

# WG Adequacy #16

17 February 2023

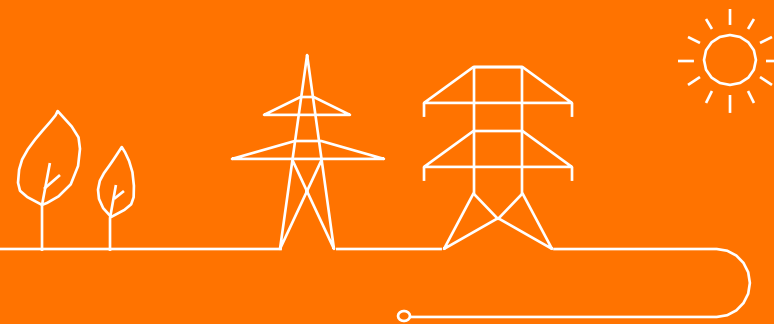


## Agenda

- Welcome
- AdeqFlex: Public Consultation Report
- Design info sessions
- Go-to-Market Implementation Timeline
- PQ CMU evolution in time philosophy
- Updates from Cabinet
- Next meetings



# AdeqFlex: Public Consultation Report



## Feedback on public consultation

17.02.2023

# Adequacy and Flexibility Study for Belgium

2023-2034



## 1. Context of the Adequacy & Flexibility study (timeline, process, regulatory framework)

## 2. Feedback received on input data and updated scenario

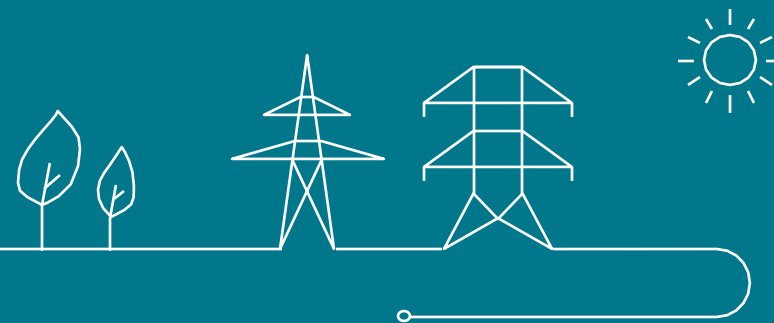
- Renewables
- Storage
- Thermal fleet
- Demand & DSR
- Other countries
- Outages
- Fuel & CO2 prices and Investment costs

## 3. Feedback received on methodology

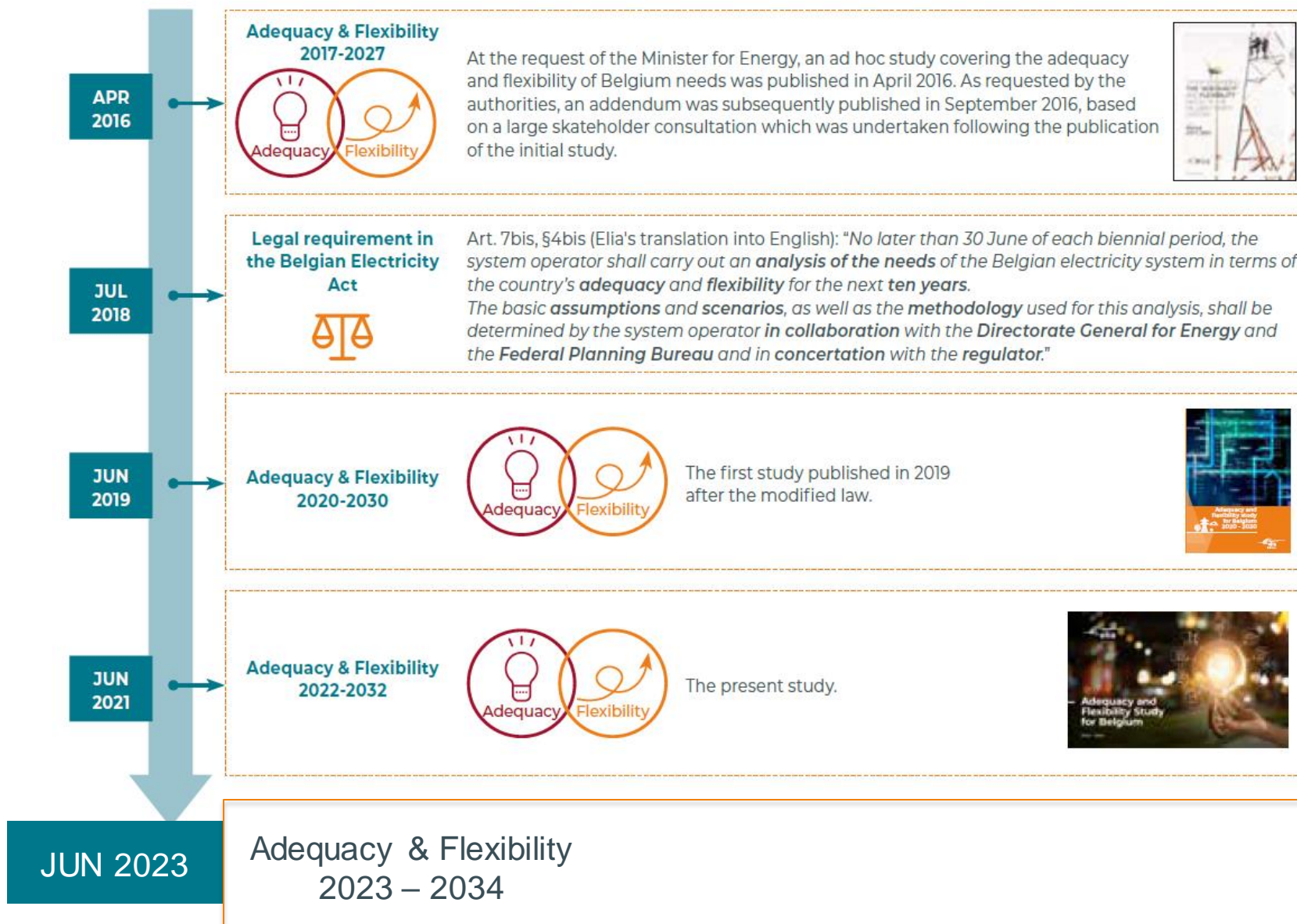
- Adequacy methodology
- Economic Viability Assessment
- AFRY study
- Short-term flexibility study (method and assumptions)

## 4. Sensitivities

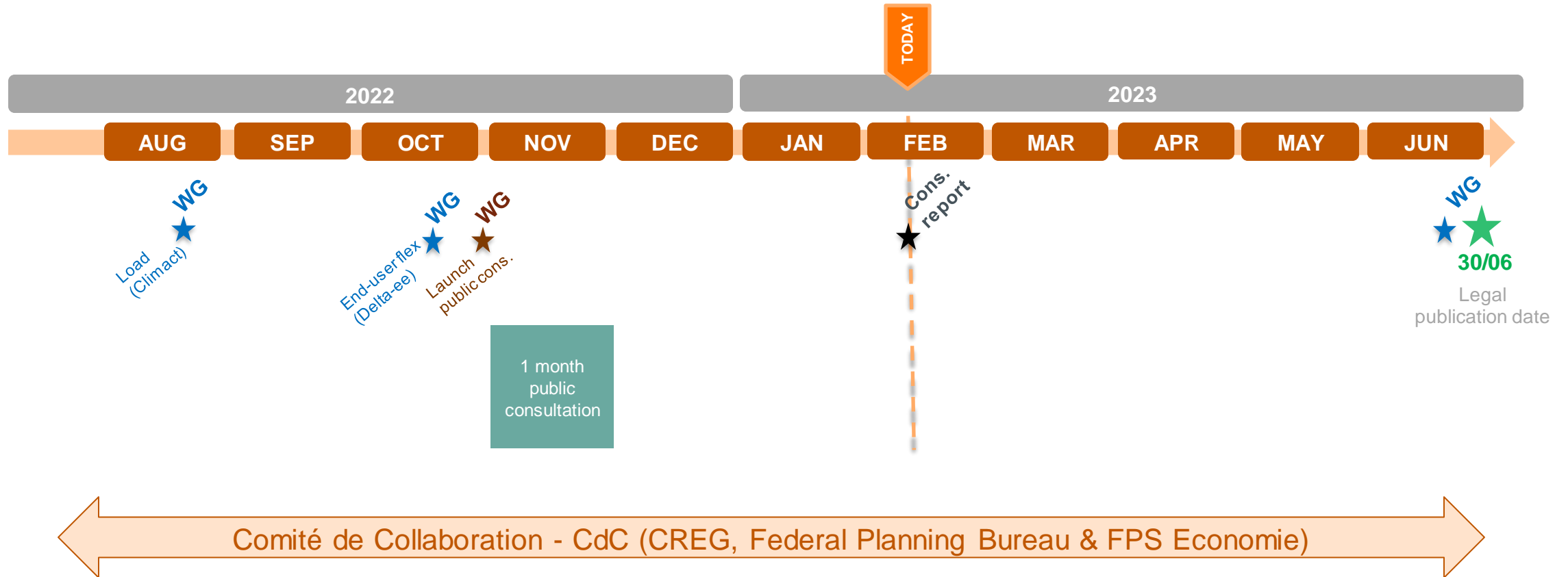
# Context of the study



# Belgian legal & regulatory framework related to this study



# High level timeline of the study delivery



Note that although not mentioned on this slide, the scenario process for the 'Low Carbon Tender' (W24-25) is integrated in the study delivery.





From 28/10 until 28/11/2022 6 PM

## WHAT ?

### – Data:

- Any feedback is welcome on the proposed values for the CENTRAL scenario

### – Sensitivities:

- As for the previous study, we are open for quantified suggestions for sensitivities from stakeholders. Those will be further analyzed within the CdC to be taken into account in the study.

### – Methodology:

- The methodology is also part of the public consultation. Any comments or suggestions are welcome taking into account the existing regulation on adequacy studies

### – Specific data for the LCT:

- Additional parameters required in the framework of the LCT for winter 2024-25 are also provided

# Overview of documents and submitted to public consultation



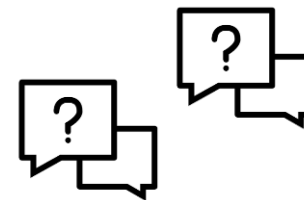
- Document providing explanations on the input data
- Excel file with detailed input data
- **9** comprehensive methodology appendices
- Separate document focusing on 2024-25 for the LCT



- AFRY study on fixed costs of existing units
- DELTA EE study on residential and tertiary future flexibility
- N-SIDE study on forced and planned thermal plant outages
- Prof. K. Boudt study on the WACC and the hurdle premiums

# Feedback received to public consultation

*Elia thanks all the stakeholders for the feedback received.*



## 12 stakeholders with non-confidential feedback

- Febeliec
- Fluxys
- FEBEG
- CREG
- Sebastien Gonzato (KUL)
- Johan Springael (Universiteit Antwerp)
- Pierre Kunsch (ULB)
- Citizen Task Force – Groupement de Citoyens Belges Inquiets
- 100TWh
- Keep The Lights On
- Maxime de Changy (independent expert)
- Organisatie Duurzame Energie

## + 3 stakeholders with confidential feedback

*The non-confidential feedback are attached to the consultation report that will be published on Elia website*

## More than 200 comments

Input data / Generation	32
Input data / Total electricity demand	23
Input data / Demand Side Response	10
Input data / Economic and technical variables	17
Input data / Grid & Flow based domains	9
Input data / Data for other countries	10
Input data / Other topics	11
Methodology / General	10
Methodology / Cross-border exchanges	10
Methodology / Other topics	11
Economic Viability Assessment	20
AFRY study - cost of capacity	25
Assessment on short-term flexibility	5
General comments	12

## Today's objectives



- Presenting **reality checks** and **updates** performed early 2023 as promised by Elia;
- Presenting **consultation report** in a **transparent** and **comprehensive** way while covering **most of the answers** given;

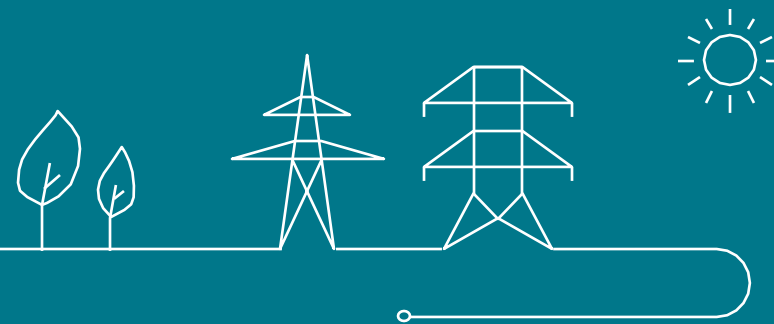


- It is however **not possible** to go **through each** of the 200 feedback/answers of the report;
- Elia refers to the consultation report that will be made available on Elia's website

# General feedback

- The **current context** adds several **uncertainties** on the future assumptions one can make. Several assumptions (e.g. prices) are experiencing high volatility.
- Despite this, Elia did submit numerous and detailed information to the public consultation, ensuring a **scenario dataset** that is as **complete** as possible.
- Elia understands the **timing was short** in view of the **numerous detailed documents** submitted to consultation (first time Elia consulted on the full methodology). However, launching the **consultation earlier** would result in **outdated data** and/or methodology given the current rapidly changing context. Unfortunately, it is also **not possible to extend** the public consultation period without risking the timely implementation of the study.
- As promised, Elia performed a “**reality check**” **beginning of 2023** in order to take into account developments that happened in 2022 but that were not yet known (e.g. the amount of PV installed in 2022 or the amount of EV sales). It is important to note that values for 2022 are still estimates as final data are usually not available.
- Regarding **new information** that might come **later**, Elia will always do **its best** to take it into account. It should be noted that a **trade-off** will however have to be made between **respect of the timing** and the **added value** of such update.

