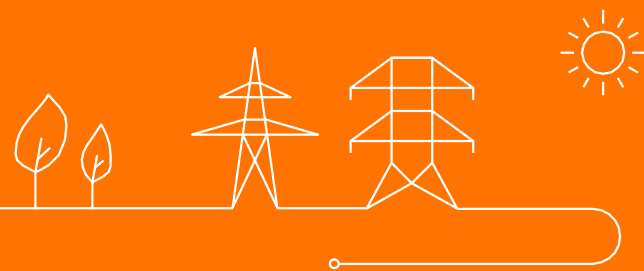


Users' Group

Working group Belgian Grid

27 juni 2024



Agenda



1. EOS/EDS Capacity Reservation: discussion (1 hour) (C Bastiaensen)
2. Grid Losses (P Buijs)
 1. Grid losses: % for BRPs for 2025 (20 mins)
 2. Procurement method for regional losses and evolution towards DA procurement (20 mins)
3. Federal Development Plan (45 min) (L Mees & M Koninckx)
4. Access Contract 2.0 (20 min) (J Moelans)
5. Derogation type A,B,C,D (15 min) (J Moelans)
6. Type A/B PGM conformity process (30 min) (M Backer)
7. AOB (Hosting Capacity Maps – I Verbruggen,...)

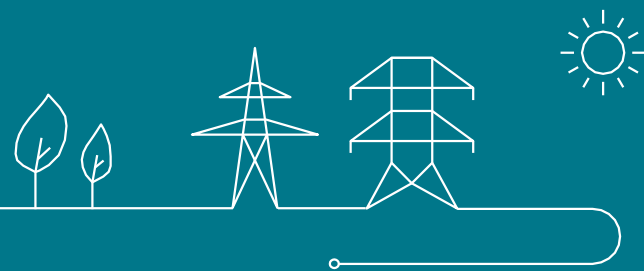


Agenda

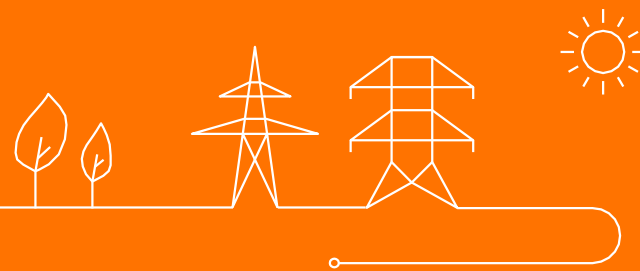
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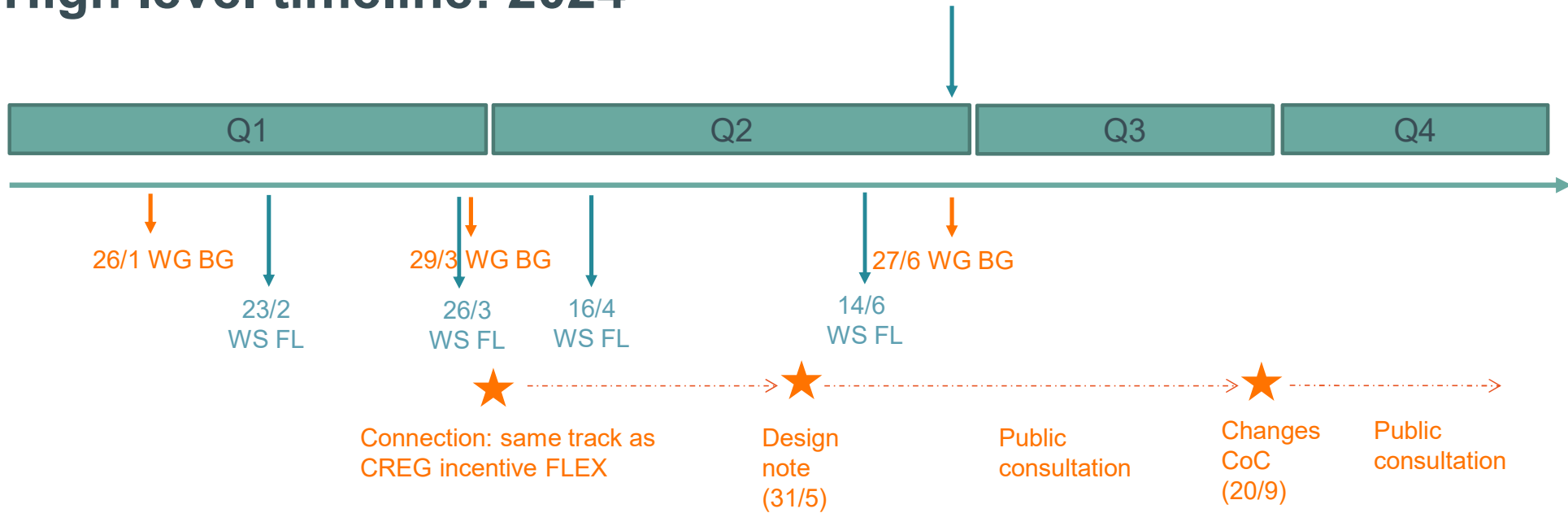
EOS/EDS Capacity Reservation



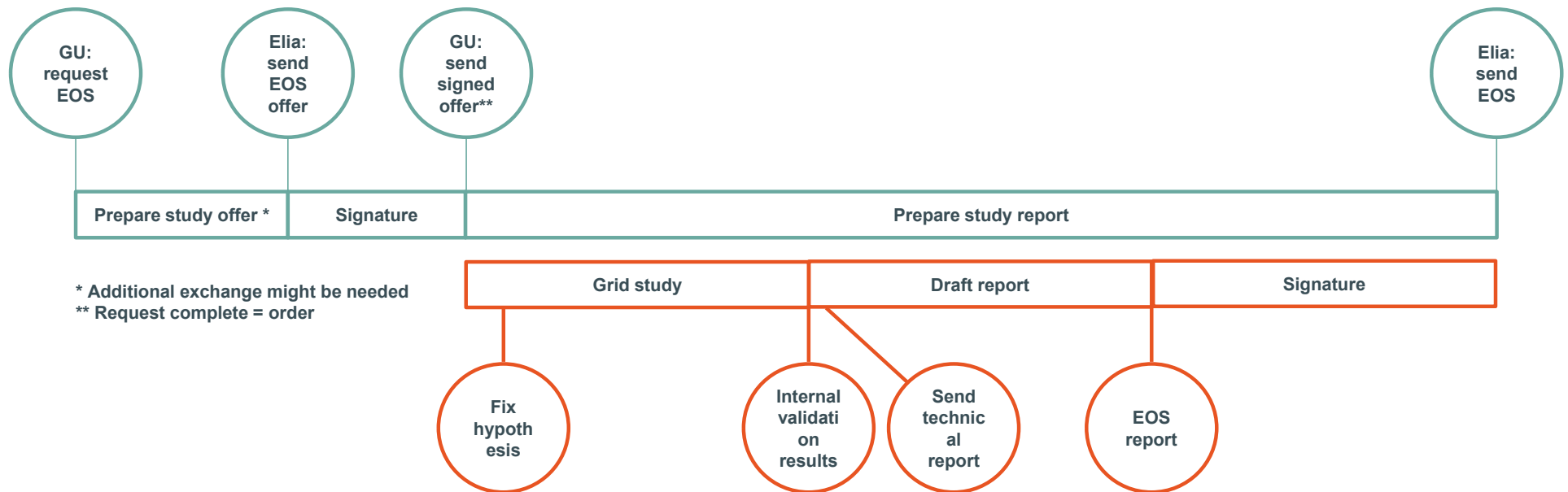
Connection process



High level timeline: 2024



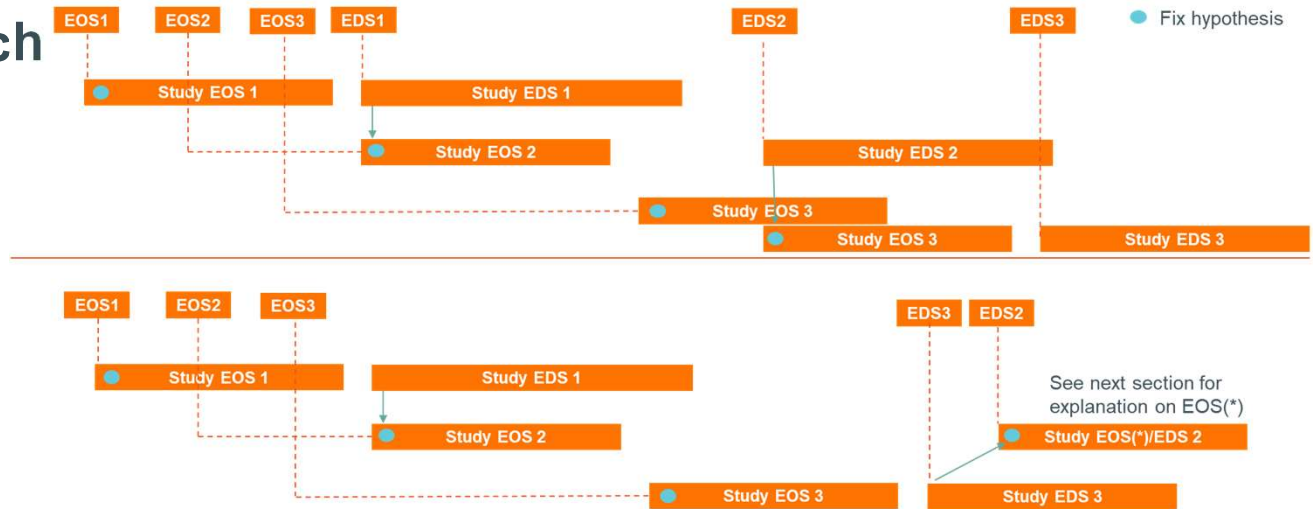
EOS: preliminary study



An orientation study is a preliminary study, before the detailed study, that assesses, through network calculations, the possibility to connect a new asset to the grid, and that sets out the technical connection options with a high-level estimation of costs and planning. Often multiple options are suggested.



