accelerate emission reductions. The direction of climate policy is already clear, and overly aggressive short-term targets could undermine long-term investment certainty and the credibility of the 2050 trajectory.
    d. At EU level, the proposed -90% target for 2040 is not yet confirmed and should be treated with caution. If adopted, the target could become conditional on key enabling factors, such as: access to affordable and secure energy, global competitiveness of European industry, Robust carbon leakage protection under the EU ETS, ...

4. **2050 Net Zero Targets**
    a. The consultation refers to validated net zero targets for both ESR and EU ETS sectors by 2050. However, the only legally binding target is the overall EU-wide net zero GHG emissions by 2050.
    b. Sectoral or national breakdowns of this target are not yet defined or validated, and should not be presented as such. Scenario planning should reflect this uncertainty and avoid implying a level of precision that does not exist.

Conclusion

essenscia encourages Elia and Fluxys to maintain a realistic, technology-neutral, and industry-aware approach to scenario development. Infrastructure planning must be grounded in credible assumptions, with also regularly updates to reflect the evolving policy and innovation landscape. Imposing targets in this not in scope of this study and should be avoided as this can lead to wrong estimations of the real infrastructure needs. We remain committed to constructive dialogue and to supporting the energy transition in a way that safeguards industrial competitiveness and societal resilience.

negaWatt	**Emissions scope – include feedstock, international aviation and shipping** We welcome the dedicated discussion of feedstock and the clarification that international aviation and shipping are only partially covered by ETS accounting. To avoid misleading claims such as “fully net zero by 2050,” these emissions should be systematically reported alongside territorial totals, with consistent treatment of bunkers and non-energy use. This is essential to reflect the significant demand for molecule-based energy carriers in these sectors and to assess their implications for domestic availability in the MOL scenario.
BBL - Canopea	Nous regrettons que les trajectoires et les mesures actuellement envisagées ne permettent pas d’atteindre les objectifs climatiques hors ETS. Le gap de 9-14 MT equ CO2 (12MT dans le scénario BASE) hors ETS peut être comblé par l’ajout de mesures ambitieuses. Pour nous, l**e présent scénario représente un outil clé d’information du politique face à ces manquements (mais requière le développement d’un scénario POLICY complémentaire).** Certaines mesures doivent urgemment être évaluées pour diminuer le gap par rapport a l’objectif 2030. Parmi les mesures, au niveau régional wallon, Canopea a proposé un arsenal de mesures climatiques de court terme *[Footnote https://www.canopea.be/climat-que-fait-le-gouvernement-wallon-en-2025/]* (baisse de la vitesse, révision de la TMC, obligation de rénovation, fiscal shift accéléré, interdiction d’installation de chaudière fossile,…) qui doivent être évaluées. ETS.
CREG	7.La CREG observe que la consultation organisée par Elia et Fluxys exclut à ce stade le recours au biométhane, aux combustibles synthétiques, aux biofuels et au CCS/CCU, et que les scénarios soumis à consultation ne respectent par conséquent pas encore les objectifs climatiques fixés aux niveaux belge et européen. La CREG considère toutefois que le recours à (certaines de) ces technologies et son timing seront déterminants pour l'évaluation de certains besoins d'infrastructures de transport. La CREG regrette que ces éléments ne soient pas soumis à consultation publique, et souhaiterait disposer de davantage d'informations quant aux hypothèses retenues. De plus, la CREG recommande d’assurer l’alignement des scénarios avec les objectifs climatiques. […] [Concerning the 2030 emission targets] 63. La CREG considère qu’une certaine déviation est acceptable sachant que l'ESR permet certaines flexibilités, notamment la

vente/le transfert de quota entre états membres. Il est toutefois raisonnable de supposer que chaque état membre essaiera de limiter au maximum l'achat de ces quotas, en privilégiant d'éventuels soutiens financiers/subventions aux investissements nationaux face à l'achat de quotas étrangers n'offrant pas de solution pérenne au niveau national. La CREG recommande de se baser sur les dernières mises à jour des plans énergie-climat pour évaluer le niveau minimal de réduction réaliste à l'horizon 2030.

[Concerning ETS targets at BE level]
64. Le marché ETS européen vise à réduire en premier lieu les émissions là où c'est le moins cher. Appliquer un objectif de -62% au périmètre belge pour 2030 serait plus contraignant que nécessaire, sachant que tous les états membres ne présentent pas tous les mêmes coûts d'abattement des émissions. La CREG est d'avis que les scénarios proposés par Fluxys & Elia devraient idéalement se baser sur une analyse du merit order des coûts d'abattement des émissions par secteur d'activité, évaluée à l'échelle de l'Union pour en déduire des conclusions spécifiques au périmètre belge. A défaut, la CREG préconise de se baser sur les résultats de l'étude «Scenarios for a climate neutral Belgium by 2050 » (Vito et DG Environnement, 2021).