# Feedback on input data



# Overview of input data



**Renewables**



**Storage**



**Thermal generation**



**Electricity demand (EV, HP, industry electrification & DSR)**



**Data for other countries**



**Fuel & CO2 prices**



**Outages**



**Investment costs**



# Overview of input data



**Renewables**



Storage



Thermal generation



Electricity demand (EV, HP, industry electrification & DSR)



Data for other countries



Fuel & CO2 prices



Outages



Investment costs





# Renewables energy sources

## General feedback received

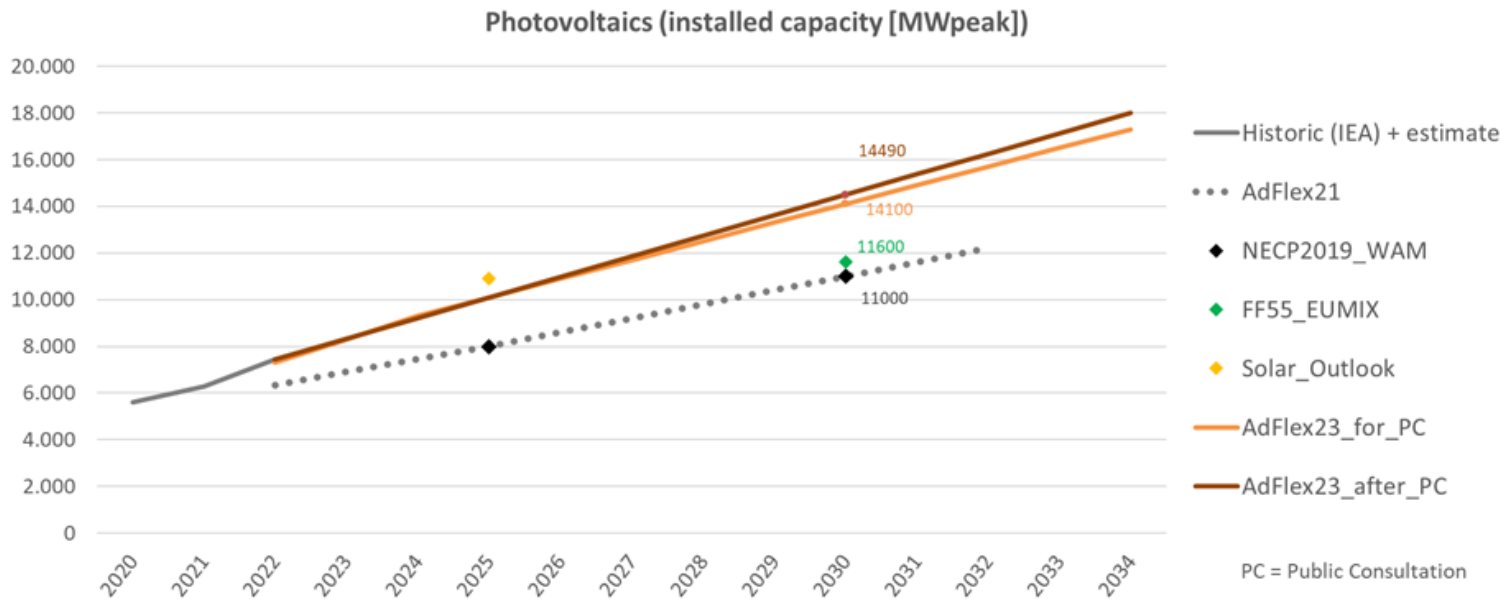
- **Many comments** from **citizen groups and researchers** on the **high/unrealistic assumptions** regarding PV and onshore wind, e.g. qua available ground (onshore wind) and qua available critical raw material [[Citizen Task Force](#), [Pierre Kunsch \(ULB\)](#), [100TWh, Keep The Lights On](#)];
- **FEBEG** believes the **NIMBY-effect** - and in particular the delaying effects of the appeal procedures - should unfortunately not be underestimated. **FEBEG** would welcome a **lower RES sensitivity**;
- On the contrary, **CREG** believes that a slow-down of PV installation rate after 2024 is not compatible with electrification assumptions. **CREG** recommends +1000 MW/year, **ODE** proposes +/- 1500 MWp/year for 2023. **Febeliec** would expect an increased PV target by 2030 for Flanders.

- Elia recalls that the '**base**' scenario follows the **latest official ambitions**. In absence of official update of the National Energy and Climate Plan (NCEP), the updated trajectories are based on **exchanges with the regions** and **data reported by DSOs** on the existing capacities.
- One major concern that is shared by Elia is the **availability of critical raw materials** that are required for many technologies. It is expected that Europe will take actions, amongst others through its Critical Raw Material Act, towards a more resilient raw materials supply chain. A **sensitivity** assessing the potential impact of such shortage on **RES development** but also **storage means** (EV, small and large scale batteries) could be studied.
- Regarding the land availability for onshore wind and the NIMBY effect, Elia understands the point of view and agrees that it should not be neglected. More generally, Elia understands that the RES trajectories can be seen as **optimistic** as **many factors** come **into play** and can alter the realized evolutions. Elia agrees that **sensitivities** with lower/higher RES trajectory can be added.



# Photovoltaics

Proposed updated PV trajectory for the 'CENTRAL' scenario, after exchanges with the regions and DSOs on realized 2022 installed capacity and future trajectories.

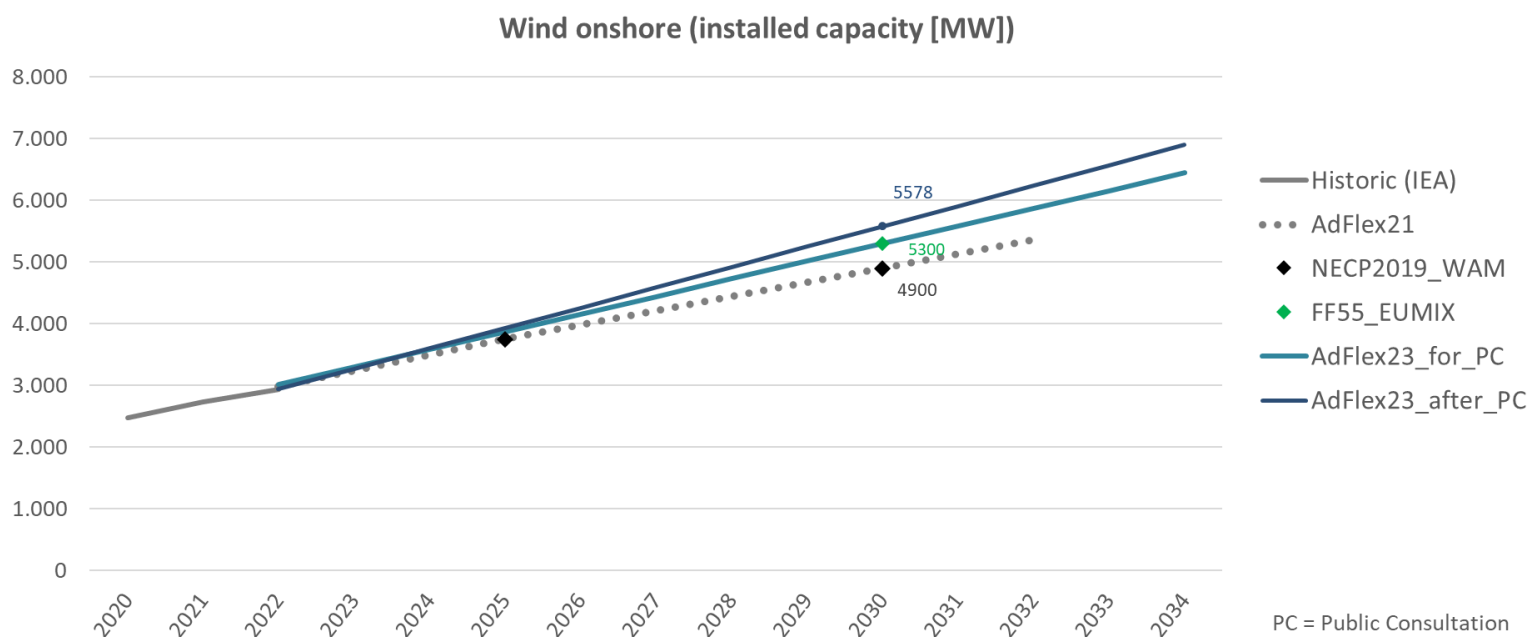


## Updated assumptions on the yearly increase:

- Wallonia: +400 MW/yr until 2030 to reach draft **PACE** estimated target (Plan Air Climat Energie) with 5 GW by 2030;
- Flanders: +450 MW/yr for 2023 (official **target for 2023**, same value is kept for later years). It leads to 9 GW by 2030;
- Brussels: +30 MW/yr reaching 470 MW by 2030 (capacity double compared to 2022 values);

# Onshore wind

Proposed updated onshore wind trajectory for the 'CENTRAL' scenario, after exchanges with the regions and DSOs on realized 2022 installed capacity and future trajectories.

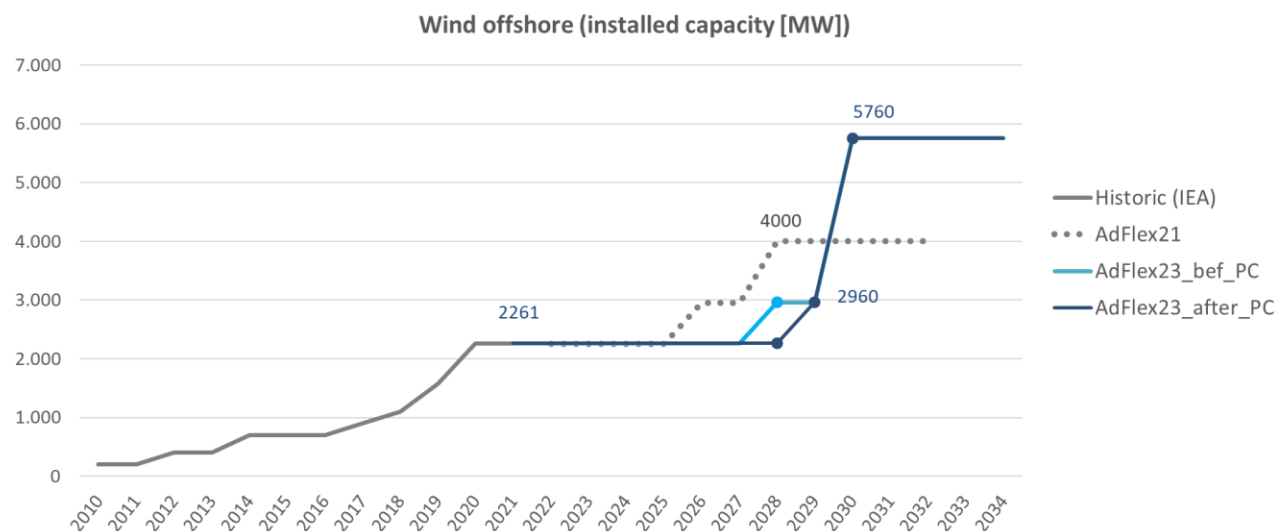


## Updated assumptions on the yearly increase:

- Wallonia: +180 MW/yr until 2030 to reach draft PACE (Plan Air Climat Energie) estimated target of 2,7 GW;
- Flanders: +150 MW/yr for 2023 official **target for 2023**, same value is kept for later years). It leads to 2,9 GW by 2030;

# Offshore wind

Questions were raised on the **capacity considered** for MOG II project that wouldn't be compatible with available space in North Sea [Pierre Kunsch] and on the **planning** and impact of delays on Ventilus & Boucle du Hainaut [FEBEG, Maxime de Changy],



**Proposed update of the trajectory of MOG2 (3500 MW), considering +700 MW by 2029; +2800 MW by 2030.**

- Elia confirms that it is a range between 3,15 GW and 3,5 GW that is mentioned by SPF Economy. This means that the grid infrastructure needs to be ready for 3,5 GW (as approved by the Council of Ministers in Dec. 2021). Elia proposes to consider the **full 3.5 GW**, which leads to a total capacity of 5761 MW by 2030.
- Elia is not responsible for assessing if the foreseen capacity is compatible with the available space in the Belgian EEZ in the North Sea.
- On 03/02/2023, SPF Economy published an **updated planning for MOG II**, based on which Elia proposes to consider **+700 MW by 2029** (first wind turbines are foreseen for Q4 2028 but not yet in operation) and **+2800 MW by 2030**.
- Elia agrees that Ventilus and Boucle du Hainaut are crucial for the evacuation of the electricity produced in the North Sea. Elia considers relevant to perform a **sensitivity** on potential **delays of MOG II**.

# Overview of input data



Renewables



**Storage**



Thermal generation



Electricity demand (EV, HP, industry electrification & DSR)