EOS: serial approach



* Linked: impacting the same congestion

Advantage:

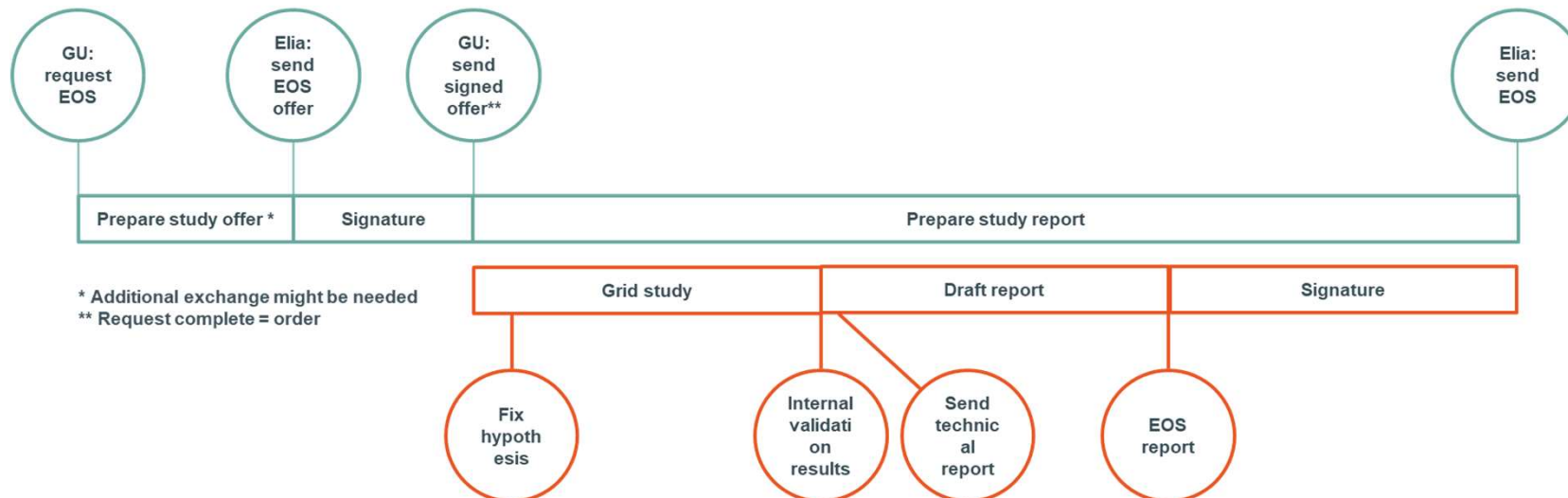
1. Guarantees that the results are valid at the time of sending the study report
2. Respects the order of requests including some decision time to move to a detailed study
3. Provides some transparency on other ongoing requests, without sharing confidential data of other Grid Users

Disadvantage:

- Timing will be depending on the number of linked studies (timing can be made more transparent by communicating the number of linked studies and follow up on the EPIC platform)



EOS: temporary results

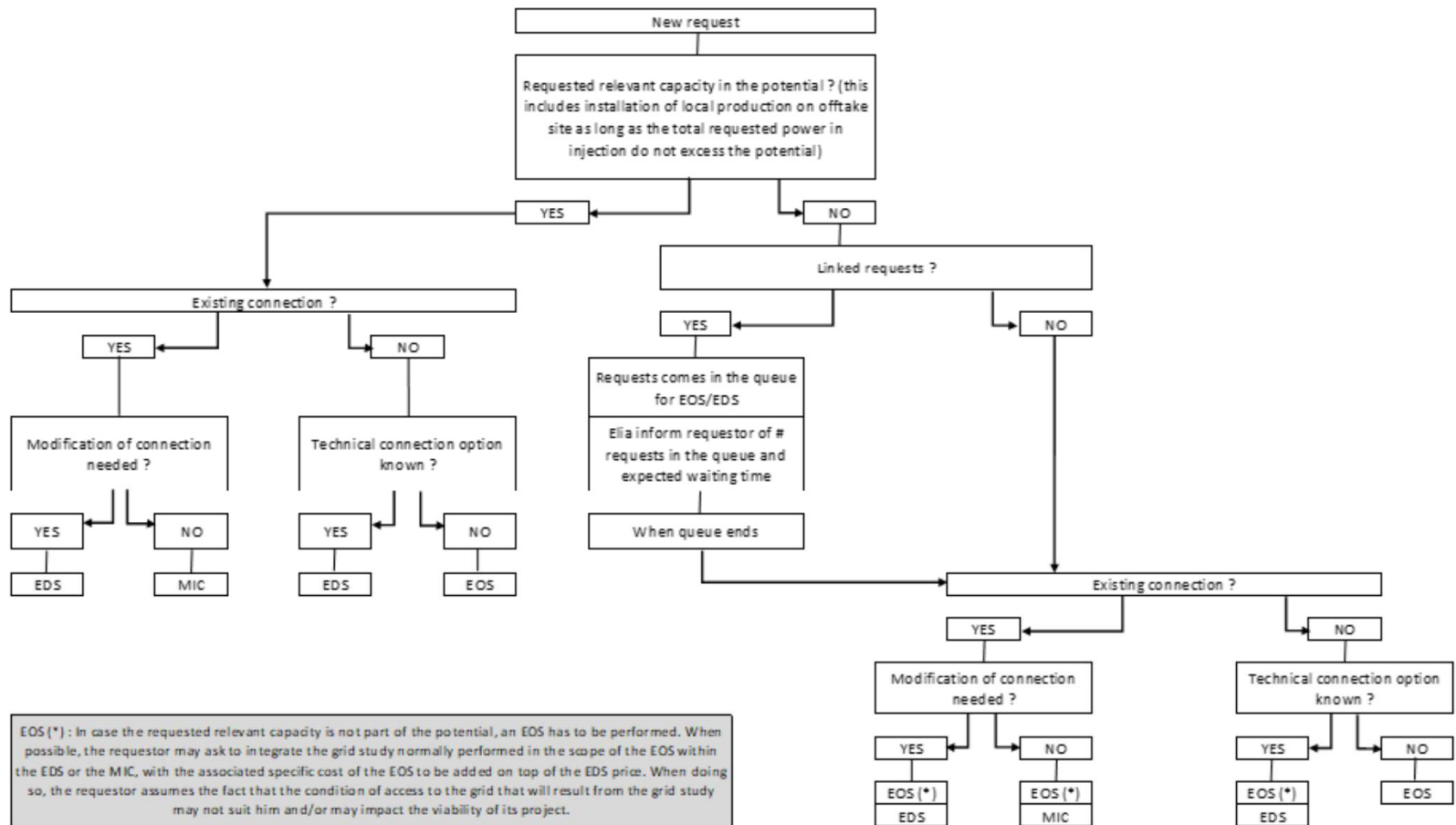


Share after the internal validation process the results of the study with the (candidate) Grid User

1. Slide format, without an official correspondence
2. GU could decide to stop the study (in this case 50% of the study is paid)
 - In case of a flexible connection: before the end of a possible escalation request
 - In case of a connection with firm access: within 10WD
3. GU can decide to move to the detailed study



EOS: obligation except for fast track



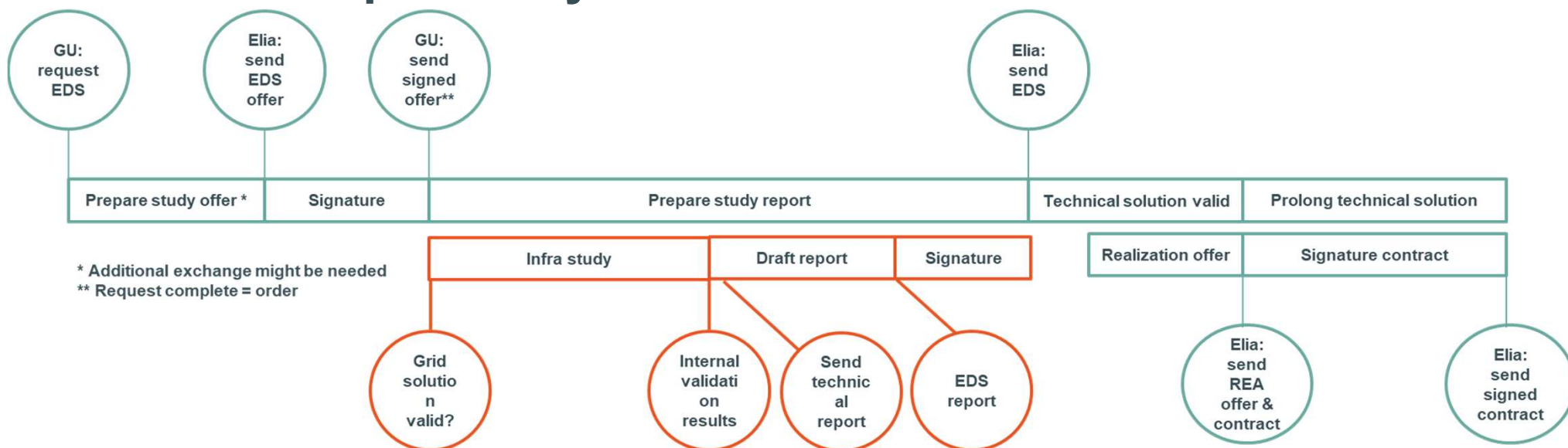
EOS/EDS: timing

AS IS: EOS 40WD / EDS 60 WD

The proposal would be to keep in the Code of Conduct a requirement to deliver as soon as possible, complemented with an indicative target for the maximum number of WD. This target should be met for most of the studies, provided that the request is complete, there is no need for additional information, and there is no flexible connection proposal.