[Concerning 2035 and 2040 emission targets]
65. En ce qui concerne les émissions ETS à l'horizon 2040: L'objectif de -90% pour 2040, même si pas encore adopté formellement, constitue a minima une orientation de la part de la Commission Européenne. Cette communication mène à supposer que la Commission souhaite concentrer une réduction plus importante sur la décennie 2030-2040 que sur la suivante, sachant que la dernière portion de réduction sera la plus difficile/couteuse. Un objectif de réduction situé entre -85% et -90% pour 2040 à l'échelle de l'UE permettrait de répartir la réduction sur base d'une clé 2/3 - 1/3 entre les 2 décennies (62% + 2/3 x (100% - 62%) = 87,3%).

En ce qui concerne la réduction des émissions ETS au niveau national, la CREG considère que la proposition d'Elia et de Fluxys devrait se baser sur une analyse de merit order des coûts d'abattement des émissions par secteur d'activité, évaluée à l'échelle de l'union pour en déduire des conclusions spécifiques au périmètre belge. A défaut, la CREG préconise de se baser sur les résultats de l'étude «Scenarios for a climate neutral Belgium by 2050 » (Vito et DG Environnement, 2021).

66. En ce qui concerne les émissions ESR à l'horizon 2040: comme pour l'objectif ETS 2040, à défaut d'autre narratif une répartition des réductions sur base d'une clé 2/3 - 1/3 entre les décennies 2030-2040 et 2040-2050 semblerait raisonnable.

	67. En ce qui concerne les émissions ETS et ESR à l'horizon 2035: à défaut d'autre narratif la CREG trouverait pertinent d'appliquer une interpolation linéaire entre les objectifs 2030 et 2040.
FEBELIEC	ETS Targets Febeliec underlines that the EU Emissions Trading System (ETS) functions with a European-level cap. Introducing national ETS targets would undermine this efficiency and should be avoided.
ENGIE	The scenarios presented for consultation illustrate this imbalance. All three proposed scenarios (ELEC, MOL, BASE) would result in Belgium (i) missing its ESR target (-47% by 2030 compared to 2005) and (ii) showing no alignment with the EU ETS reduction pathway (-62% by 2030 compared to 2005). Moreover, the electricity scenarios and sensitivities make no reference to GHG reduction targets, while the molecules scenario (CENTRAL) does assess supply sufficiency in a net-zero context (p.15).

ANSWER

Regarding a delayed transition scenario

Some stakeholders inquired the addition of lower ambitions/delayed transition and/or the inclusion of less ambitious assumptions regarding the uptake of certain low carbon solutions (e.g. new technology developments).

Fluxys and Elia fully acknowledge and understand these concerns. However, the framework of the TEN-E Regulation (EU) 2022/869, Transmission System Operators (TSOs) does not foresee the framework to develop or use scenarios that are not aligned with the EU's 2050 climate neutrality objective in the context of the Ten-Year Network Development Plans (TYNDPs).

As such, scenarios that imply a slower uptake of low-carbon technologies or a delayed transition would not be compatible with the requirements of the TEN-E framework that is to be used in this exercise.

Regarding the general approach of scenario creation

As stated previously, Elia and Fluxys would like to emphasise that the approach followed in the development plan is also a bottom-up approach, based on the publicly available information, historical trends and confidential data shared by their customers.

Indeed, when it comes to the shorter-term projections (2030 and 2035), Elia and Fluxys would like to clarify that bottom-up information was used as much as possible. Elia continuously surveys its direct clients when it comes to load projections (load

management exercise) and also has information regarding contracted and requested connection capacities. This information is enriched by survey data which Fluxys in turns receives from their clients regarding the expected supply/demand of hydrogen and CCUS uptake. For DSO-connected industries, the EnergieGRIP study (Flanders) forms a basis for quantification as well as Plan de Puissance (Wallonia).

These scenarios are then expanded until 2040-2050 based on assumptions derived from other publications, inhouse optimisation studies, bilateral discussions with industrial players and sectoral federations and the workshop on industry during the Task Force Multi-Energy Scenarios. The uncertainty in speed and final goal of the transition is large, an ELEC and MOL scenario were added to explore two reasonable extremes next to the BASE scenario.