Data for other countries



Fuel & CO2 prices



Outages

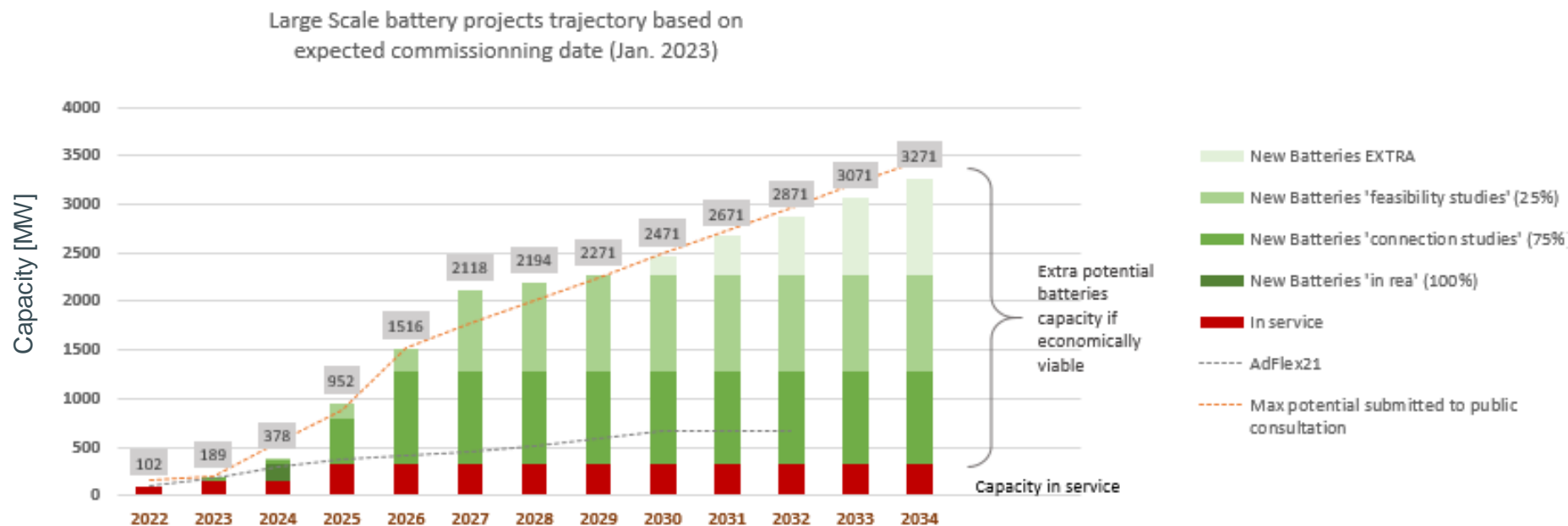


Investment costs



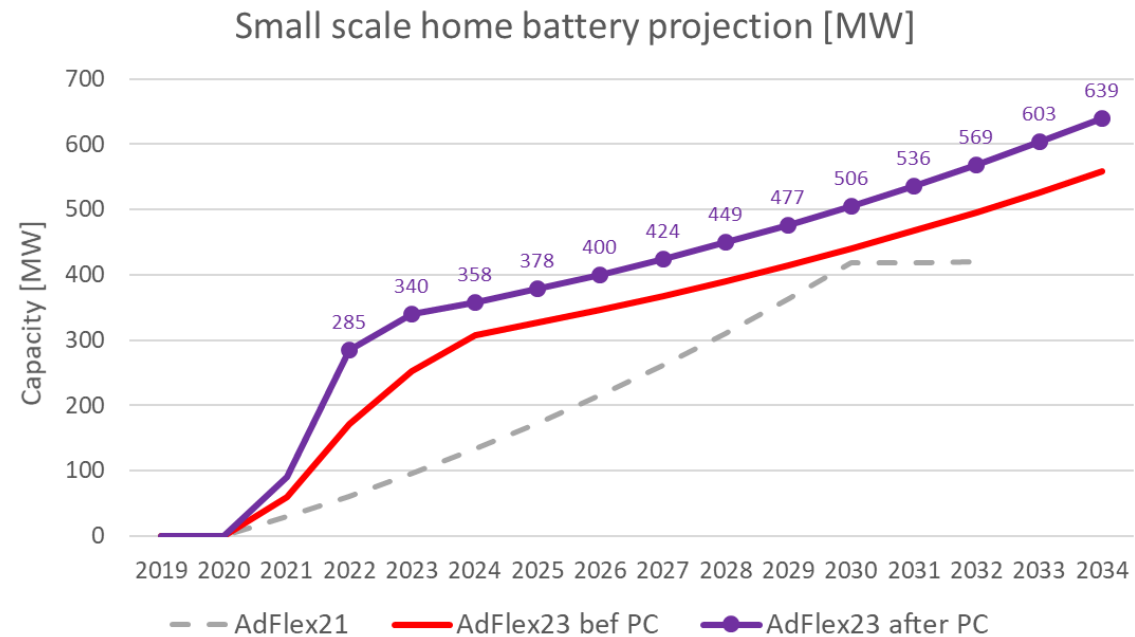
# Large scale batteries

- CREG considers the approach too conservative (no 'feasibility' project in 2024, only positive EVA projects) and asks for more info on duration assumptions (energy content). FEBEG considers it is highly ambitious as there is no guarantee for the projects to materialize. FEBEG would welcome a sensitivity (compared to the base-case scenario which for which the values should already be lowered).



- By considering **percentage** of total capacity, Elia accounts for the fact that there is **no guarantee** for these projects to materialize.
- Updated **capacity** trajectory based on **latest projects status** (e.g. some projects were abandoned, some were shifted due to revision of best case commissioning date)
- Updated **energy** trajectory following stakeholder feedback, based on
  - BloombergNEF data for "In service" capacity;
  - Considering small existing batteries are of 2 hours;
  - Considering any new battery project to be of 4 hours;

# Home residential batteries



The updated trajectory (after public consultation) is based on the following assumptions:

- Update of the **realized installed capacity** for 2022 based on available **Fluvius data** (+ assuming jump in December 2022).
- Update of the **future trajectory** based on **changes in subsidy** scheme in Flanders which ends sooner than initially foreseen (end by March 2023).
- For later years, the following assumptions are kept
  - Each year, an additional capacity equivalent to 0.2% of the existing PV capacity in MW is installed.
  - **2 hours** per battery.

# Overview of input data



Renewables



Storage



**Thermal fleet**



Electricity demand (EV, HP, industry electrification & DSR)



Data for other countries



Fuel & CO2 prices



Outages



Investment costs





# Thermal generation

- **CitizenTaskForce** and **Keep The Lights On** asks if the study can recommend to delay some closures and if it can consider delay of new units. KTLO feels like nuclear is omitted by Elia.
- **CREG** wonders if the effective precise decommissioning dates are considered in the simulations.

- Elia applies latest policy decisions (for existing and new units), based on **announced closure dates** from **legal documents** (either article 4bis notifications or data published through REMIT).
- Elia's recommendation on identified capacity requirements are always expressed as **volumes of 100% available** capacity, and are as such **technology neutral**.
- Elia takes **precise decommissioning date** in consideration within the simulation.

- **FEBELIEC** considers assumptions are very conservative for nonCIPU capacity (based on known projects)

- Elia believes it is **more realistic** than very conservative as it integrates known future projects but **without considering potential decommissioning**. It is difficult to predict CHP capacity (stop of subsidy in Flanders but can still participate to CRM). Therefore reference scenario **assumes all capacity will stay in the market**. Reality checks leads to 1600 MW CHP non-CIPU by 2027. Sensitivities could be performed.
- Elia clarifies that **diesel generators** and emergency generators are included in **DSR shedding** if they **participate to the market** via the quantification of the existing market response which serves as basis for the DSR shedding estimates.



# Thermal generation - sensitivities

- **FEBEG** would welcome a sensitivity on **availability of gas-fired power plants in case of strict CO2 emissions'** limits in the CRM (current rules – proposed trajectory (if known at the time) – ambitious trajectory).
- **Febeliec** wonders whether no **sensitivity** should be added with **additional nuclear** availability in Belgium.

- A **sensitivity on gas capacity** can be included, although for the moment, given that those stricter CO2 emissions limits in the CRM are not yet known, Elia will need to make assumptions on the level to be applied.
- Regarding the availability of the **nuclear fleet in Belgium**, sensitivities can be performed
  - The **reference scenario** considers the agreement announced on the 09.01.2023 between the Belgian government and Engie, namely the **10 years extension of Doel 4 and Tihange 3**, with both parties doing their best for a start in November **2026**;
  - Several **sensitivities** around the base scenario could be performed, such as
    - A **delay in the extension** that would start later than November 2026 as the timing for the extension is tight;
    - As mentioned in the press, a sensitivity could consider a **short (e.g. 1-year) extension** of some units during winter 2025-26, thanks to fuel savings during the summer.

The above proposal is subject to change if other information becomes available in the coming weeks.











# Thermal generation – additional changes

- **Zandvliet Power:** a capacity of **419 MW** will be considered as of November 2024 (published on REMIT data).
- **Vilvoorde**
  - Adapted capacity of Vilvoorde ST to 105 MW (and not 121 MW) (keep decommissioning date 01/04/2023);
  - Adapted capacity of Vilvoorde GT to 255 MW (and not 360 MW) (keep decommissioning date 31/10/2025);
  - Efficiency of 52% until 01/04/2023, efficiency of 37% after (OCGT modus).
- **Seraing**
  - Adapted decommissioning date of Seraing TGV (from Oct. 25 to 18/04/2024) based on Art 4bis letter;
  - Efficiency of Seraing GT1 & GT2 switch from 52% to 37% when Seraing TGV closes (OCGT modus);
- **Awirs new CCGT:** name adapted to “Flémalle” and efficiency of 61% for the 2 newest CCGTs (Flémalle and Seraing NEW).
- **Borealis Kallo:** adapted commissioning date to June 2024 (not for winter 2023).
- Review of **CHP units efficiencies** and CHP credit to ensure coherence with heat produced (overall efficiency will always be set to 90%).
- Variable O&M (**VOM**) used in the simulations are based on **JRC/ENTSO-E** data (see consultation report for more info) as in previous Adequacy & Flexibility study of 2021. The VOM shown in the submitted Excel file were not the correct one.



# Overview of input data

-  Renewables
-  Storage
-  Thermal fleet
-  **Electricity demand (EV, HP, industry electrification & DSR)**
-  Data for other countries
-  Fuel & CO2 prices
-  Outages
-  Investment costs



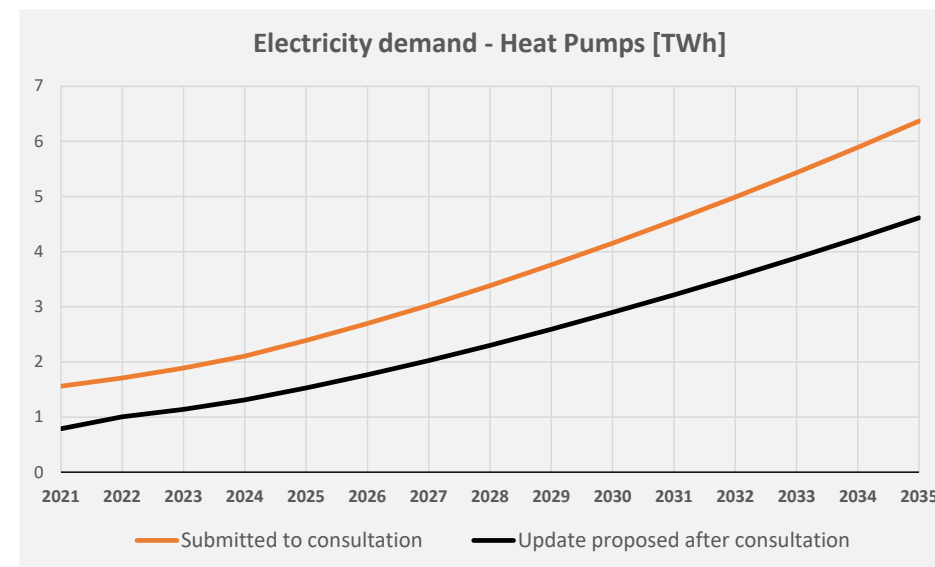
# Update of Heat Pump trajectory

## Updates performed

- Reality check of 2022 data (mainly increase in HP Air-Air secondary)
- Reduced heating demand for new build/renovated based on inputs Fluvius
  - New build ~ EPC A
  - Renovated ~ EPC C
- Heat pumps (secondary) → reduced heating demand to 50% of the building

It leads to a reduced heating demand per building and heat supplied by secondary units lowers the electrical demand

	Unit	Pre PC	Post PC
New buildings	thousand/y	55	55
Renovation rate avg 2022-2035	%	1.00%	1.00%
Average Heating demand - new build	kWh/y	6500	4400
Average Heating demand - renovated building	kWh/y	10 200	8000
Heat supplied by secondary heater	%	~modeled as hybrid HP*	50%
Average Hot water demand	kWh/y	1 600	1 800

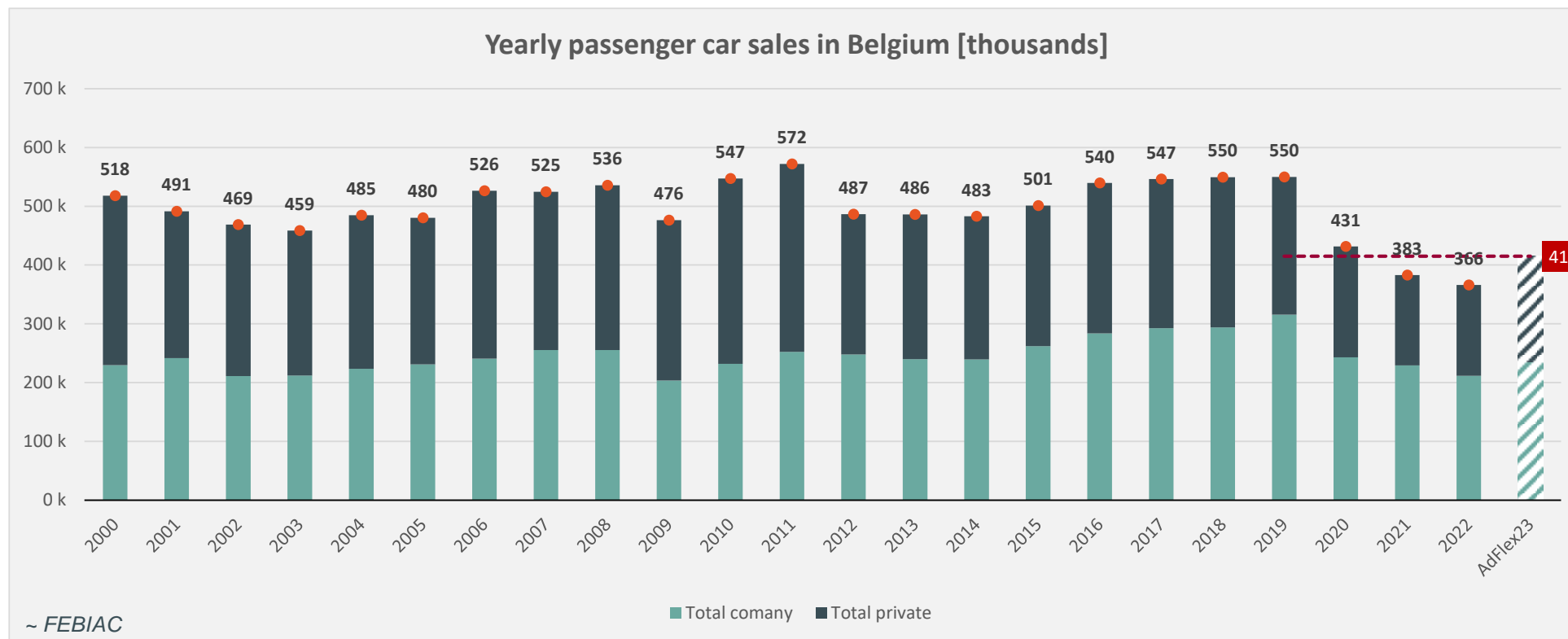


Modeled as hybrid HP: (partial) switch off at <5°C



# Update of Electric Vehicle trajectory

- Lower car sales in 2022 than expected (366k vs 392k estimated in Oct. 2022)
- Elia proposes to keep the average (415k) car sale estimate for 2023-2034 as car sales might recuperate once supply chain issues are overcome (increase in car sale observed in Dec. 2022 and Jan 2023)



Assumption 2023-2034:

- Sale 235 k/year company car
- Sale 180 k/year private car



# Update of Electric Vehicle trajectory

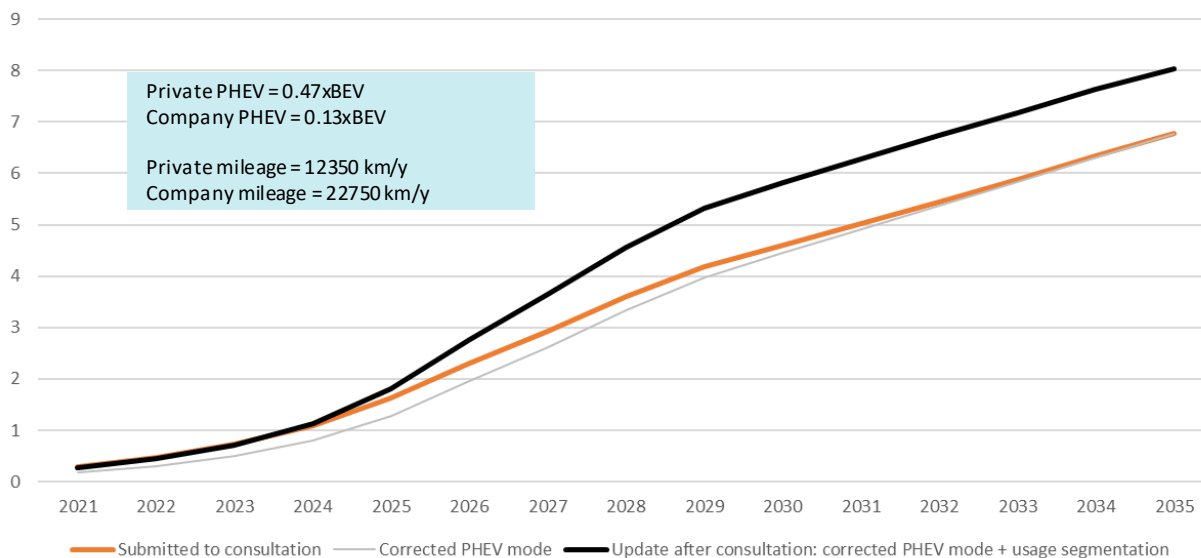
## Passenger EV

As proposed by stakeholder, PHEV (Plug-in Hybrid EV) parameters are reviewed and distinct parameters are considered for private & company cars:

- PHEV is used less in electric mode in company car (reduction of demand)\*
- Company cars are used ~ x2 (km/y) then private car (increase of demand)\*\*

In general it leads to an **increase of electricity demand** as the company car segment is the first to electrify due to a **higher mileage**, compensating the lower electric mode usage of PHEVs)

Passenger cars - Electricity demand [TWh]



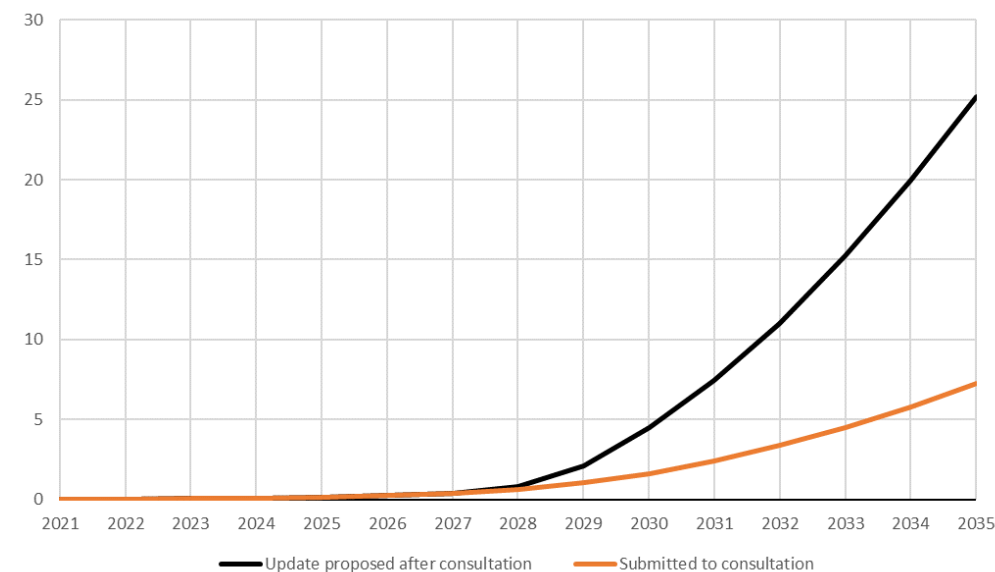
## e-Truck

The uptake post 2027 has been revised upwards to take into account recent increased ambitions in the truck manufacturing sector, but also increased ambitions on EU level.

- European Commission proposal (14/02/2023):
  - 2030: increase from -15% to -45%
  - 2035: increase from -30% to -65%

**No updates for Light Duty Vehicle (camionette) and buses.**

HDV (trucks) - [Thousands units]



\*Using EU average: [Real-world usage of plug-in hybrid vehicles in Europe: A 2022 update on fuel consumption, electric driving, and CO2 emissions - International Council on Clean Transportation \(theicct.org\)](https://www.theicct.org/publications/real-world-usage-of-plug-in-hybrid-vehicles-in-europe-a-2022-update-on-fuel-consumption-electric-driving-and-co2-emissions/)

\*\* Based on FEBIAC info



# Electricity demand

## Model & high-prices impact

- CREG asks several questions (comparison with Federal Development Plan, impact of energy efficiency in organic demand, hypothesis regarding losses).
  - Most Federal Development Plan scenarios were frozen by March 2022, therefore an additional one was done (RePowerEu). Since then, many elements have changed, and it is clear that **electrification has become a central point** within EU and national policies.
  - The **organic demand** is mainly driven by the **tertiary sector** added value, but also influenced by **other factors** such as population growth
  - The **losses hypothesis** are now a separate category (see later).
- CREG and Febeliec comment on the **high-prices** and **delocalization** of the industry from Belgium (“**Make-or-Buy decision**”). CREG believes it should be considered in the reference scenario, Febeliec points out considering industry is staying is not guaranteed. KeepTheLightsOn sees major shortcomings and underestimations in the forecast of the energy demand.
  - The **impact of the high-price on consumption** has been reviewed: it is **also** now considered **for the industry** until prices are coming back to stable levels. Indeed, if the consumption of the industry was not impacted by the high prices this summer (values were even higher than the past 5 years), the impact became visible during the last weeks of 2022 and therefore now also considered.
  - Elia proposes to consider a **lower industry consumption** due to a **delocalization** of the industry as a **sensitivity** but not as the reference
  - Elia also proposes to look at **higher consumption sensitivities** in the short and longer run due to possible rebound effects or faster recovery of the current crisis.





# Electricity demand

## Electrification – industry & data-center

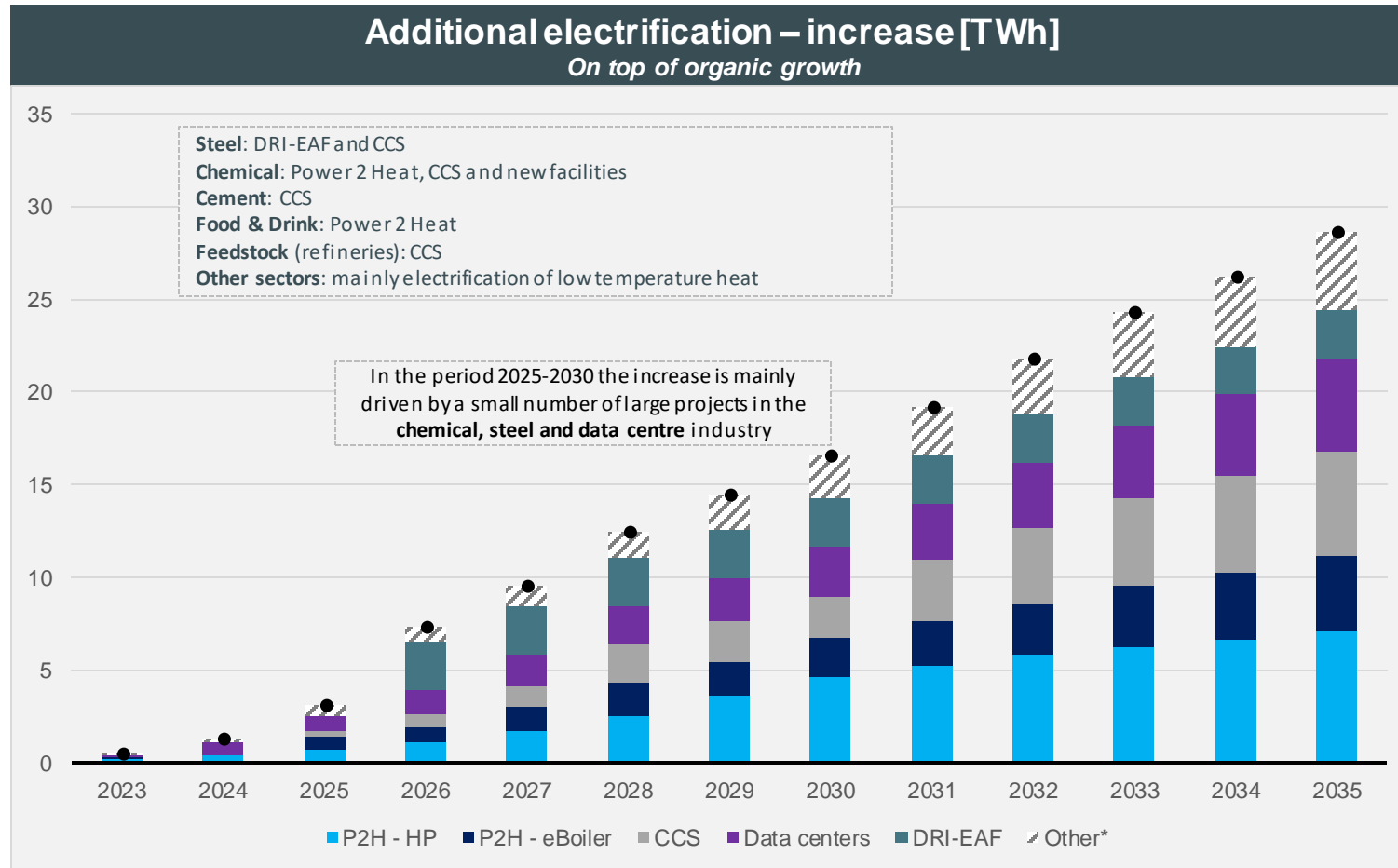
- CREG in general is asking for a ‘low demand’ scenario as all electrification projections are assumptions.
- Keep The Lights On and Citizen Task Force are asking more information on the flexibility considered for the additional load. The question was also raised by Febeliec during Working Group Adequacy.
- FEBEG supports such vision & expects a strong impact of the electrification of the demand in the next years.

- Elia proposes to consider a **‘low/high demand’ sensitivity** & with a **lower/higher electrification rate**.
- Elia Group published a **viewpoint on industry** after the public consultation of this study (18/11/2022), in collaboration with some **key industrial players and organizations**, which allowed to obtain a **detailed view** on their decarbonisation objectives and strategies.
- **Refined assumptions** in terms of **electrification** and associated flexibility are discussed in the following slides. The additional electrification is based on **bilateral exchanges between Elia and industries**, requests for orientation and detailed studies, information from direct clients,...

# These forms of new electrification can generally be divided in 4 categories

Based on the industry viewpoint published on 18/11/2022 (published & finalized after the start of the public consultation)

- The additional electrification is based on: bilateral exchanges between Elia and industries, requests for orientation and detailed studies, information from direct clients...
- During the public consultation a range was proposed. Where possible, bilateral and/or publically communicated commissioning dates are taken into account to refine the trajectory



Demand source	Flexibility potential	Comments
DRI-EAF (Steel)	40%	Flexibility if overcapacity is built such that production can be shifted within a given timeframe while still meeting production targets.
Data centers	20%	Value from the flexibility is low in comparison with the potential loss if there is an outage/issue.
CCS	0%	It is assumed that CCS will not offer flexibility in the "BASE" scenario in order to avoid stopping carbon capture & storage
P2H – e-boilers	100%	In a first phase it can be assumed e-boilers are installed in combination with fossil based systems, allowing a hybrid running mode.
P2H – Heat Pumps	50%	Similarly as e-boilers, although due to the higher efficiencies these will run more in baseload modus and not all might still have a fossil-based back-up.

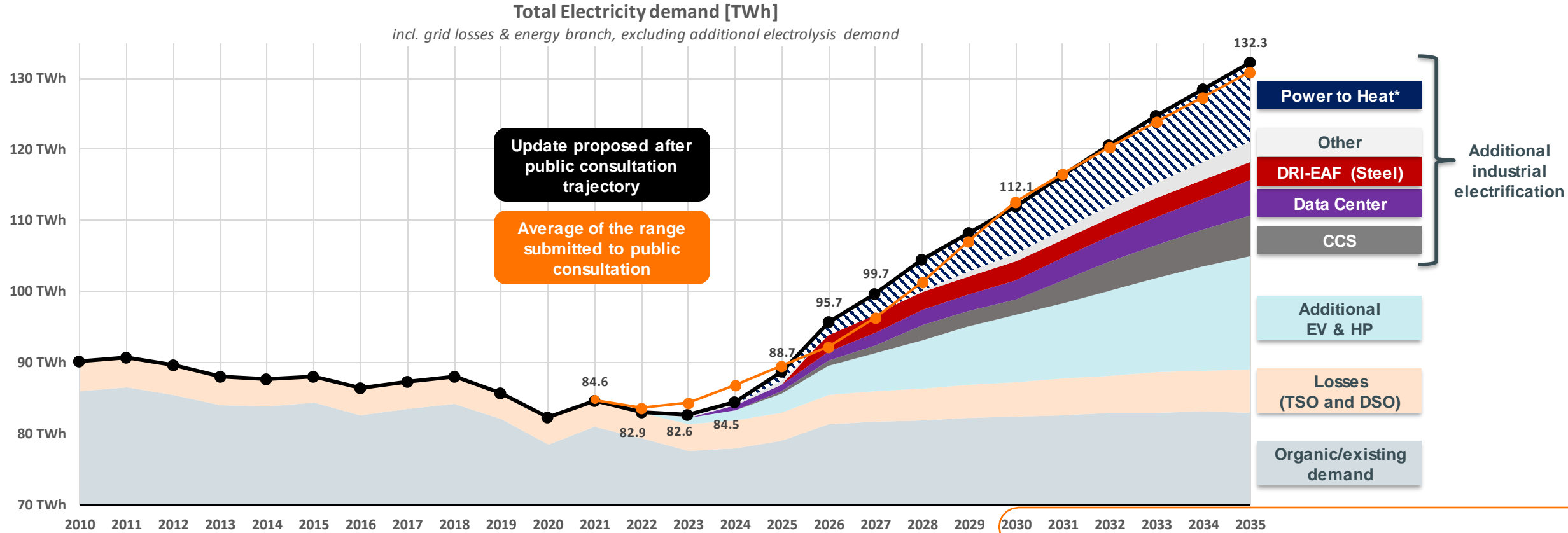
\*Note that this total electricity demand is an estimate, as part of the consumption linked to the 'Power-to-heat' will be determined when performing the market simulations as those are used when electricity prices are below a certain level.

Sensitivities on those values can be performed

# Total Electricity demand

## Changes

- Decrease of the short-term projection due to the inclusion of the price impact on industry. It is important to note that no rebound effect was included in the proposed base scenario while there are indications the current impact could disappear quicker than assumed.
- Refinement of the trajectory for new industry & data centers, where some large industrial electrification projects are already expected in the period 2025-2030
- Update of the HP & EV trajectories, with limited impact on net yearly demand (decrease for HP, increase for EV)



*\*Note that this total electricity demand is an estimate, as part of the consumption linked to the 'Power-to-heat' will be determined when performing the market simulations as those are used when electricity prices are below a certain level.*

# Demand Side Response

## Industry

- **CREG** considers the approach for future DSR potential not justified (% of today peak load).
- **Febeliec** reiterates its comments on the E-CUBE study, incl. the impact of recent high-prices on DSM and impact of diesel generators. Febeliec also comments the approach of considering DSM as 'expensive generation units'.
- **FEBEG** considers the assumptions very optimistic, also compared to neighboring countries. FEBEG wonders if the high level of DSM seen in the E-CUBE study can be extrapolated.
- **100TWh** also wonders how this DSM will be developed.