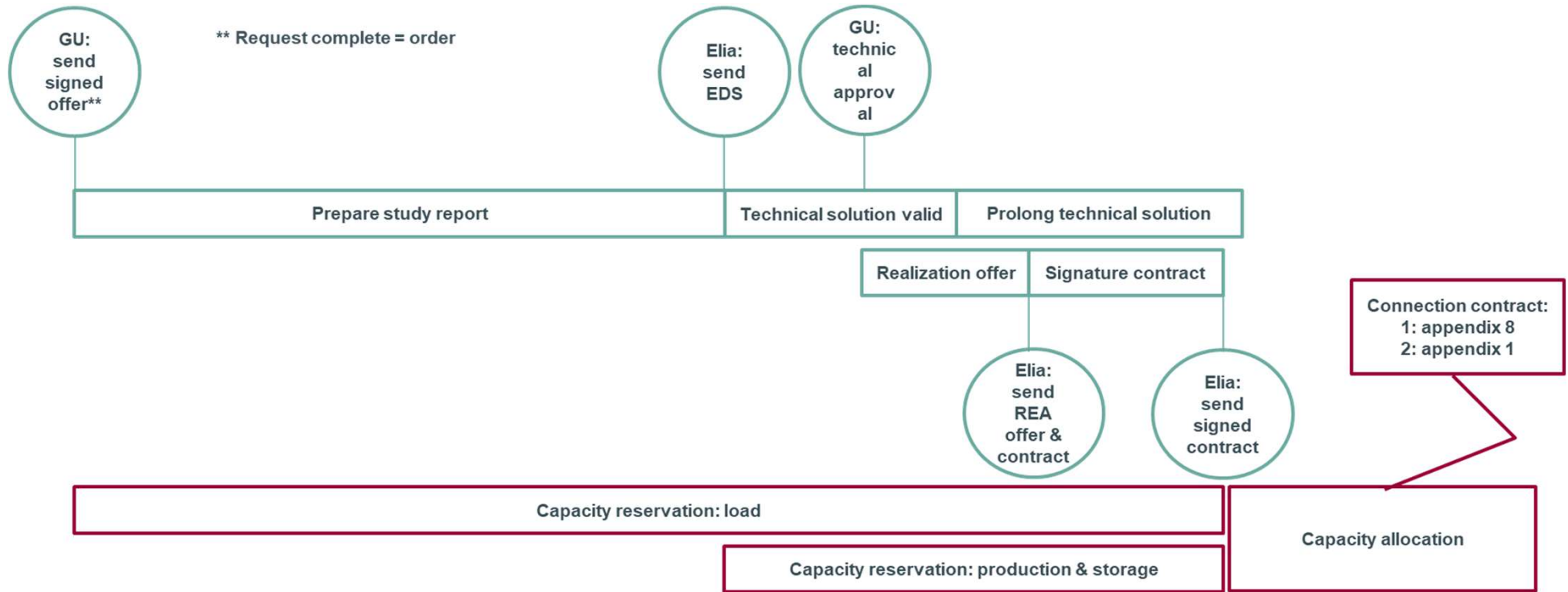
EDS: in-depth study



A detailed study is an in-depth study that sets out the technical solution and associated cost and timing. In case in the orientation study multiple options are elaborated, the detailed study elaborates on one solution for the connection. This is why, in the application form, some additional technical specifications are required to conduct the study. The project of the (candidate) Grid User should already be concrete and should not just revolve around reservation of relevant capacity on the grid. The main focus of a detailed study is about the infrastructure needed to realize the connection of the (candidate) Grid User.



Capacity reservation & allocation



Capacity reservation: limit prolongation

AS IS: in case of a capacity reservation the technical solution is valid for 120WD, with a possibility to prolong with 60WD on request of the (candidate) Grid User (without the possibility of refusal by Elia). After this period there is a possibility to prolong as long as the connection conditions (e.g. a new linked detailed study having an impact on the available capacity) do not change.

The proposal would be to limit the prolongation of the reservation to 1 period of 120WD without the possibility of refusal by Elia. At the latest 70WD after the prolongation of the technical solution the Grid User should give its technical approval, in order to leave 20WD for Elia to prepare the connection contract and offer, and 30WD for the Grid User to sign the offer and contract. Once the capacity is allocated the rules set out in the connection contract apply.



Capacity allocation: bank deposit

AS IS: there is no payment for the reservation or allocation of the relevant capacity before the related access point comes effectively in service and the allocated capacity is invoiced based on the tariff for Power Put At Disposal (PPAD).

Elia propose to request a bank deposit that has to be paid by the (candidate) Grid User as from the ordering of the realization.

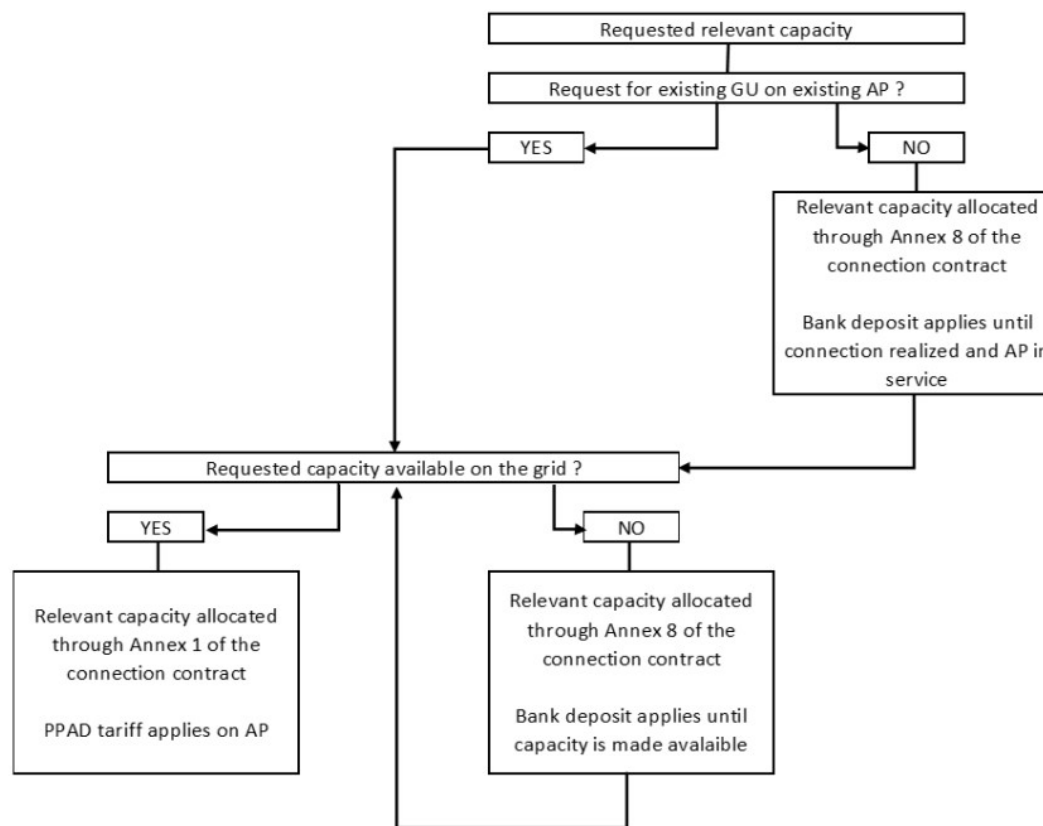
Amount of the deposit = Number of years x MVA x yearly tariff PPAD

1. If the connection commissioning happens as planned the Grid User is reimbursed for the amounts blocked and the tariff for PPAD is applied.
2. If the realization is abandoned, Elia keeps from the bank deposit the yearly bank deposit amount for the number of years the capacity has been unduly blocked. The rest is reimbursed.
3. If the project is realized but delayed, Elia keeps the yearly bank deposit amount for each full year of delay and reimburses the rest