Regarding 2030 target for ESR

The latest consolidated NECP has been published on the 6th of October 2025. This document clearly states that -47% target for the ESR sector (compared to 2005) does not need to be met. Indeed, this target is not solely assessed based on emissions in the year 2030. Instead, it is a cumulative obligation over the entire period from 2021 to 2030, based on an allocated emissions budget.

Belgium argues that although its projected emissions in 2030 fall short of the annual target, the country will still meet the overall ESR obligation because it emitted less than expected between 2021 and 2024. These lower emissions were largely the result of warm winters and external crises (including the COVID-19 pandemic, the war in Ukraine, and the energy crisis) which led to reduced mobility, economic activity, and energy consumption.

Thanks to this early reduction, Belgium has effectively created an emissions buffer. This allows it to justify slightly higher emissions in the later years of the decade, including in 2030, while still remaining within the EU's legally binding carbon budget for the full 10-year period.

The validated target for 2030 of -42.7% corresponds to the aggregation of the regional targets (i.e. -40% for FL, -47% for WL and -47% for BXL).

Regarding an additional scenario reaching 2030 targets

In the updated scenario report, Elia and Fluxys outline and examine various potential measures that could help to narrow the gap between the calculated emissions and the established targets for 2030. However, determining which specific measures should be prioritised, along with assessing their associated costs, is not the responsibility of Elia or Fluxys. Such decisions are the responsibility of the relevant authorities, who must establish and implement the necessary policies in the immediate future.

Regarding additional decarbonisation options/measures (in general)

Elia and Fluxys have repeatedly highlighted the potential for deploying further decarbonisation measures to reduce greenhouse gas emissions. Nonetheless, it is not Elia and Fluxys' responsibility to set priorities for these measures or to calculate their respective costs. To facilitate informed discussion, Elia and Fluxys offer supplementary insights into the potential of various decarbonisation options, such as biomethane, carbon capture and storage (CCS), and biofuels. The ultimate decision regarding which measures to prioritise and implement rests with the competent authorities. Given the challenge of meeting the established targets, Elia and Fluxys recommend making full use of all available decarbonisation options within Belgium.

Regarding the ETS target at Belgian level

Taking into account the input received from this public consultation, as well as the discussions held during the supply/GHG workshop, the decision has been made not to set any further targets for ETS emissions at the Belgian level. Stakeholders have emphasised several times that the EU ETS operates as a market-based system with a cap established at the European Union level, and therefore, it does not stipulate national-level targets. Moreover, it is not the responsibility of Fluxys or Elia to develop new methodologies to define a potential Belgian ETS emissions target based on a merit order analysis of EU-wide CO2 abatement costs.

Regarding 2035 and 2040 targets for ESR

In the absence of, currently, further direction from the competent authorities, targets for 2035 and 2040 will not be set in the proposed scenarios.

Regarding 2050 net zero targets

Although the 2050 greenhouse gas target falls outside of the scope the TYNDP's development, Elia and Fluxys appreciate essenscia's clarification concerning the net zero objectives for 2050. Please find below the revised summary, highlighting the updated emission targets (with changes indicated in blue):

Climate policy instrument	Level	2030	2040	2050
Effort sharing regulation (Non-ETS)	Belgian	-42.7% Compared to 2005 (New)	Not yet specified	Not yet specified
Effort sharing regulation (Non-ETS)	Flanders	-40% Compared to 2005	Not yet specified	Net zero @ EU level
	Wallonia	-47% Compared to 2005	Not yet specified Interpol = -73.5%	Net zero @ WL level
	Brussels	-47% Compared to 2005	-69% Compared to 2005	Net zero @ BXL level
EU - ETS	European	-62% Compared to 2005	Not yet specified	Global (ETS I/II + ESR) Net zero target @ EU level
EU - ETS 2	European	-42% Compared to 2005	Not yet specified	
Total GHG	European	-55% Compared to 1990	-90% Compared to 1990	Net zero @ EU level

Validated Proposal

Regarding CCS

Numerous stakeholders have requested an assessment of CCS (Carbon Capture and Storage) pathways, with a particular focus on estimating the associated electricity demand. In the short term (2030–2035), these pathways are informed by bottom-up data provided by Elia and Fluxys clients, reflecting their communicated intentions regarding CO_2 capture volumes and the corresponding electricity needs. For the longer term (2040–2050), this data is complemented by a top-down approach, where scenario storylines guide assumptions about the share of residual emissions to be captured. Additionally, external studies have been consulted to estimate the CCS potential towards 2050, helping to refine and validate the long-term projections. As a result, the updated scenario report proposes a single CCS pathway per scenario, integrating both internal stakeholder input and external study insights.