- While **Elia agrees that the method** for the estimation of **installed DSR** as applied in the **E-Cube study should be updated** to be better suited to a context with **very high volatile electricity prices**, there are currently **no better estimates** of the installed DSR volume for Belgium available. Belgium is also to date one of the few countries performing such a study. The **growth rate applied** for the trajectories are **in line with historic trends** and therefore there is no reason to deviate from the trajectory for the short-term.
- Regarding the **maximum future DSR potential** (for existing industry load), the assumed value corresponds to 25% of the total peak load for Belgium today (all sectors, not only the industry) which is therefore an **overestimation of the potential**. Such value corresponds to the maximum potential of the Gils study. Other studies that have looked at the potential of DSR in Belgium obtain much lower values (e.g. Sia Partners ). Elia agrees that this potential can be seen as optimistic as it is way beyond any study on the potential of DSR.
- On the flexibility potential of **new electrification in industry & data-centers**, the potential depends largely on the origin on the type of demand as shown in previous slides.



# Demand Side Response

## Tertiary & residential

- **Citizen Task Force & Keep The Lights On** consider public charging point cannot be flexible, otherwise long queue. KTLO also asks what if EV are used also as home battery (bi-directional) ? Is there a min level of charge required before enabling flexibility (e.g. 50%)
- **CREG** has remarks on EV load profile considered (from a UK study) and points out that not all users need a daily recharge;
- **Febeliec** appreciates the detailed approach on DSR residential & tertiary, but not enough time to react;

- Regarding the state of charge, Elia assumes the following assumptions:
  - Elia does **not model** the state of charge of **every EV** but rather an average representation of the **whole fleet**.
  - For EV following a **fixed load profile** (natural, V1H or V2H), the **state of charge is not considered** as (i) the load profile covers the average daily energy needs and (ii) the average daily energy needs are much lower than the battery size.
  - For EV following a **dispatch by the market** (V1M, V2M), Elia made sure that EVs should **start each day** with a battery charged to **at least 50%**.
- It is not expected that **natural charging** would be significantly impacted by **any difference** between the **United Kingdom and Belgium**. This intra-day profile is statistical representation of the whole fleet: meaning some EVs will fully charge on some days, where some EVs will not charge.
- On the **flexibility assumed**, Elia refers to DELTA-EE's charts with the **portion of each flex category** (V1H, V2H,...) within the fleet. This evolves over the studies horizon.
- On the **charging infrastructure**, the nature of the charging point impacts directly the flexibility available. These can be smart / dumb uni-directional / bi-directional and public / home-based. In the study, **no flexibility** is considered from **public charging points**.
- On the use of an **EV as a home battery** (with a **bidirectional** charger), part of the EV fleet is considered using V2G (as of 2025) and being dispatched by the market at the most opportune times (e.g. charging when PV are producing).



# Overview of input data



Renewables



Storage



Thermal fleet



Electricity demand (EV, HP, industry electrification & DSR)



**Data for other countries**



Fuel & CO2 prices



Outages



Investment costs



# Data for other countries

- Regarding **nuclear capacity in France**, FEBEG recommends Elia to carefully model the expected available capacity in neighboring countries and FEBEG would welcome a sensitivity on unavailability of several French nuclear reactors (with various levels).
- FEBELIEC wonders whether no sensitivity should be added with **additional nuclear availability** (in Belgium and/or abroad) and/or **retention of coal/lignite plants** in light of the current discussions.
- CREG asks info on **gas capacity** and asks for considering **out of market capacity** as available.
- CREG considers hypothesis with actual policies might lead to unrealistic scarcity situation (e.g. if coal phase out lead to adequacy issues, Germany will take remedial actions). CREG asks for a **sensitivity** where **neighboring countries** respecting their adequacy criteria.

- Elia agrees that **sensitivities on neighboring's countries assumptions** should be carried out (e.g. nuclear availability in France, coal/lignite capacity in Germany,..)
- **Gas** capacity is based on **ERAA22 database**, complemented with more recent info.
- **Out of market capacities** are **not** taken into account **as available** for the market (they are foreseen to solve a 'problem' in their country and will be dispatched 'after' the market). To Elia's knowledge, such contracted out-of-market capacities abroad cannot be called upon for Belgian use.
- Regarding **Germany** and the coal phase out, the proposal is to take the latest information available from **BNetzA**. To the knowledge of Elia, there is to date **no market wide/in the market capacity mechanism** in Germany. Elia agrees that **sensitivities** such as proposed by CREG are relevant.
- Regarding **Netherlands**, the renewables trajectories in **ERAA22** are in line with the "**Hogere Ambitie**" scenario from the latest **Monitoring Leveringszekerheid**. The offshore trajectory has been updated based on governmental announcement from June 2022.



# Overview of input data



Renewables



Storage



Thermal fleet



Electricity demand (EV, HP, industry electrification & DSR)



Data for other countries



Fuel & CO2 prices



Outages



Investment costs





# Fuel & CO2 prices

- Citizen Task Force and Keep The Lights On see prices as too low in view of recent evolution and asks for more information.
- CREG wonders why it is the “Announced Pledges” scenario from WEO that is chosen.
- Febeliec is asking for a sensitivity in both directions regarding prices.

- Elia acknowledges that the **current prices are very volatile** and has therefore proposed to update the **fuel and CO2 prices** based on the **latest forecast** of future prices available on the market available when performing the simulations.
- Note that as the forward prices are very volatile (as they have been for the past year), Elia takes a **month average** of these market **forward prices**.
- For the years where no forwards prices are available, an interpolation towards the **World Energy Outlook** published by the IEA end of October 2022. The scenario proposed to be used by Elia as reference is the “**Announced Pledges**” which assumes that all **aspirational targets** announced by governments are **met on time and in full**. This is aligned with the philosophy used for other input variables.
- In the past studies, **sensitivities on carbon and gas prices** were taken into account. The proposal of Elia is to perform such sensitivities for the upcoming study as well.

# Overview of input data



Renewables



Storage



Thermal fleet



Electricity demand (EV, HP, industry electrification & DSR)



Data for other countries



Fuel & CO2 prices



Outages



Investment costs



# Outages

- **Febeliec** remains surprised to see high values for some categories for forced outages.
  - **Febeliec** makes several comments on the approach (small sample whereas larger samples should be available on EU level, why no impact of removing older unit, etc.)
  - **CREG** asks for more information on the methodology applied
- 
- Elia would like to stress that a **thorough study** was performed by **N-Side** on these outages.
  - In this study, outage data for **Belgium** were **combined with** data from other **EU countries** from ENTSO-E's transparency platform. This expanded the dataset compared to previous years and gives statistically more robust results. As part of this analysis, a comparison was made between the forced outage rate of old and recent units and no significant difference was found.
  - For **pumped storage** (PSP), Elia proposes to deviate from the approach to include other countries than Belgium (avoids considering also run of river units from EU countries). Elia therefore proposes to calculate the outage parameters for **PSP for Belgian units only**, which results in a **forced outage rate of 2.9%**.
  - Regarding the CREG's comment on the methodology for determining the forced outage probability of the different technologies, Elia would like to refer to the **study performed by N-Side** which was published as part of the public consultation. The **study report** gives an overview of the **formulas** to calculate the different parameters and how they are aggregated.
  - Elia proposes to include a **forced outage rate for batteries of 2%**. This FO rate covers various effects such as deterioration, self-discharge and the effect of temperature on battery performance. It will be applied as a derating factor on the capacity of batteries. This number can evolve in the future if reliable data/analysis were to be found.

# Overview of input data



Renewables



Storage



Thermal fleet



Electricity demand (EV, HP, industry electrification & DSR)



Data for other countries



Fuel & CO2 prices



Outages



Investment costs



# Investment costs

- Comments from **CREG** on how construction period is considered and on the fact that a longer lifetime should be considered.

- Concerning the construction period, Elia proposes to use the same values as used in the CRM:
  - <1 year for PV and DSR;
  - 1 year for batteries, wind onshore;
  - 2 years for OCGT and CHP;
  - 3 years for CCGT and wind offshore.
- For the capacities not included in the source used in the CRM, Elia would propose:
  - 3 years for the biomass;
  - 4 years for the pumped storage;
  - 1 year for the diesels.
- On the **economic lifetime** to consider, Elia sees no reason to change the initially proposed values as no other sources were mentioned nor proposed as alternative.
- Elia also proposes to **remove IC gas turbine** candidate. Elia proposes to **replace** them by **hydrogen turbines candidates** as from **2030** with CAPEX costs taken from gas OCGT and CCGT with an increase of around +25% based a literature review.



# Investment costs

- Comment from CREG on the comparison of real costs & AdFlex21 assumptions (overestimated). KeepTheLightsOn considers that prices are underestimated. ODE also for PV.

Based on literature reviews that are detailed in the consultation report.

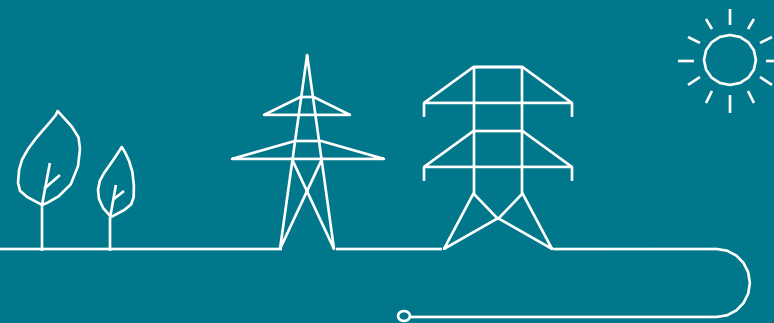
		CAPEX [€/kW] in EUR 22						AdFlex 2021 (EUR 19)
		Initially proposed			Updated after PC			
		2022-2025	2026-2030	2031-2035	2022-2025	2026-2030	2031-2035	
CCGT	>800 MW	750			650			600
	400 < 800 MW	950			850			750
	< 400 MW	1050			950			850
OCGT	>100 MW	500			550			400
	<100 MW	600			650			500
Batteries/Storage	Large scale batteries (1h)	400	280	260	450	300	300	100
	Large scale batteries (2h)	650	460	440	750	500	450	NA
	Large scale batteries (4h)	1000	850	750	1200	900	750	NA
Pumped Storage - new unit	New unit in Coe	1000			2000			900
PV	New	600	550	500	800	600	500	600

Update after public consultation

- Removal of IC gas turbine candidate, replaced by hydrogen-fueled plant;
- For OCGT and CCGT, if 100% hydrogen fueled, CAPEX +25% and only considered as from 2030;
- For batteries, update of the FOM to 20 EUR/kW (instead of 15 EUR/kW) and of the round-trip efficiency to 85% (instead of 90%).



# Feedback on methodology



# Overview of methodology



**Adequacy methodology**



**Economic Viability Assessment**



**AFRY study on fixed costs of existing units**



**Short-term flexibility study (method and assumptions)**





# Overview of methodology



**Adequacy methodology**



Economic Viability Assessment



AFRY study on fixed costs of existing units



Short-term flexibility study (method and assumptions)



# Adequacy methodology

## Probabilistic vs deterministic

- Pierre Kunsch (ULB) and 100 TWh argues for a deterministic approach;
- “100TWh does not agree with Elia’s methodology. Our security of supply may not be evaluated using statistical simulations based on unrealistic assumptions, including optimistic interconnections and exchanges with our neighbouring countries”.

The **probabilistic approach** which is considered by academia and most stakeholders as ‘**state of the art**’ is also used by Elia and other **TSOs/academia/experts** for more than 10 years for evaluating adequacy. Elia is following the **methodological requirements** required by **ACER** in the **ERAA methodology**.

## Unit Commitment & Economic Dispatch

- Sebastian Gonzato (KUL) shows that different storage strategies for energy limited resources (e.g. battery) can give different LOLE values and asks which strategy is used by Elia.

The ‘**shedding policy**’ of ANTARES used by default is “**shaves peaks**” aiming at **minimizing the depth of the ENS**, in line with the reliability standard calculation and as mentioned by the stakeholder. Regarding the results found in the paper, we believe the **impact of the shedding policy** to be much **lower** when simulating the **whole interconnected system** (whole Europe) although Elia agrees that such parameter can have an increasing impact depending on the penetration of **ELR** technologies.

- Sebastian Gonzato (KUL) also asks question on the aggregation of technologies and the solving of clustered unit commitment.

For **Belgium**, large units which have a **CIPU** (Coordinating Injection of Production Units) contract are **modelled individually**, **smaller units** (non-CIPU) are **aggregated** via one profiled production.

For the **other countries**, it is a **trade-off** between heavy modelled (all individually modelled) and a lighter model (shorter running time). E.g. some countries have more than 500 units of less than 100 MW → smaller units are aggregated into clusters without losing economic or dispatch information (e.g. aggregation of 2 units of 50 MW with the same marginal price & others economic parameters).

# Adequacy methodology

## Climate years

- **Febeliec** doesn't understand why not using 30 last historical climate years.
- **CREG** wonders if the database is adequate (e.g. climate of 2025, calibration on 2000 data) and asks for another analyse of the climate years.
- **FELEG** would recommend using RCP 4.5 (instead of 8.5) if available, to more representative of the longer run.

- The approach followed by Elia is fully compliant with the **ERAA methodology**. **ENTSO-E** will also move towards such forward looking data, hence using such datasets is considered by Elia as **best practice** for the **future**.
- Since the foreseen **ENTSO-E future-proof climate database** (ENTSO-E PECD v4.0) is **not yet available**, Elia still relies on its best available forward-looking climate database (MétéoFrance).
- MétéoFrance considers the **interpolation** to an intermediate climate between **2000 and 2050** allows a representation of the climate for the target year (**2025**) to be approached with good plausibility **without having to implement a specific simulation**, therefore no calibration of the 2025 database. **Elia relies on MétéoFrance's knowledge** (renown institute) on the choices made on the methodology to elaborate such databases.
- The period **2024-2034** still falls within the period of "constant climate" defined **around 2025** ( $\pm 15$  years around 2025).
- For the targeted horizon, the difference between both RCP trajectories is limited  $\rightarrow$  **RCP 8.5 still relevant** for this AdFlex study.



# Adequacy methodology

## Adequacy study

- **Febeliec** asks for a finer granularity than 100MW.