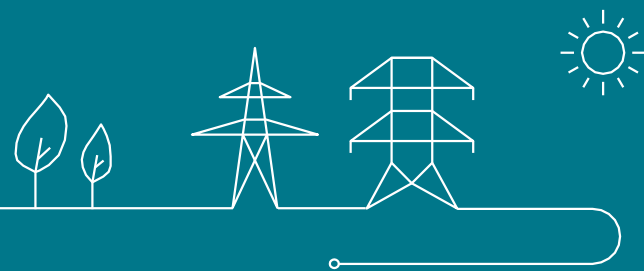
Formula: open
for discussion



Capacity allocation: bank deposit versus tariff



Grid Losses



Agenda



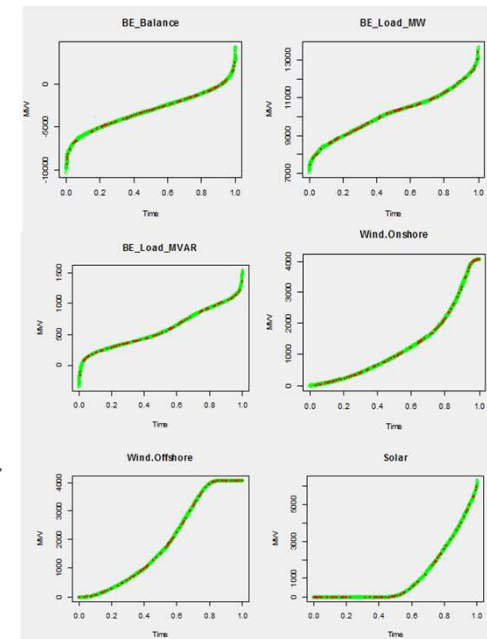
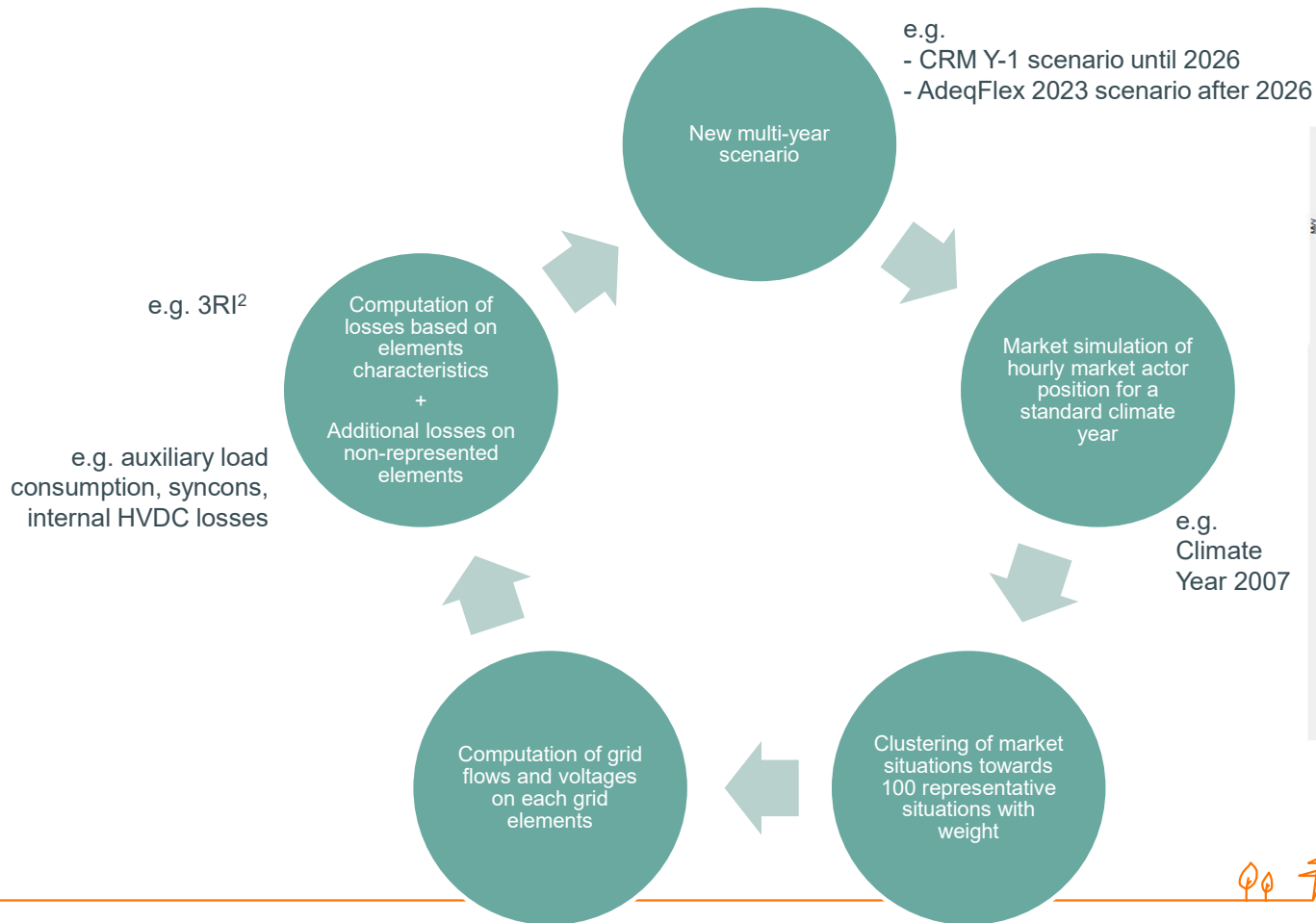
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**Outlook : Mid-Term grid
losses: Target year 2026**



Methodology for MT & LT losses computation*



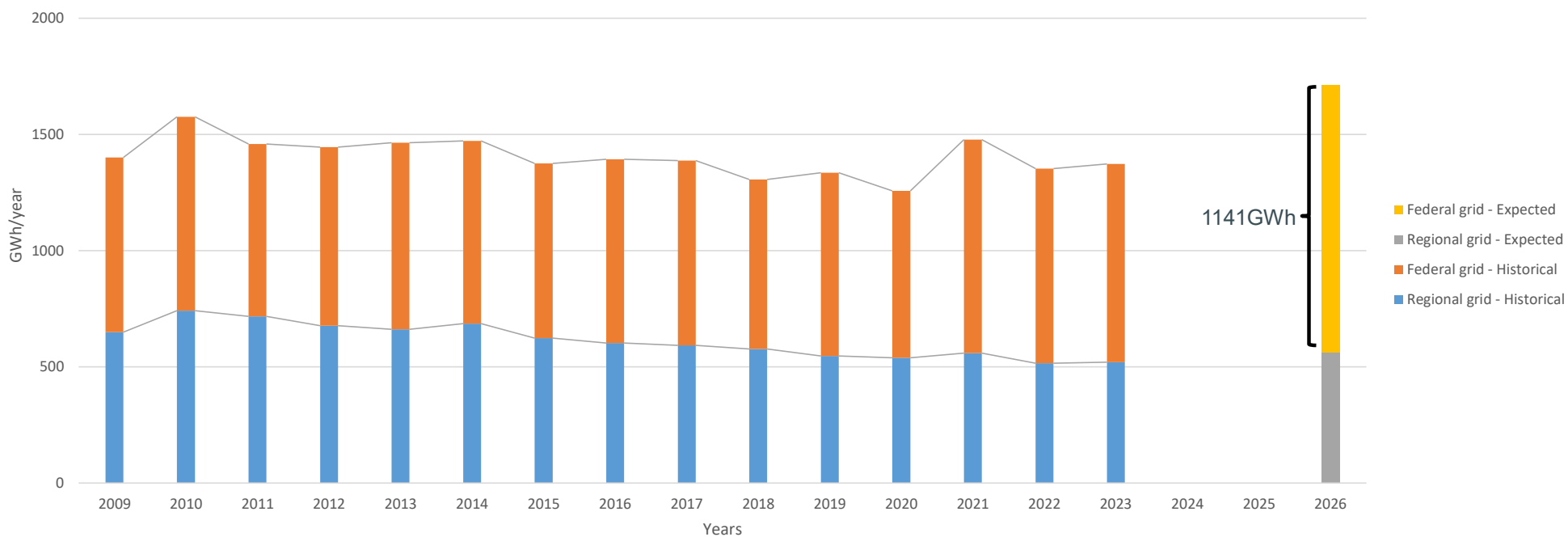
● Clusters
● Market data set



* Methodology suited for MT & LT scenarios as planning of outages is not considered. Applied from Y+3 onwards

MT evolution of grid losses: Target Year 2026

Evolution of Losses (Historical+Expected)



MT evolution of federal grid losses - Explanations

The elements contributing to the increase of the Federal Grid losses until 2026 are :

- Expansion of the grid: 400kV, 220kV & 150kV.
 - E.g. Gramme-Rimière,
- Increasing flows on existing part of the 150kV and 400kV grid
 - Market flow evolution
 - Market capacity evolution reinforced with HTLS conductors having similar impedance but much higher rating: E.g. HTLS Massenhoven - Meerhout - Van Eyck, Mercator – Bruegel,
- Increasing of the number of transformers between 400kV, 220kV & 150kV linked to the increased consumption or decentralized generation:
 - E.g. TFO in Rimière
- Installation of phase-shifting transformers:
 - E.g. PST on Lonny-Achene-Gramme
- Installation of shunt reactors to absorb generation of reactive power: e.g. Champion, Meerhout, Lint, ...
 - Situations with high import, high DG and limited conventional generation
 - Increasing number of underground cables
 - Increasing power factor of distribution system



Compensation of federal losses – BRP coefficient



Context

- The Code of Conduct (in the past it used to be the Federal Grid Code) provides in a compensation in kind by BRPs of the federal losses, further arranged in the T&C BRP
- Elia has committed to publish the new coefficient(s) for year Y+1 before the end of June of year Y
- The coefficients of the compensation in kind takes into account:
 - Expected losses for year Y+1
 - Any deficit/surplus in order to strive towards long-term financial neutrality of BRPs



Determination of the yearly percentage for compensation of federal grid losses by BRPs on their net offtake

Main drivers:

- Estimation of the grid losses in year Y+1 (*cf. methodology in previous slides*)
 - Expected load evolution

Complement:

LT financial neutrality correction (+/-) to cover for BRPs' surplus/shortfall compensation

Valorization of (remaining) historical shortfall/surplus and estimation for running year Y @[cost of regional losses and balancing cost] for year Y-1 and years Y respectively