Regarding the emissions associated with the power sector

Within the scenarios, an initial estimate for emissions from the power sector has been used, based on findings from Elia's Blueprint study. It is important to highlight, however, that this figure is subject to change and will be updated when running the market and network simulations.

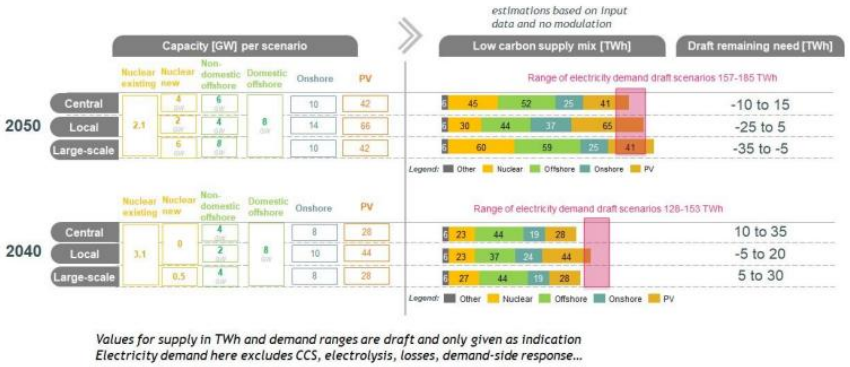
10. Comments on the market modelling of the electricity system

10.1 General comments on the market modelling of the electricity system

General comments

Stakeholder	Feedback received
BBL - Canopea	Mieux étudier la limitation du curtailment des renouvelables. Nous estimons que le plan ne semble pas suffisant pour réduire le curtailment des renouvelable en stimulant la flexibilité de la demande, le stockage et l'interconnexion avec d'autres pays. Il est possible de promouvoir et d'intégrer la flexibilité non thermique par rapport aux combustibles fossiles dans la mesure du possible et d'étudier l'impact de l'électrification de la demande de chaleur à basse température dans l'industrie pendant les heures où les prix sont négatifs. Nous estimons qu'un des but de des scénarios doit être d'accroître la transparence sur les niveaux actuels de curtailment afin de mieux informer les investisseurs potentiels et de promouvoir les développement des solutions.
CREG	9. La méthodologie proposée dans le document de consultation (cf. Section 1.8) vise la simulation d'un nombre plus restreint d'années climatiques pour le Plan de Développement Fédéral que ce qui a été fait pour l'étude d'adéquation 2026-2036. La CREG tient à attirer l'attention sur le fait que même si le nombre d'années climatiques influence principalement les résultats des études d'adéquation et dans une moindre mesure les résultats du Plan de Développement Fédéral, le choix des années climatiques pourrait néanmoins influencer les résultats. En effet, l'ensemble de 200 années climatiques inclut certaines années climatiques « extrêmes » dont la probabilité d'occurrence est faible. Ces années climatiques « extrêmes » peuvent influencer les résultats d'adéquation. Cependant, le nombre de simulations élevées dans l'étude d'adéquation implique qu'une année climatique n'aura pas une influence significative sur l'ensemble des résultats de l'étude. Pour le Plan de Développement Fédéral, le choix d'un nombre restreint d'années climatiques pourrait influencer de manière non négligeable les résultats des simulations de marché si le poids relatif des années climatiques « extrêmes » change.

	La CREG ne peut donc se prononcer sur la pertinence de la méthodologie utilisée sans avoir plus de détails sur la sélection des années climatiques parmi l'ensemble de 200 années climatiques utilisées dans l'étude d'adéquation. La CREG estime nécessaire que la méthodologie de sélection des années climatiques utilisées soit clairement détaillée, en particulier quant aux critères retenus pour cette sélection, et que son impact potentiel sur les résultats du Plan de Développement Fédéral fasse l'objet d'une analyse approfondie, afin d'assurer la cohérence des résultats. Par ailleurs, compte tenu de l'équilibre à trouver entre la charge de calcul informatique (limitant le nombre d'années climatiques à sélectionner), la robustesse statistique (nécessitant un échantillon d'années climatiques suffisamment large) et la représentativité du climat sur l'horizon temporel étudié (en évitant d'inclure des années climatiques peu représentatives vu le dérèglement climatique en cours), il apparaît essentiel d'avoir plus de détails sur la méthodologie suivie.
EDORA	**Section 1.5 : Data for other countries** Il nous semble que la façon dont l'importation d'électricité sera prise en compte dans les simulations n'est pas claire (quoiqu'il en soit des scénarios en cours d'élaboration dans les pays voisins).
Vlaamse Nutsregulator	In de publieke consultatie wordt eveneens een afzonderlijke bijlage met een methodologische bespreking van flexibiliteit geconsulteerd. Gezien bovenstaande bespreking is het voor de Vlaamse Nutsregulator niet duidelijk welke rol deze methodologische bespreking van flexibiliteit speelt in deze eerste stap 'Multi-Energy Scenario's' van het gehele netontwikkelingstraject, die als voornaamste doel heeft om jaarlijkse (verbruiks)hoeveelheden vast te leggen op nationaal niveau. Flexibiliteit betekent zeker niet (altijd) dat er minder energie verbruikt wordt, maar veelal dat deze verschoven wordt naar een ander tijdstip of een andere energievector. Wat betreft netontwikkeling (in tegenstelling tot adequacy) ziet de Vlaamse Nutsregulator de inbreng van flexibiliteit dan ook vooral maar als zinvol ná het proces van lokale redistributie. Uit de bespreking in paragraaf 3.11 'Indicative supply-demand balance' begrijpt de Vlaamse Nutsregulator dat flexibiliteit ook effectief nog geen rol speelt in de indicatieve energiebblans van 'figuur 3-9' (zie onderstaande Figuur 2), die de uitkomst vormt van de 'Multi-Energy Scenario's'. Het lijkt de Vlaamse Nutsregulator zinvol om verder te verduidelijken waarom een methodologische bespreking van flexibiliteit toch reeds is opgenomen binnen deze publieke consultatie, die de uitkomst vormt van de eerste stap 'Multi-Energy Scenario's'.