- **Calibration reports** are used to determine the parameters which determine how much will be effectively sourced in an auction and hence as put forward by Febeliec, in these cases, a **finer granularity** is used for **all parameters: 1 MW**.
- For **adequacy studies**, this block size of **100 MW** was chosen to **be as small as possible** while still ensuring **statistically robust** results for the determination of the volume. Choosing smaller step sizes might lead to a calculation result that differs depending on the random seeding of the model. Higher granularity would exponentially increase the computation time.

## Adequacy patch

- **CREG** asks for indication in the results of the activation of the adequacy patch, with the mention of the curtailed volume and net position of the neighboring countries.

In the simulations performed, the so-called “**curtailed volumes**” are equal to the reported **Energy Non-Served (ENS)**. Furthermore, the corresponding ‘net positions’ of the neighboring countries are the ones reported in the results.

On the **activation** of the “**adequacy patch**”, the simulations performed follow the rules defined within the EUPHEMIA algorithm and therefore the adequacy patch rules are applied **at every hour in which ENS** would take place in the simulation perimeter.



# Adequacy methodology - Cross-border exchanges

## Input data

- Citizen groups express their concern on relying on other countries' import.
  - On the minRAM, **Febeliec** agrees to consider minRAM 70% and **FEBEG** would welcome a sensitivity on non/strict achievements of the FB CEP rules.
- By simulating the market rules, **no ex-ante assumptions** on the **energy available for import** during scarcity situations are needed. The available physical import capacity is computed and the demand, generation and storage technologies are explicitly modelled for each country.
  - Assumptions for **other countries** are based on **latest policy announcements**. Elia will also perform sensitivities on the available generation abroad.
  - As Belgium relies heavily on imports for its security of supply, such **sensitivities** can provide additional insights for policy makers on the impact of such risks.

## Methodology

- **CREG** asks several detailed questions on the flow-based domains (e.g. inclusion of loop flows, calculation of zonal PTDF, projection of BE-DE, PST flexibility, impact of AHC/SHC, etc.)
- Next to the capacitor banks of the program Voltage Control II – preconditions for the increase of the **allocation constraint** to 7500 MW – **no capacity banks** are needed for the **further increase to 8000-9000 MW**.
  - **Flow based domains** are based on Critical Network Elements and Contingencies (**CNEC**) = contingencies **limiting the flow** on grid elements and therefore the flow-based domains. **Outages** are therefore **included** in this definition.
  - Flow based domains are built through a **set of simulations** taking into account a **range of values for different input** parameters (expected production, demand,...). Perfect foresight is assumed. A selection of the most representative FB domains is then done (needed to reach feasible simulation times). **No FRM** (Flow Reliability Margin) are considered (this could be an improvement for the future).
  - The computation of the **zonal PTDFs** uses **GSKs** based on the **dispatchable thermal capacity** (so excluding nuclear, DSR & storage, ...)
  - The **Belgium-Germany plane** could be added to the final study.

# Overview of methodology



Adequacy methodology



**Economic Viability Assessment**



AFRY study on fixed costs of existing units



Short-term flexibility study (method and assumptions)



# Methodology

## Economic Viability Assessment

- **Febeliec** appreciates the work done, but wonders how the profitability over the lifetime is considered.

Estimation of the revenues and costs over the full future expected lifetime. As it depends on future market situation, a probabilistic draw is performed for a large number of possible lifetimes of the unit. The resulting IRR is then calculated for each of these draws and their average is taken and compared to the hurdle rate. There could be sampled years or even full lifetimes where the unit is not profitable, even if overall IRR might be higher than the hurdle rate.

- **Sebastian Gonzato (KUL)** is asking several questions on how the EVA loop is done (EVA candidates list, evolution, convergence once EVA loop is finished, etc.) and on the clustering of climate years.

- Goal of the use of clusters of Monte Carlo years is to reduce the needed time towards convergence without influencing final results
- To facilitate the convergence, only the most profitable (not yet installed) and most “unprofitable” (installed) units are added/removed (risk of ‘cannibalisation effect’ if all profitable units are installed at the same time).
- At the end, the convergence is verified on a larger amount of Monte Carlo years (not only on the clustered years).
- Elia uses a k-medoids algorithm to cluster climate years. As the full MC years are run to validate the convergence, the chosen clustering approach has no impact.



# Methodology

## Economic Viability Assessment

- Febeliec and CREG suggest to take into account **portfolio effect** in the EVA

In line with the ERAA, the EVA is performed at the level of the capacity resource (any generation, storage or DSR asset which may bring resource adequacy benefit).

- CREG thinks the **inclusion of hedging** could be improved and refers to its comment in the annex of the note (Z)21541

Elia understands that CREG supports the contours of the updated EVA methodology but considers that within those contours hedging opportunities on the forward markets are not fully reflected in the proposed methodology. Elia refers to its reply to CREG's note (Z)21541 as part of the AdFlex21 consultation.

- Febeliec considers that **price limits** should not be modelled as too limiting [...]

Elia will take into account the published decision of ACER. A sensitivity on a higher price limit not linked to the decision by ACER does not seem justifiable. The starting price limit will be therefore set to 4000 €/MWh as proposed in the public consultation and which is now confirmed by ACER in its decision.

- FEBEG asks for considering impact of **revenue cap** in EVA considering the ongoing discussions at EU & BE level.

Revenues cap introduced by the EU & by BE are both temporary and extraordinary measures, with no plan to extend it after June 2023. Therefore not considered for the base case. But for future years, a sensitivity on such measures could be included.



## Methodology Economic Viability Assessment

### Prof. K. Boudt study

- **Febeliec** reiterates its comment on the risk averseness considered for investors & high hurdle rates.

Febeliec seems to challenge the hypothesis of a risk-averse investor. However, risk aversion is commonly accepted as an assumption for a rational investor in many economic studies and academic works.

- **Febeliec** remains with many questions towards the applicability of this model in the real world, asks for a more in-depth presentation and does not see why investment in electricity sector should be considered as different than in other sectors. **Febeliec** is also surprised to see that the analysis considers simulated rents under lower market price caps compared to 3000 EUR/MWh [...]

Professor Boudt has presented the applied methodology during the Working Group Adequacy of 27/1 and has further clarified the applicability of the model in the real world. The hurdle rate covers for the price risk of investors in the electricity sector driven by several risk parameters such as the revenue distribution and loss aversion, as well as the model and policy risk. As to the price cap, the initial price cap was dependent on existing simulations and hence set at 3000 EUR/MWh. Then an extensive sensitivity analysis is done, estimating the impact of different risks to the investor in terms of prices, adequacy level, price caps,...

- Risk-free rate and inflation rate seem underestimated given the current market evolution [...] FEBEG asks to review the WACC considering the changes of the underlying parameters. [FEBEG]

Professor Boudt will update the calculation of the reference WACC in 1Q2023 taking into account the most recent market evolutions.



## Methodology Economic Viability Assessment

### Prof. K. Boudt study

- **CREG** makes several comments on inclusion of a gearing ratio adapted to the type of project considered, on how inflation should be included, on how different hurdle premium should be considered for auction Y-4 and Y-1 and on how the increase of the hurdle premium to account for taxation of excessive revenues should not be done.

First of all, Elia would like to repeat that the public consultation only relates to the hurdle rates as calibrated by Prof. Boudt in EoM context, so without impact of the CRM and thus the type of auction (Y-4 versus Y-1). Also, Prof. Boudt has calculated the reference WACC, taking into account industry averages, leading to a gearing percentage of 44%. Technology-specific corrections to this reference WACC are made via the hurdle premium. Elia would also like to clarify that Professor Boudt has taken into account the scenario with taxation of excess revenues in both the 2020 and the recent 2022 study. However, in the 2022 study, the probability of occurrence of such scenario is increased. Finally, inflation is indeed taken into account in the calculation of the real reference WACC.



# Methodology

## Economic Viability Assessment

### Balancing services

- **Febeliec** considers Elia's approach with a discarding/derating of most of the revenues from ancillary services too conservative [...]

Elia insists again on the 'net' character of balancing revenues to be estimated here. Elia is thus not convinced that an increase of prices on energy markets would automatically lead to an increase in net balancing revenues given the arbitrage principle considered. On the uncertainty regarding the estimation of some of these revenues, Elia can only but stress the fact that past and current balancing prices can hardly be used to forecast future prices given the future significant changes foreseen (EU platforms, PaB -> PaC), Elia deems this estimation as unfeasible and incorrect. Elia will keep investigating on this while keeping the arbitrage principle in mind.



# Methodology

## Economic Viability Assessment

### Balancing services

- CREG formulates several comments on number of historical months considered, overestimation of missing money for intraday market and activation of balancing market, comments also on FCR and aFRR.

Elia would like to stress several elements here :

- Elia must make an estimation of net balancing revenues on a technology basis (intraday market are not considered here, especially not on a unit basis).
- Elia can only but repeat that an estimation of future net balancing revenues coming from activation is a task impossible to achieve given the enormous changes expected on EU balancing markets (connection to EU platforms, switch from PaB to PaC).
- Regarding the % used to consider the evolution from gross to net revenues for balancing products, Elia wants to point out that several elements are/will be provided transparently when realizing this exercise :
  - Evolution of mix of technology expected to participate to the provision of each balancing product
  - Evolution of installed capacity of these technologies
  - Specific technology factors (eg. Round trip efficiency for batteries)

Finally, Elia will keep investigating to improve the estimation of these net revenues coming from the provision of balancing services.



# Overview of methodology



Adequacy methodology



Economic Viability Assessment



**AFRY study on fixed costs of existing units**



Short-term flexibility study (method and assumptions)



# AFRY study

## Elements of the Fixed O&M

- CREG asks questions with regards to the different cost components that are taken into account for the Fixed O&M and the Variable O&M respectively
  - Elia highlights that an important clarification has already been made in section 3.1 of the AFRY study
  - Elia understands that this might not encompass all possible cost components linked to a power plant
  - The goal of the AFRY study was never to determine all these cost components, but rather to update the AFRY 2020 study
  - Elia commits to launch a new study in 2023 with a much broader scope in order to determine the Fixed O&M more in detail in close collaboration with stakeholders



# Overview of methodology



Adequacy methodology



Economic Viability Assessment



AFRY study on fixed costs of existing units



**Short-term flexibility study (method and assumptions)**



## Method (1)

- CREG request for further clarification on the choice of time horizons for slow flexibility (as from 5 hours) and ramping flexibility (as from 5 minutes) in view of the ability for BRPs to balance their portfolio in intra-day and the acceptability of remaining area control error in the system
- CREG requests for further clarification on the impact of forced outages on flexibility needs in view of the assumed duration (up to 5 hours in fast flexibility and up to 36 hours in slow flexibility)
- Question further clarification on the choice to determine the flexibility needs to cover 99.9% of the expected prediction errors and forced outages in view of the reliability criterion used in reserve dimensioning of 99.0%

Elia explains the scope of the flexibility study is on the total flexibility needs of the system rather than reserve capacity managed by the TSO (which is only a subset of the total flexibility as part of the flexibility needs will be covered by the market players). This study therefore also assesses the availability of slow flexibility (even if generally well managed by the market through intra-day market), including for balancing forced outages.

Elia also explains that the selected criterion is starting from an assumption that in principle that all variations and prediction errors need to be covered (including via cross-border flexibility such as imbalance netting). This approach is different from the legal minimum requirement applied in reserve dimensioning assuming that occasional reserve shortages are dealt with exceptional balancing measures or the activation of FCR

These elements are elaborated in the methodology sections of the report.



## Method (2)

- CREG asks to which extent demand destruction and low voltage demand response is accounted in the study, and how Elia takes into account implicit flexibility in the assessment

- Elia clarifies demand destruction is assumed to be included in the load profiles for the adequacy simulations and is not assumed to provide short-term flexibility
- The assumptions on the participation of low voltage flexibility in short-term flexibility is included under the categories “new technologies” in the excel file, including heat pumps, electric vehicles and home batteries (all are expected to provide short-term flex, at least in upward direction)
- The calculation models the total remaining flexibility of all these categories after the day-ahead based on the schedule in day-ahead (result of the adequacy simulations), and the technical characteristics (specified in the excel file) and assumes that this flexibility can be used by BRPs (implicitly) or by the TSO (explicitly).

- Keep the lights and Johan Springael identify the hourly time resolution of the calculations as a shortcoming while also identifying the need to deal with volatility of renewable generation through probabilistic risk assessment

Elia explains that the intra-hourly volatility, as well as the uncertainty following the prediction errors of renewable energy, is part of the flexibility study, going to a resolution of 5 minutes (higher resolution is part of European scope, cf. FCR).

## Method (3)

- Keep the lights explains the need to study volatility of renewable energy and refers to a large offshore variations early July 2022

Elia clarifies it studied the impact of exceptional balancing events following offshore wind power in several studies, and in particular in view of the foreseen increase in offshore capacity towards 5.8 GW by 2030. It therefore refers to the previously published reports on the system integration of offshore wind power<sup>60</sup>. Specific sections are dedicated to simulating the impact of storms and ramps on the system, and the re recommendation of mitigation measures. These mitigation measures are currently further discussed with stakeholders in the framework of the Task Force MOG 2.

- Johan Springael asks how local balancing shortages will be covered, and if this is appropriately included when assessing the impact of wind and solar power

Reserve requirements are integrated in the simulations by means of projections towards 2034 as a constraint in the market simulations to ensure sufficient flexibility to manage forced outages and unexpected renewable variations, even during adequacy events. New projections were presented and discussed with stakeholders in the TF MOG 2 of 10.01.2023 and an in depth session of the WG Balancing 15.02.2023.

# Assumptions (1)

- CREG requests more transparency on the calculation of the forced outages
  - Elia refers to its answers in the sections on the input data and on the specific study it presented in the public consultation on the calculation of the forced outage characteristics
- CREG asks how the contribution of demand destruction during periods of scarcity integrated in the study
  - Cf. previous question
- CREG asks to elaborate on the parameters used to determine the contribution of cross-border flexibility to short-term flexibility

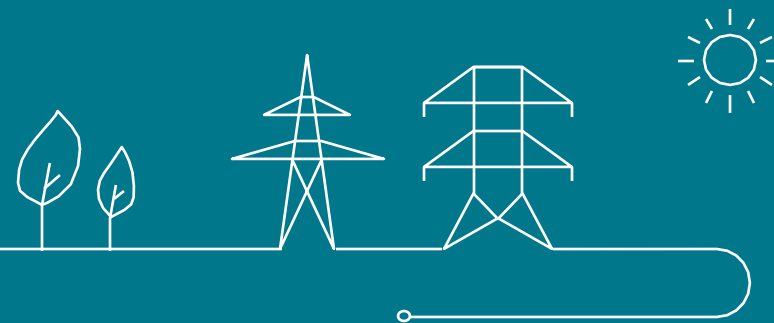
Elia clarifies the price thresholds until which short-term flexibility is assumed to remain available (0 €, 300 €/MWh) are indeed determined arbitrarily. Considering the large contribution of slow flexibility (available flexibility means already covers the full flexibility needs when taking into account cross-border flexibility, Elia considers further finetuning these parameters not useful.