GWh * price (Y-1,Y) → €

Update remaining cumulative value of the valorized shortfall/surplus

Σ€

Determination of the equivalent volume to be corrected for in Y+1

Σ€ / price(Y+1) → GWh

% Y+1

Note that LT financial neutrality effectively fluctuates around zero (*cf. 2022 study Fig.5, p.13*)



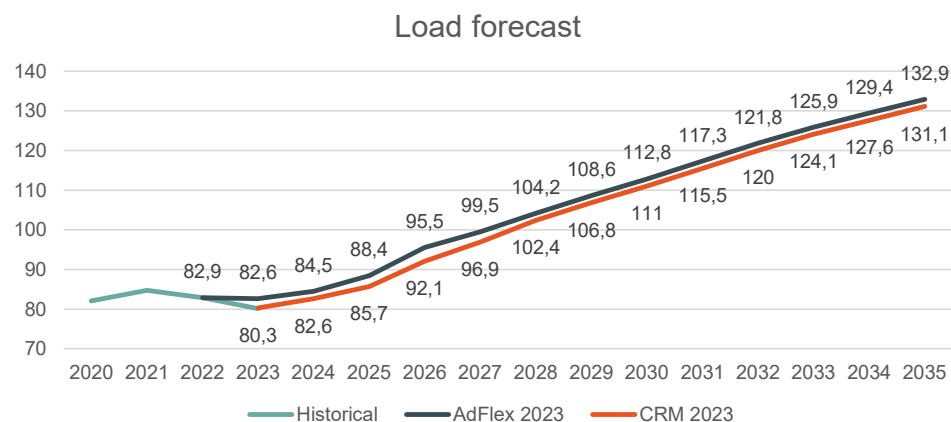
Main drivers: estimated losses and load

ESTIMATED LOSSES

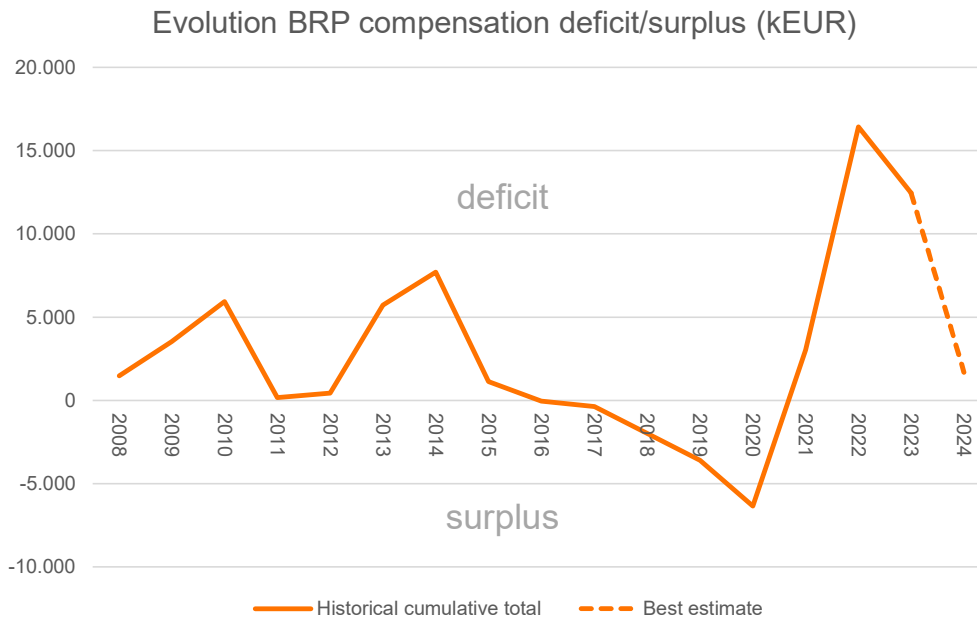
	2022	2023	2024	2025	2026
Federal losses (in GWh)	838	853	923	1035	1141
	2022 actuals	2023 actuals	4 months of actuals + 8 months of interpolation between actuals 2023 and 2026 forecast	Interpolation between actuals 2023 and 2026 forecast	2026 forecast

ESTIMATED LOAD

Same values used as in the reference scenario for the CRM Y-1 auction with delivery period 2025-2026. This is an updated revision of the forecast that was made in the AdeqFlex'23 study.



Long-term financial neutrality correction



1. 2023 has partially reduced the sharp increase that was caused due to the high prices of 2022.

2. 2024 is already expected to reduce a significant portion of the deficit. However, at the end of the year, a total deficit will remain.

→ In order to continue decreasing the deficit, the percentage of the BRP's will be adapted in the upwards direction.





2025 Percentage for BRP compensation in kind

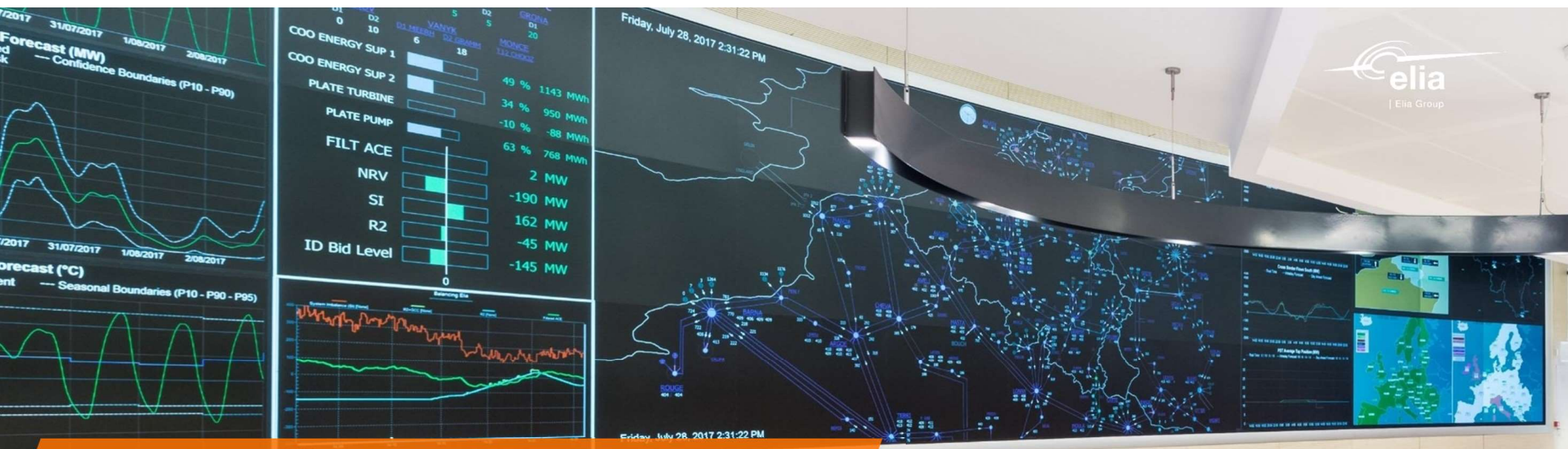
	2022	2023	2024 (partially estimated)	2025 (estimated)
Federal losses (GWh)	838	853	923	1035
Compensation in kind (GWh)	840	955	1120	1062
Coefficient %	1,45%	1,80%	1,95%	1,75%

The coefficient is aligned upwards/downwards:

- Losses and load estimations would lead to a percentage of about 1,7%
- Additional increase/decrease of about 0,05% in order to recover (partly) the deficit in the view of LT neutrality

→ The final coefficient for 2025 is set at 1,75% for both peak and off-peak moments.

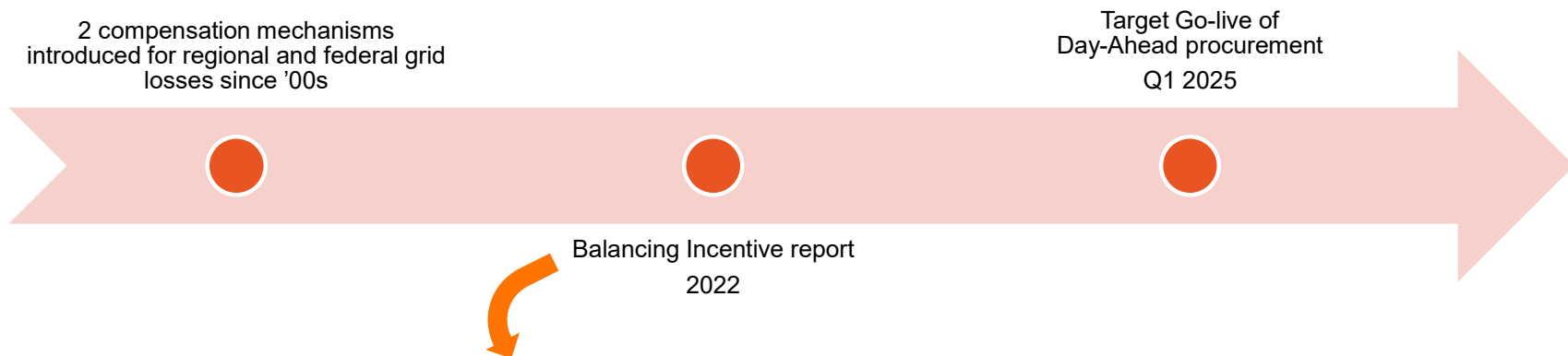




Day-Ahead Procurement for Grid Losses Compensation



Introduction: FROM the 2022 Balancing Incentive TO ...



The CREG laid an incentive on Elia to investigate amongst other things:

Whether it would be more efficient that Elia also procure (part of) the compensation energy on a shorter-term time horizon (particularly Day-Ahead) based on a short-term forecast?