Figuur 2 - Publieke consultatie Figure 3-9 Overview of draft proposed electricity supply scenarios for Belgium

ANSWER

On the curtailment of renewables

BBL – Canopea comments that the curtailment of renewables should be explicitly considered when simulating the scenarios for the development. Such indicators, also called 'RES integration' by the ENTSO-E methodology was reported in the previous plan when assessing the benefits of interconnections.

On the exchanges of electricity with neighbouring countries

Elia confirms to Edora that a Europe-wide model incorporating a modelling of in-and exports will be included in the upcoming federal development plan for the electricity transmission grid 2028-2038. To model the grid, a flow-based methodology (as described in the electricity modelling details document included in the present consultation) will be used. This approach could be complemented with other approaches (e.g. NTC or simpler flow-based modelling). Concerning the data used for other countries Elia proposes to base itself on the draft ENTSO-E/ENTSO-G TYNDP 2026 scenarios as described in the report under consultation. However several updates to the data used or additional scenarios (e.g. different mix of PV/wind, different fuel/CO2 prices) could be considered for certain analysis.

On the amount of climate years to simulate

CREG requests clarity on the amount of climate years simulated and the methodology chosen to select them, highlighting that a good balance must be found to keep calculation times acceptable. Elia agrees with the CREG and confirms this is the reason that a clustered set of climate years was simulated for the previous federal development plan. To foster transparency, Elia proposes to share the methodology which will be used

to select the climate years as a methodological attachment to the final Federal Development Plan.

Finally, for context, Elia would like to highlight that three climate years are simulated at European level for the ENTSO-E Ten-Year Network Development Plan, indicating that the simulation of a reduced set of climate years is acceptable.

On the inclusion of the flexibility modelling methodology in the public consultation

Elia would like to stress that flexibility of electric vehicles, heat pumps and batteries are expected to take an increasingly important role in the electricity system. As the values proposed for flexibility in the consultation are inherently connected to the methodology used to simulate the electricity grid, the present document gives stakeholders the opportunity to react on that methodology.

11. Conclusions and next steps

Elia and Fluxys would like to extend their sincere thanks to all participants for their engagement in this public consultation. The feedback received was carefully reviewed and changes applied to the proposed scenarios. Fluxys and Elia provided topic-specific responses and, based on this input, updated the scenario report to be shared with the authorities and the minister. This updated scenario report can be found on the Elia and Fluxys websites[10] together with this consultation report. Once the minister has taken a position on the scenarios, they will be used for the federal electricity and hydrogen development plans.

12. Attachments

The reactions received to the document submitted for consultation from the following stakeholders can be found on Elia and Fluxys websites[10] together with this consultation report:

- Alfaport VOKA
- BBL Canopea
- Belgian Hydrogen Council
- Belgian Offshore Platform
- Bnewable
- BSTOR
- COGEN
- CREG
- EDORA
- ENGIE
- Essenscia
- EV Belgium
- FEBEG
- FEBELIEC
- Fevia
- Gouvernement wallon
- Karno.Energy
- negaWatt
- ODE Vlaanderen
- ORES
- TotalEnergies
- Vlaamse Nutsregulator
- Vlaamse Regering

In addition, an updated version of the scenario report is also attached.