Elia clarifies that the ramping and fast flexibility are limited by the remaining ATC (derived from the adequacy and flexibility simulations). Additional limits are nevertheless put forward based on current volumes (250 / 350 MW mFRR, 0 MW aFRR) and complemented with sensitivities up to 50% of the needs.

## Assumptions (2)

- FEBELIEC stresses the importance of BRP portfolio balancing responsibilities and that relaxation of these obligations should result in better market functioning and less balancing capacity
  - Out of scope, Elia refers to its recent answers given in previous consultations
- FEBELIEC asks to clarify the demand response categories used in short-term flexibility
  - Elia clarifies it models the 8 hour duration category similar as in previous studies (Elia will correct this in the excel file)
- FEBEG refers to the discussions on flexibility in view of the TF MOG 2.
  - Elia refers to the different workshops on reserve dimensioning (15/2), storm and ramp mitigation measures(24/3) and offshore bidding zones (24/3) which are currently organized
- FEBEG recalls the increasing flexibility needs coming years but doubts the assumptions put forward by Elia on available flexibility (particularly on the low voltage level)
  - Elia explains different scenarios on renewable integration and available (consumer) flexibility will be analyzed in the study

# List of sensitivities

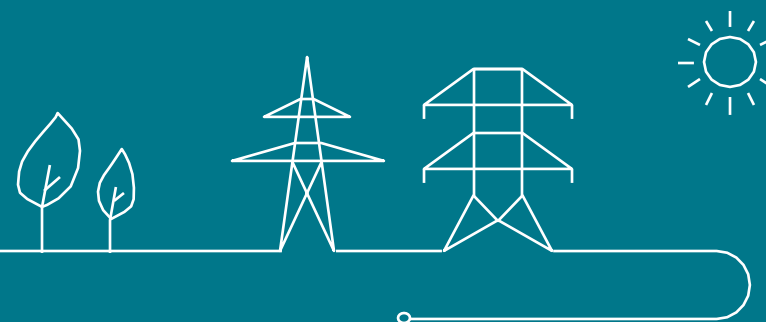


## Non-exhaustive list of possible sensitivities

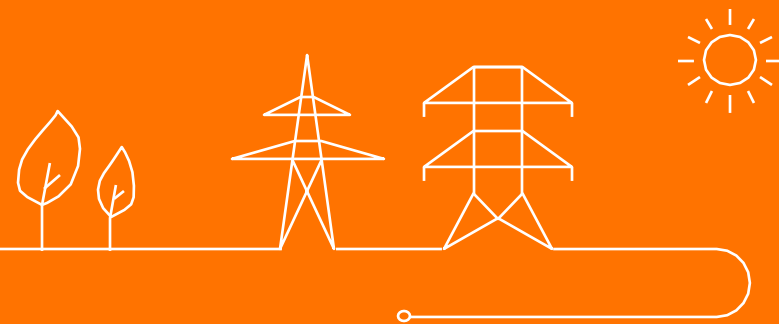
- On a different **load trajectory** in Belgium (e.g. higher/lower load due energy-crisis recovery, on relocalisation of industry outside Belgium, ...)
- On the availability of **gas-fired power plants in Belgium** (e.g. in case of strict CO2 emissions' limits in the CRM) and on the availability of **nuclear power plants in Belgium**
- On the **Renewable Energy Sources**, with lower and higher RES development (e.g. a delay of MOG II offshore wind farm);
- On the **DSR capacity and volume**, e.g.: lower/higher residential & tertiary DSR, industrial DSR);
- On the **storage capacity and volume** (e.g. in a context of shortage of critical raw material);
- On the **available capacity abroad**, e.g: **nuclear** availability in **France** (with various level of unavailability), **coal/lignite** capacity in **Germany**, ...;
- On possible measures to guarantee the **reliability standard in other countries** (Germany), irrespective of the presence of dedicated mechanism.
- On lower **RAM assumption** for flow-based (e.g. 50% RAM);
- On the impact of **revenue-cap** at EU and BE level;
- On the **combination of several sensitivities** to better understand the combined effect of the most likely ones for an highly interconnected country such as Belgium;



**Thank you.**



# Design info sessions





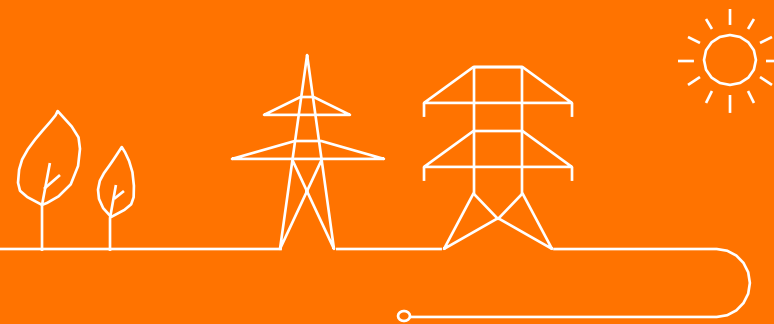
# CRM Design info sessions

Elia would like to organize different info sessions on the design of the CRM. The goal of these sessions would be to inform a broad audience on the general design principles of the CRM as well as facilitate a deep dive discussion on selected topic.

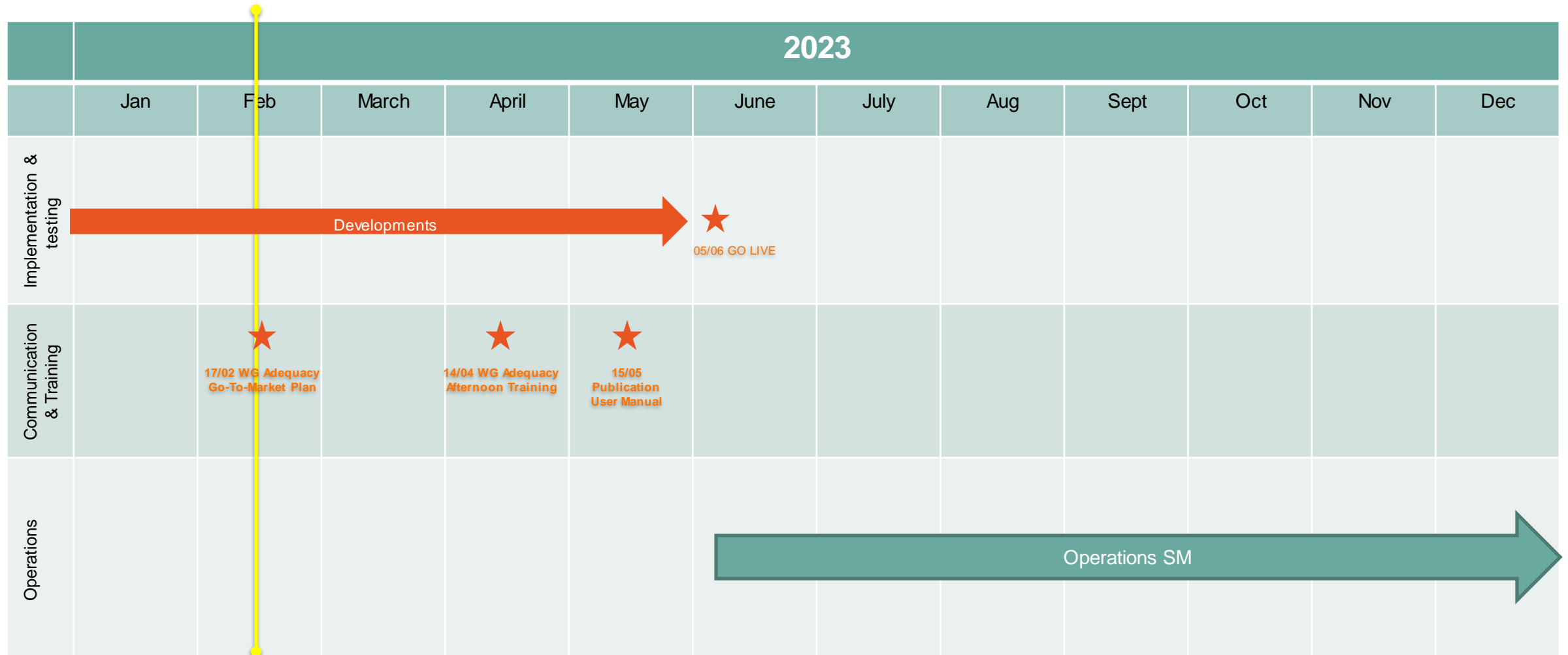
- Elia proposes to organize two general half day info sessions (31/03 or 7/04), followed by two full day sessions on selected topics (18/04 and 24/04).
- Elia targets a more general audience than the members of the WG and invites federations to share the dates with their members. The goal is twofold:
  - Explain and illustrate the current rules and mechanisms for market parties which might be interested in participating to the CRM.
  - Allow a more detailed discussion and knowledge sharing between experts (on amongst others availability monitoring, prequalification, etc)
- Let us know what you would like to discuss by 3/03 via [Taskforce.CRM@elia.be](mailto:Taskforce.CRM@elia.be)!



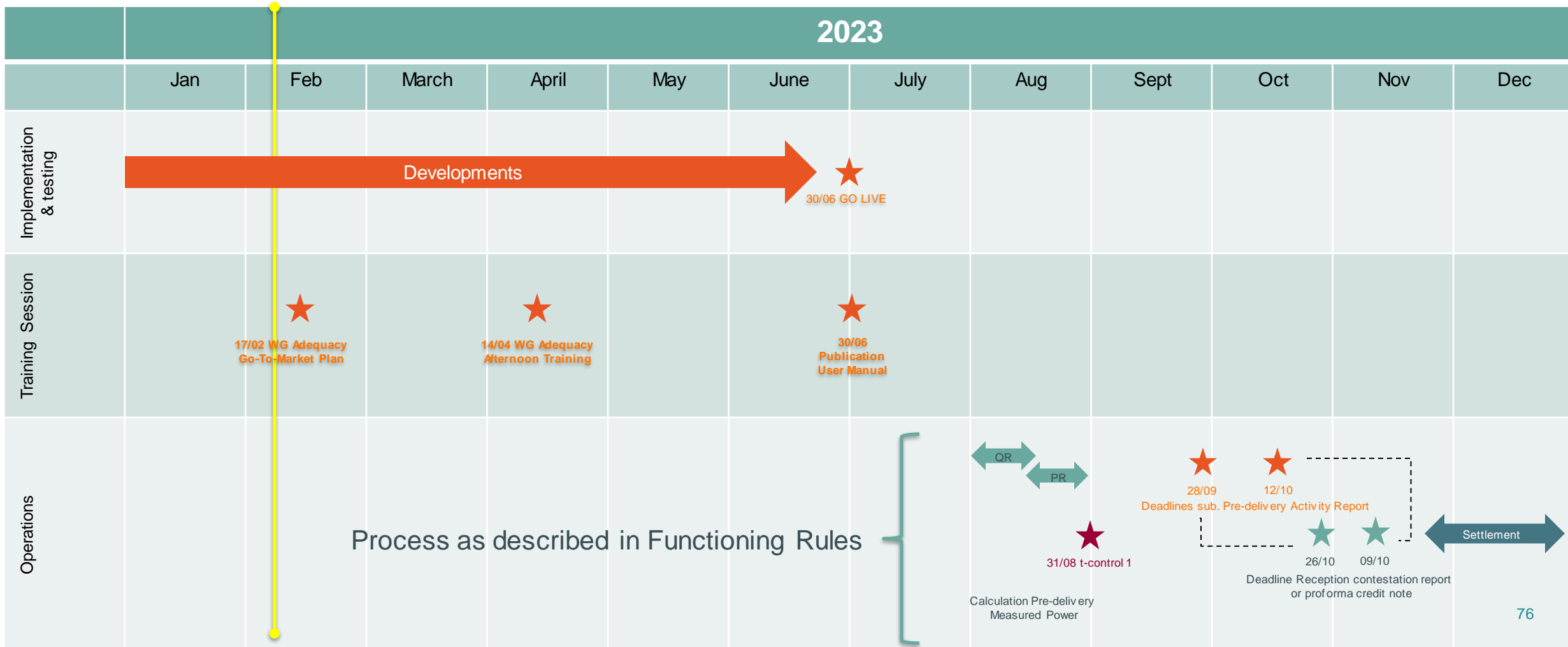
# Go-to-Market Implementation Timeline



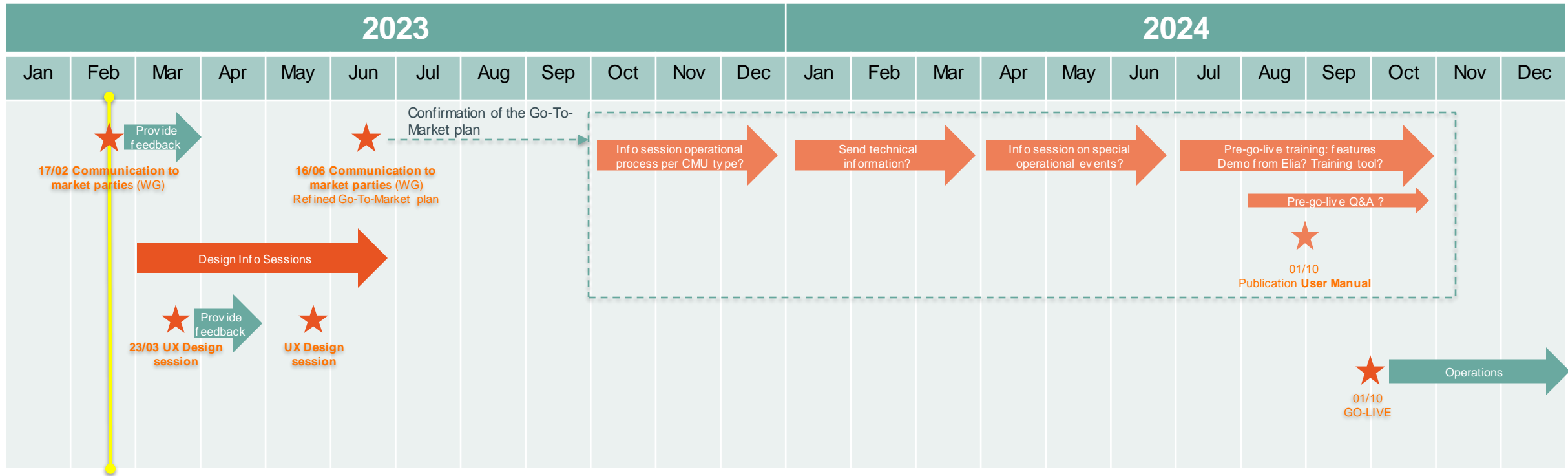
# Go-to-Market planning – Secondary market