Elia did a desktop study, benchmarking with other EU TSOs and ran a forecasting POC.

Report: [Balancing incentive study on the estimation and the compensation of the grid losses \(elia.be\)](https://www.elia.be/en/press-releases/2022/09/2022-balancing-incentive-study-on-the-estimation-and-the-compensation-of-the-grid-losses)

Result:

- Complementing the existing compensation mechanisms with ST procurement would increase efficiency
- POC shows a sufficient ability to make such D-1 forecast



Introduction: Regulatory Framework

- At Federal level, the CREG sets the framework (through the tariff file, code of conduct and T&C BRP) for the respective federal aspects of losses compensation.
- For Flanders, the mechanism for the regional losses has been further embedded in the “Energiedecreet”. Recently, in a decision VREG took note of the current methodology, calling for some further clarifications.

Energiedecreet artikel 4.1.17/6

*§ 1. De elektriciteitsdistributienetbeheerders en de beheerder van het plaatselijk vervoernet van elektriciteit zijn verantwoordelijk voor de aankoop van producten en diensten, namelijk voor de aankoop van energie voor het dekken van netverliezen en niet-frequentiegerelateerde ondersteunende diensten, die nodig zijn voor een efficiënt, betrouwbaar en veilig beheer van het elektriciteitsdistributienet en plaatselijk vervoernet van elektriciteit, en stellen daarvoor de transparante, objectieve en niet-discriminerende regels op, **in een transparant en participatief overleg met de transmissienetbeheerder en alle relevante marktdeelnemers. Die regels worden, na het voormelde overleg, ter goedkeuring voorgelegd aan de VREG.** [...]*

§ 2. Bij het verrichten van de taken, vermeld in paragraaf 1, kopen de elektriciteitsdistributienetbeheerders en de beheerder van het plaatselijk vervoernet van elektriciteit de niet-frequentiegerelateerde ondersteunende diensten aan die nodig zijn voor hun net, volgens transparante, niet-discriminerende en marktgerichte procedures, tenzij de VREG van oordeel is dat de marktgebaseerde verlening van niet-frequentiegerelateerde ondersteunende diensten economisch niet efficiënt is en een afwijking heeft toegestaan. De VREG werkt de nadere regels in verband met die afwijking uit in het technisch reglement distributie elektriciteit en het technisch reglement plaatselijk vervoer van elektriciteit.



A revised methodology on the procurement of energy for the compensation of the grid losses will be submitted to the VREG for approval by the **30st of September’24**. This will include:

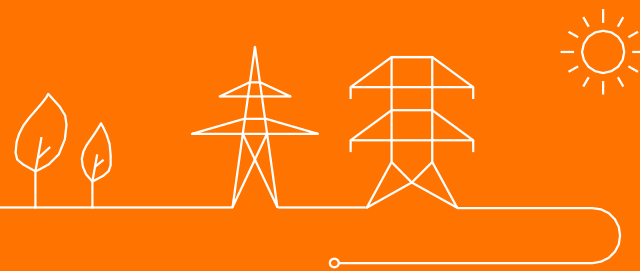
- Long-term procurement for regional grid losses: clarifications following the earlier VREG decision
- Day-Ahead procurement for regional and federal grid losses

- Similar decrees exist for Wallonia and Brussels, but without the requirement to submit a methodology for regulatory approval.



Recap Compensation of the grid losses

As-is



Recap - Grid losses compensation: today's design



Today, the compensation of Elia's grid losses is arranged via 2 mechanisms, for which any delta (supply gap) is settled through the imbalance mechanism (cf. later slide):

1. Regional grid losses compensation

What? Losses on Elia's grid ≤ 70 kV

How much? ~500GWh/yr \rightarrow about 60 MW (but volatile)

Responsible for compensation? Elia

How?

- Following a long-term prognosis based on power flow simulations
- Elia contracts energy through longer-term contracts with suppliers
- Yearly/Quarterly contracts for standard BASE or PEAK blocks, sometimes complemented with Monthly contracts. Procurement starts 3 years ahead to spread price risk.
- Financed through the Elia tariffs as 'influenceable cost', i.e. with an incentive to procure at lower cost

2. Federal grid losses compensation

What? Losses on Elia's grid ≥ 110 kV and HVDC (excl. Nemolink)

How much? ~800GWh/yr \rightarrow about 90 MW (but volatile). Increase expected.

Responsible for compensation? BRPs with physical offtake position (\approx Market Parties)

How?

- Compensation "in kind"
- Inject extra energy defined as a % on physical offtake in the BRPs portfolio
- On a Quarter Hourly basis
- % fixed by Elia on a yearly basis, aiming for long-term financial neutrality
- Same % for all QHs of the year.
- BRPs charge the cost on their clients (i.e. consumers)



Long-term procurement for regional grid losses: the AS IS methodology is being embedded in a methodology to be approved by VREG



Note that the contours of this methodology were anyhow already part of the tariff file submitted to CREG.

Determining the volume to procure

Applied methodology:

1. The profiles of Y+1 are based on the latest available **historical data**
2. A **growth ratio is applied** on the profiles that are determined in the previous step. This ratio is calculated as the estimated grid losses for the year under consideration to the actual grid losses of the previous year.
3. **Additional corrections** are made on the profiles to avoid mismatches between peak and off-peak hours (e.g. matching weekdays and weekends, Daylight Saving Time)
4. The amounts are aggregated per month and **rounded to the nearest 5 MW** units.
5. Once the initial monthly profiles for each month are calculated, Elia starts an **iterative process in order to optimize the supply gap**, in which the supply gap is simulated based on the profiles per QH (as determined in step 2) and the monthly profiles as compensation (as determined in step 4). If the calculated supply gap is structurally negative or positive, the initial monthly profile is adapted accordingly. This gives us the final monthly profiles.
6. The final profiles of Y+1 are **also used for Y+2 and Y+3**.

Note: Elia may deviate from this method in case of extreme market conditions.

Procurement methodology

- All market parties, that are qualified in accordance with the European **qualification** procedure, are invited to participate. The qualification criteria are:
 - Supplier must have a BRP license for the grid of Elia
 - Must sign a declaration of honor
 - Provide a Graydon Rate as proof of a healthy financial situation
 - Agree with purchasing terms & conditions of Elia
- Qualified candidates will be invited to participate to the tenders for the grid losses via the Ariba platform.
 - 10 to 15 tenders are organized per year.
 - They receive a notification via email. But Elia also contacts them by phone to avoid missing participants.
- The purchased volumes are usually **bought in blocks of 5 MW**.
 - Buying larger blocks reduces competition and our capacity to spread the risk over time.
 - Blocks of 5 MW are the standard trading blocks. The supplier fees are higher if we purchase smaller / less liquid energy blocks.
- Elia buys the blocks over a time span of 3 years to spread the price risk over time.
- In order to decide when to perform an auction, Elia has enlisted the support of an energy market specialist consultancy agency that follows market trends and **provides recommendations on when to execute a tender**.

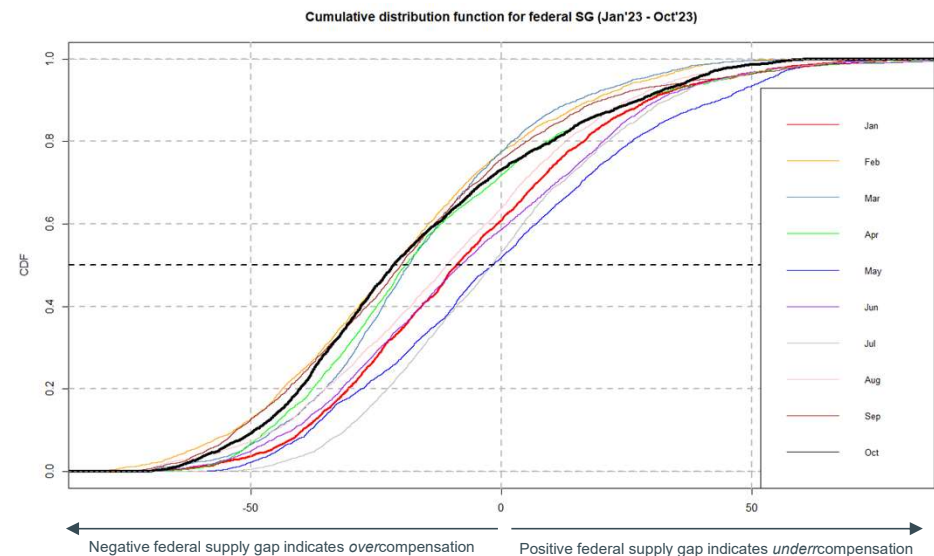
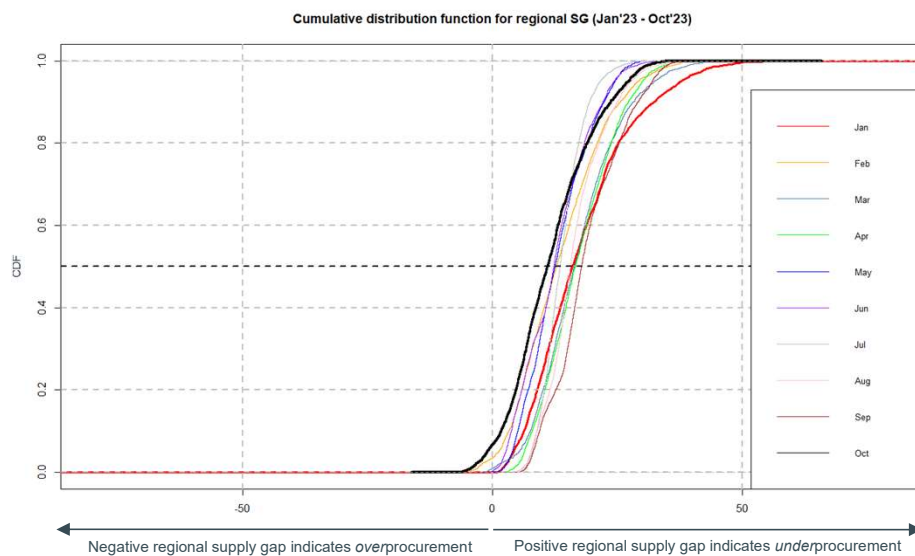
The supply gap covers the unavoidable real-time mismatch created by the two long-term mechanism.