# Go-to-Market planning – Pre-delivery monitoring



# Go-to-Market planning – Availability Monitoring & Payback

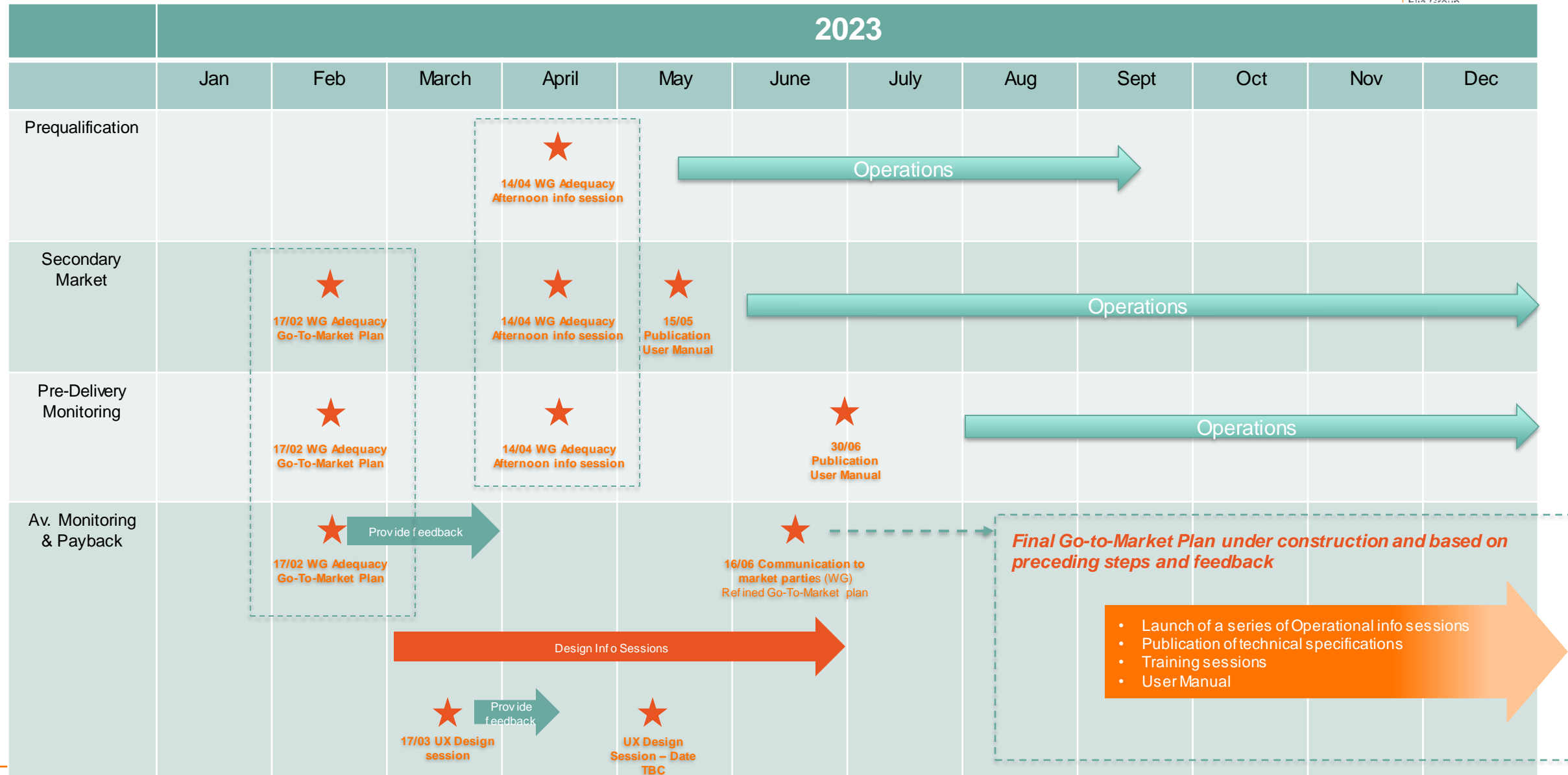


- On the WG Adequacy of 16/06, Elia will present a refined Go-To-Market plan for everything beyond that date. We welcome any messages or feedback from CRM candidates by end of March to [Taskforce.CRM@elia.be](mailto:Taskforce.CRM@elia.be)
- 2 UX Design sessions are already foreseen anyhow (see next slides)

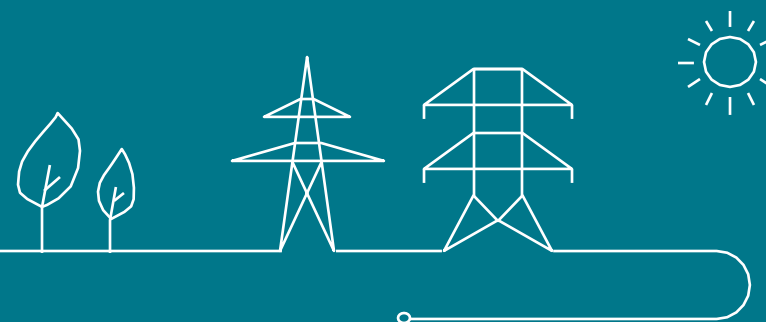
## Target audience

Design info sessions: design-related public  
 Operational info sessions: operators from CRM candidates  
 UX design sessions: operators from CRM candidates

# Go-To-Market External Communications - Summary



# Call for participation to User eXperience (UX) Design session Availability Monitoring & Payback



## What is UX?

User eXperience (UX) **bridges the gap between the end-users and a Company products and services**. UX ensures that solutions meet user needs through empathy, standardized tools and methods.

The goal of UX is to discover and **solve issues to provide a great experience to users** while serving the Company vision (business goals and needs).





## The UX Benefits for the **Users**



Ensure applications, services and processes **fit user needs** and **follow their mental model** and flow.



Ensure applications, services and processes are **positive and intuitive experiences**.



**Reduce the risk of human errors** for operators working on critical applications.



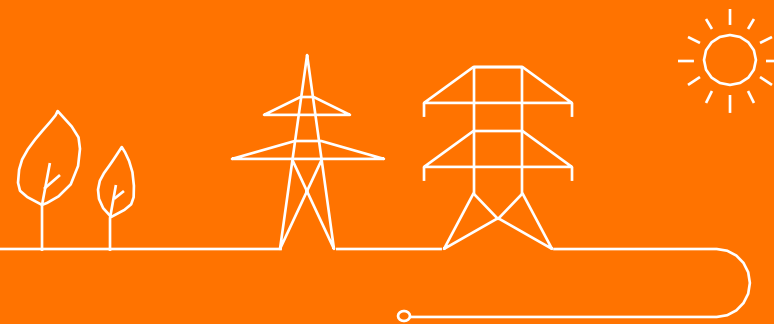
# Open Call for Participation to the Ux Design Track

- What do we want to achieve?
  - Have the opportunity to present you our draft design and ideas and exchange with you about that
  - → Build a tool that will meet our needs and your needs
- What can you expect?
  - Have the possibility to transmit your needs
  - Have the possibility to give feedback on our UI prototypes
- How?
  - Through the participation to 2 sessions of 2 hours (physical meeting in ELIA Empereur Office)
- For Who?
  - Any CRM Actor that would like to contribute to the Ux Design of Availability Monitoring and Payback Obligation tools.
  - Needed profile of the participants: Implementation profiles and future users or representatives of users of the Availability Monitoring and Payback Obligation
- When?
  - First Session on Thursday 23/03 AM @ELIA Empereur Office
  - Follow-up Session date TBC



Confirmation of participation are expected before 06/03 to [Taskforce.CRM@elia.be](mailto:Taskforce.CRM@elia.be)

# PQ CMU evolution in time philosophy



# Evolution in time of an Aggregated CMU – pool of Delivery Points

## *Problem setting*

- ✓ The pool of Delivery Points of an Aggregated CMU can of course change over time, e.g. because more Delivery Points are added, some need to be deleted or replaced because contracts with clients expire, etc.
- ✓ However, several characteristics of a CMU are crucially determined by the underlying pool of Delivery Points: status of CMU, permitting milestone status, NRP, etc.
  - ✓ Ok if the characteristics of the CMU need to change and if these changes then apply for all ongoing and future Delivery Periods
  - ✓ Not ok if these characteristics change from one Delivery Period to another. It complicates amongst others the prequalification and pre-delivery processes and even goes in the direction of having a separate CMU per Delivery Period. There is no such thing as a unique status, permitting milestone status, NRP of the CMU anymore, as they then actually vary across Delivery Periods.

**It is complicated to allow a CRM Actor to have one Aggregated CMU with varying pools of Delivery Points across future Delivery Periods and may even be unfeasible as it may require a separate CMU per Delivery Period**



# Evolution in time of an Aggregated CMU – pool of Delivery Points

## *Proposed adaptations*

### Prequalification

- ✓ AS IS (Functioning Rules '22): changes to the pool of Delivery Points of an Aggregated CMU are allowed\*
- ✓ TO BE (Functioning Rules '23, cf. § 221 of ELIA's proposal submitted to the CREG on 1/2):
  - ✓ Changes to the pool of Delivery Points that apply **as of now**, i.e. for the current – if applicable – as well as for all future Delivery Periods → **Allowed**
  - ✓ Changes to the pool of Delivery Points that apply **as of a certain Delivery Period in the future** or in general **for one or more specific Delivery Periods only** → **new CMU**

### Financial Security

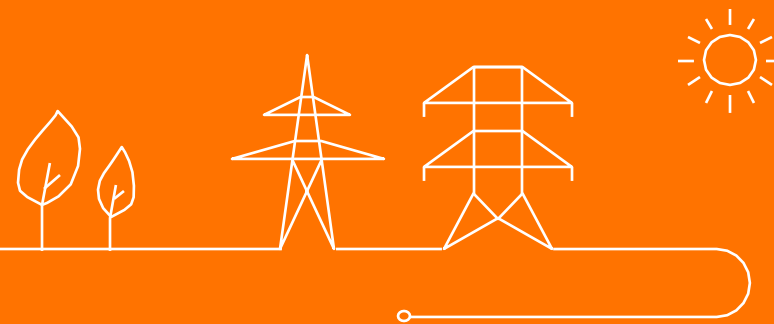
- ✓ AS IS (Functioning Rules '22 ): Financial Security obligation per CMU
- ✓ TO BE (Functioning Rules '23, cf. § 768 of ELIA's proposal submitted to the CREG on 1/2): Single Financial Security obligation for a CRM Actor's CMUs with common Delivery Points, determined jointly across all transactions to which a Financial Security obligation applies related to these CMUs

**Changes to a pool of Delivery Points are still allowed, although sometimes it will be required to do this through a new CMU.**

**However, because of the adaptation to the Financial Security obligation, there will be no negative impact on market parties.**

\*some additional requirements apply, depending on the situation, but they are not relevant for this discussion

# Updates from Cabinet



# Overview

TOPIC	LEGAL BASIS
Investment files	Royal Decree of 04 June 2021 (Inv. Tresholds)
Payback Obligation – Indexation	Royal Decree of 28 April 2021 (Methodology)
Payback Obligation – Exemption DSR	Royal Decree of 28 April 2021 (Methodology) + E-Law
IPC Derogation	Royal Decree of 28 April 2021 (Methodology)

# MAIN EVOLUTIONS

## Investment files

- The current version of the Royal Decree on Investment Thresholds and Eligible Costs stipulates that costs are only eligible for a multi-year capacity contract if spent after publication of the Auction results.
- **Proposal:** costs spent up to one year prior to the date of publication of the auction results are eligible (only for delivery period for which a Y-4 auction can no longer/not be organized).

## Payback Obligation – Indexation

- The current strike price kept 'as is' would potentially lead to persistent payback obligation events
- **Proposal:** adapt dynamically the indexation mechanism of the strike price in order to capture recent market trends + will be applied at the beginning of the delivery period and for all capacities (with a contract of one year or several years)



# MAIN EVOLUTIONS

## Payback Obligation – DSR Exemption

- Market parties stated repeatedly that Payback Obligation was a barrier to entry for DSR
- **Proposal:** Implement an exemption for Demand Response
- **Disclaimer 1:** Interactions with E.C will be needed to approve the measure. The final decision will be taken only if the measure is supported by the E.C.
- **Disclaimer 2:** a change in the E-Law is needed (constraint in term of timing)

## IPC Derogation

- Several concerns raised by market parties regarding IPC Derogation
- **Proposal:** Deadline to introduce the demand for IPC derogation is put forward (30/04) + Timing for review process is improved (transfer of competence from Elia to CREG) + application of the WACC + costs' indexation

# Planning

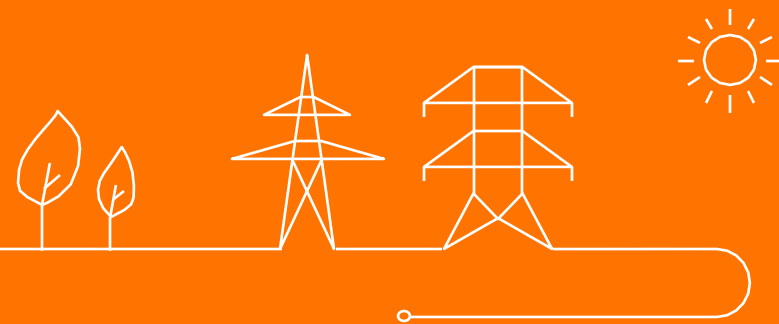
## Investment files – RD 04 June 2021

- Public consultation: 17/02 – 03/03 (3 weeks)
- Consultation report + Elia's formal opinion + Amendment of the proposal + file IF: 13/03 – 31/03 (3 weeks)
- Launch of the legal process: 03/04
- Publication: 15/05 at the earliest

## Payback Obligation/IPC – RD 28 April 2021

- Public consultation: 20/02 – 13/03 (3 weeks)
- Consultation report + formal opinion + Amendment of the proposal + file IF: 13/03 – 31/03 (3 weeks)
- Launch of the legal process: 03/04
- Publication: will depend on the amendment of the E-Law – will be clarified asap

# Next meetings



## Foreseen timeslots for next meetings

- Thursday 23th March 2023 **am** : WG
- **NEW** – Thursday 23th March 2023 **pm** : UX Design Session Availability Monitoring (part 1) \*
- **NEW** – Friday 31st March 2023 **OR** Friday 7th April **am** : CRM Design – General Info session \*
- Friday 14th April 2023 **am** : WG
- **NEW** – Friday 14th April 2023 **pm** : CRM IT Interface Training \*
- **NEW** – Tuesday 18th April 2023 **OR** Monday 24th April **whole day** : CRM Design – Specific Info session \*
- Tuesday 23th May 2023 **am** : WG
- **NEW** – Tuesday 23th May 2023 **pm** : UX Design Session Availability Monitoring (part 2) \*
- Friday 16th June 2023 **am** : WG



**Thank you !**