Supply gap = The mismatch between compensation (by Elia (reg) + BRPs (fed)) and actual losses in real-time

What? Any deficit or surplus between compensations foreseen by Elia (regional) and BRPs (federal) for a given moment.

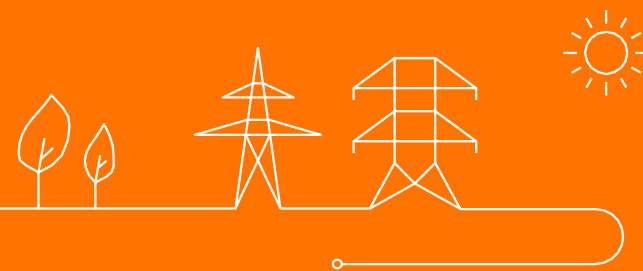
Responsible for compensation? Indirectly, Elia on behalf of 'the system'

How? Any such mismatch in real-time is an imbalance of the system. The Elia dispatching will activate balancing energy to compensate.



Compensation of the grid losses

Day-ahead procurement



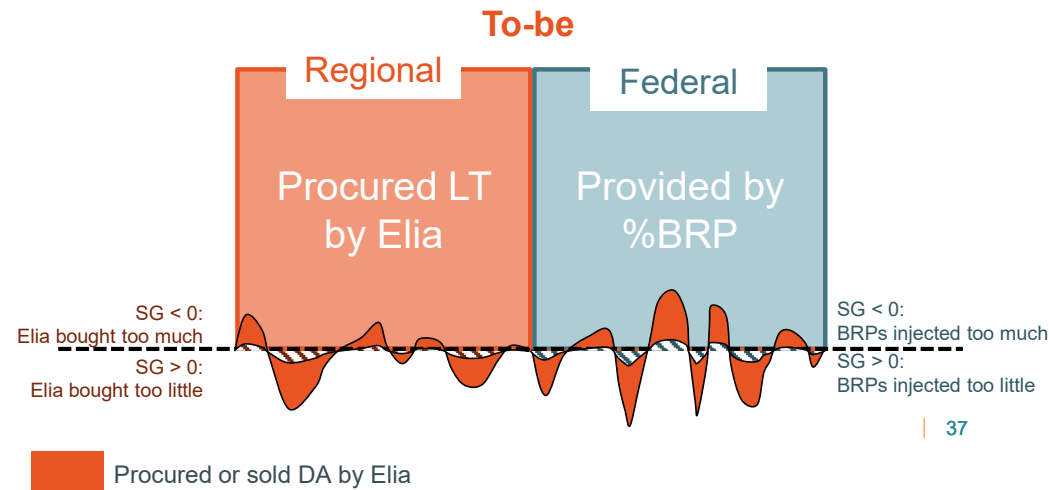
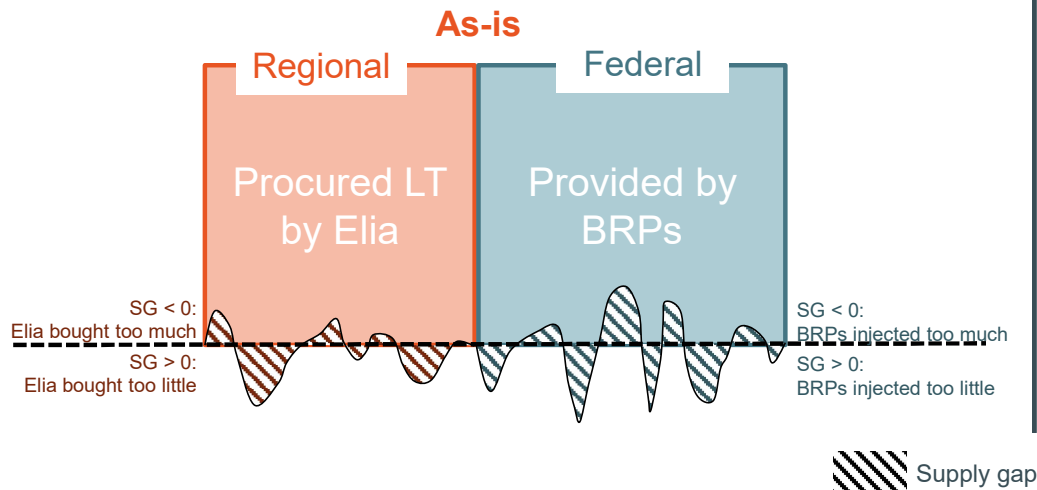
Elia will complement LT procurement with the functionality to buy/sell part of the energy on the Day-Ahead market to compensate grid losses based on a D-1 grid losses forecast.

FROM (today)

- **Regional losses:**
 - LT procurement (Y-3 to M-1)
- **Federal losses:**
 - in kind compensation by BRP based on Y-1 percentage
 - Aim for LT neutrality by correcting the percentage based on historical under/overcompensation
- **Supply gap (regional & federal)**
 - 'absorbed' in the system imbalance

TO (target: Q1'2025)

- **Regional losses:**
 - LT procurement (Y-3 to M-1), like today
- **Federal losses:**
 - in kind compensation by BRP based on Y-1 percentage
 - Aim for LT neutrality by correcting the percentage based on historical under/overcompensation (**taking into account effect of D-1 procurement**)
- **Supply gap (regional & federal)**
 - **Reduction through DA forecasting and DA procurement**
 - Remaining forecast error/supply gap: 'absorbed' in the system imbalance like today



Day-ahead procurement process starts with a day-ahead forecasting



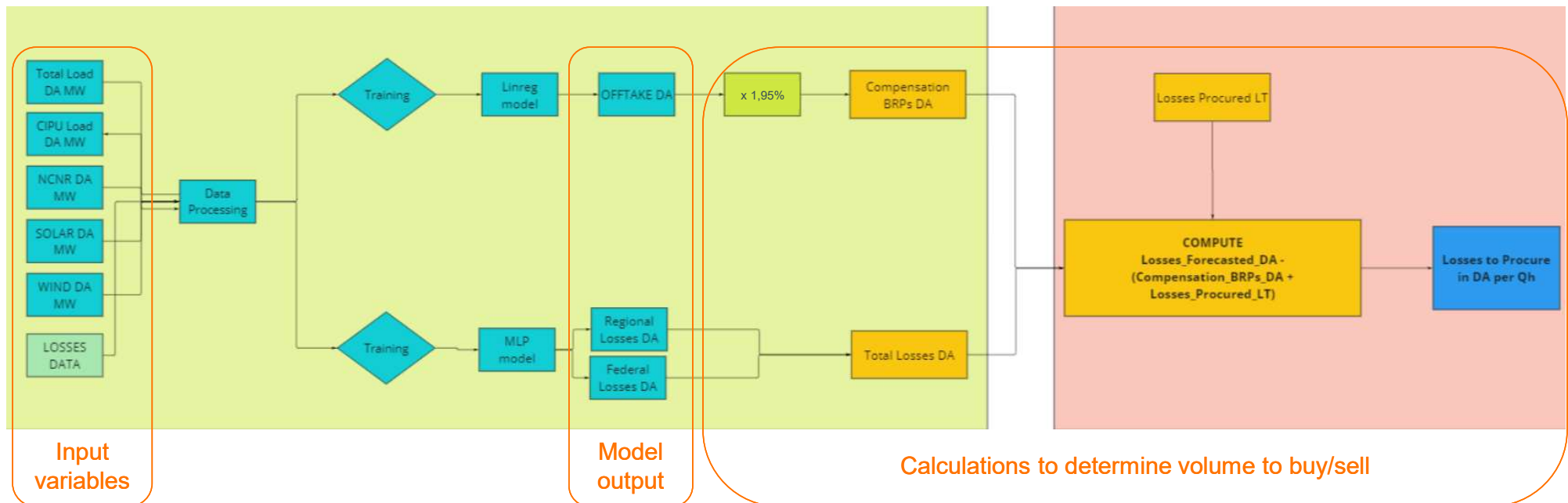
Day-ahead procurement process starts with a day-ahead forecasting



Main principles:

1. The federal and regional grid losses will be **forecasted daily** D-1 for D (including weekends and holidays) on a quarter-hour basis.
 - The daily forecast will include preliminary forecasts for the next 3-8 days that can be used as **back-up value** in case a D-1 forecast cannot be generated.
2. Elia will estimate the expected volume of federal compensation by BRPs and take into account how much regional losses have **already been compensated** via LT procurement.
3. The **volume to buy/sell** on the day-ahead market will be determined by
 - The total grid losses estimations, deducted by the compensations that are already foreseen (regional) or estimated (federal)
 - Netting the federal and regional losses to ensure overall efficient outcome
 - Averaging out the quarter-hour values per hour (i.e. DA market granularity)

Simplified view on the forecasting machine-learning algorithm and the computation of the volumes to be procured



- **Total load** day-ahead forecast in MW
- **CIPU load** day-ahead forecast in MW
- **NCNR** production day-ahead forecast in MW
- **Solar** day-ahead forecast in MW
- **Wind** day-ahead forecast in MW
- **Regional losses** actuals of last 7 days in MW
- **Federal losses** actuals of last 7 days in MW

- 3 elements are forecasted by the model:
- **Offtake** day-ahead forecast
 - **Regional losses** day-ahead forecast
 - **Federal losses** day-ahead forecast

For each QH we will calculate the **volume to buy/sell DA** =
Forecast of Regional losses+ Forecast of Federal losses
– Already_LT_bought_volumes – Forecast of BRP compensation

Day-ahead procurement process: once forecasted, volumes are traded on the DA spot market.



Main principles:

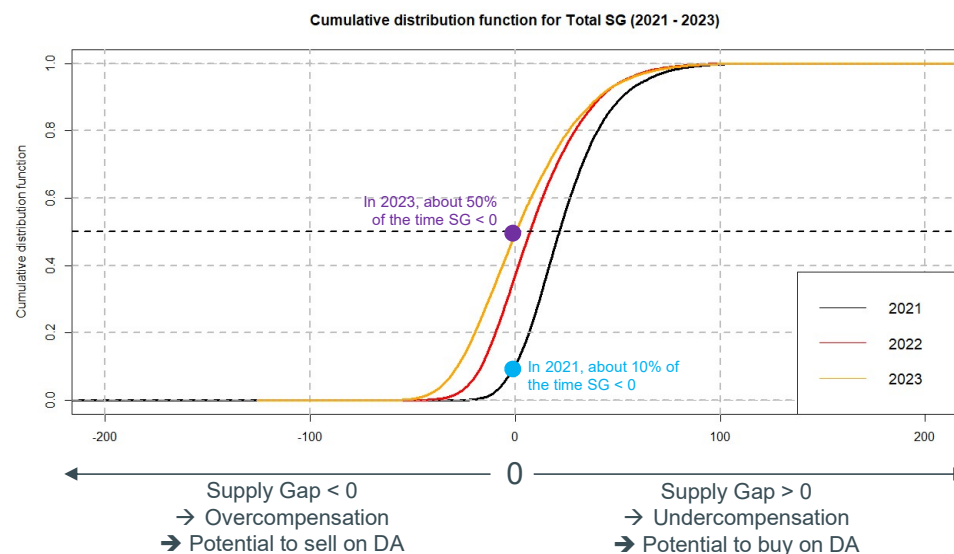
1. The volume to buy/sell will be sent to the front-office of 50Hertz, who will **perform the trades on the Day-Ahead auctions** for Market Area Belgium:
 - If the volume is positive: they will buy the additional energy in 60-minute blocks at any price
 - If the volume is negative: they will sell the excess energy in 60-minute blocks at any price
 - If the volume equals zero it means that there is no need to adjust the position further
2. In case the front-office doesn't receive a new volume to buy/sell by 9am, they will buy/sell the **back-up values** that were sent previously.
3. In case no back-up values are available, the front-office will buy/sell per hour, the **average** of the same hours of the last 10 days (separate calculation for weekdays and weekends).
4. In extreme cases, in case that the volume could not be procured/sold (e.g. due to insufficient market liquidity), the position remains open and it will result in the **system imbalance**, which corresponds to the "as is" case today.

Evolution of supply gap drives the approach for day-ahead procurement: Both buy and sell transactions are recommended to ensure a balanced result

- When the Balancing Incentive Report was published in 2022, the total Supply Gap was mostly positive. However, meanwhile the situation has evolved towards a much more even split between positive and negative compared to previous years.
- This trend is mainly driven by the overcompensation at federal level.
 - More years like 2023 are expected given significant ardoise (resulting from the energy crisis) is to be absorbed over the next years.
- Sticking to a “buy only” strategy could lead to a significant supply gap and a skewed impact on the real-time system imbalance.

→ Hence, “buy and sell” solves this and provides a robust, future-proof approach, in line with other practices in Europe







- Alternative strategies are considered, but deemed less appropriate:
 - Reduce the long-term purchases
 - Stick to a “buy only” strategy






TSO benchmark: Other TSO's are already buying and selling on the spot market, while buying the largest part with LT tenders.

Buy and sell? Or only buy?

How much volume to buy LT vs ST?

TSO	Tenders	OTC	Buy on SPOT market		Sell on SPOT market		Other
			DA	ID	DA	ID	
	● Regional losses only						
	●		●	●	●	●	● EDF obligations & capacity market
	●		●	●	●	●	
	●		●	●	●	●	
			Not applicable				
			Not applicable				

TSO	Volume LT procurement	Volume ST procurement
	100%	Adjust position in DA and ID to reduce the supply gap as much as possible.
	100%	Adjust position in DA and ID to consider forecast errors made in the LT.
	80%	20%

TSOs that have a SPOT market access are all adjusting their positions by buying and selling on the Day-Ahead & Intraday market.

→ Elia would align with such practice.

Note the Balancing incentive report indicated that acting on Intraday may be a future step to take.



After volumes are traded, the related costs must be allocated correctly



Main principles: Integration in the current allocation mechanisms

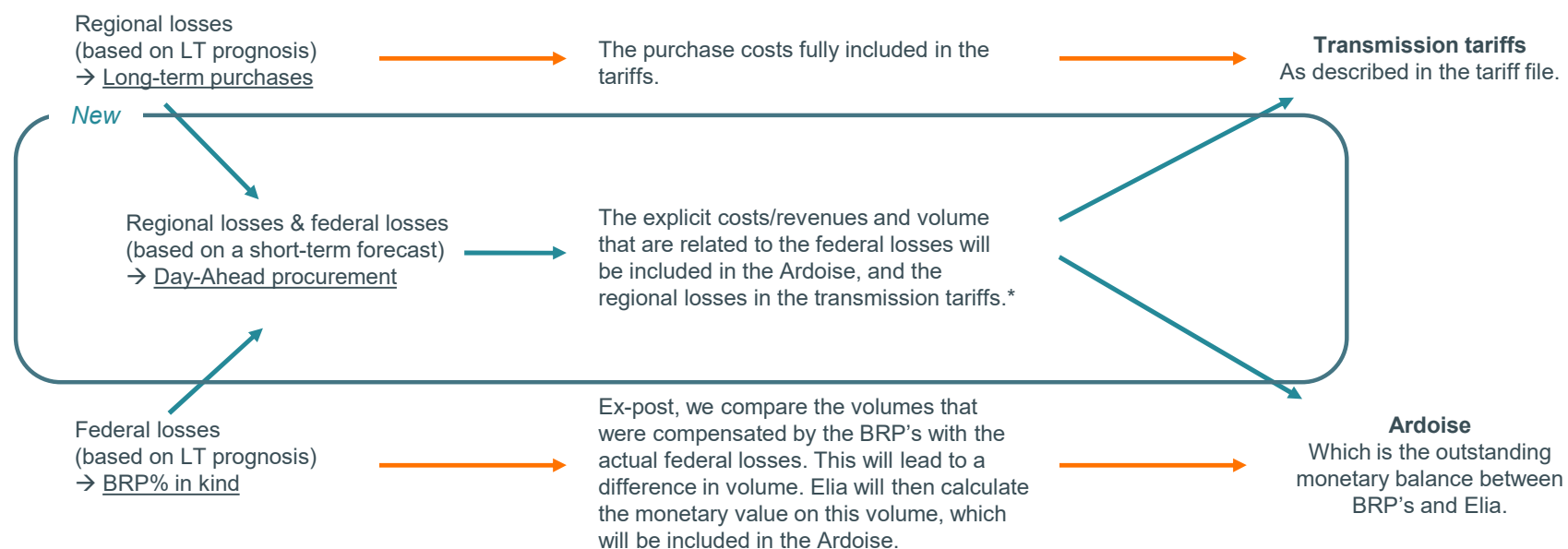
1. There are no changes to the cost allocation of the 2 first mechanisms. The costs related to the purchases for the regional losses are included in the transmission tariffs charged upon access holders and the costs related to the “in kind” compensation of the BRP’s is included in the determination of next percentages in view of a LT financial neutrality (‘ardoise’). The costs and revenues of the Day-Ahead procurement will have to be **integrated in these existing cost allocation mechanisms**.
2. **Only the explicit costs and revenues** that are a consequence of the purchases or sales on the Day-Ahead (DA) market, will have to be allocated to the Ardoise (for federal losses) or to the transmission tariffs (for regional losses). This means that only the netted DA position is taken into account.
3. The distribution of the costs/revenues is based on whether they are related to volumes of federal or regional losses. The split of federal and regional losses is made **according to the DA forecasted values**, i.e. on which the buy/sell decision was also based.
4. Also the **volume that is explicitly bought or sold** for the federal losses will be integrated in the calculation of the Ardoise, i.e. to correct the volume surplus/deficit at a specific moment and thereby avoid double/zero-counting.
5. If there is a **remaining imbalance** after the short-term procurement (e.g. due to forecast errors), this will be treated as is the case today:
 - The total supply gap will in real-time be considered in the system imbalance.
 - Ex post, the part of supply gap related to regional losses → considered in the ‘pool de réglage’
 - Ex post, the part of supply gap related to federal losses → considered in the LT financial neutrality for future %

Cost allocation of grid losses compensation: schematic view based on the principles outlined on the previous slide



Losses type and compensation

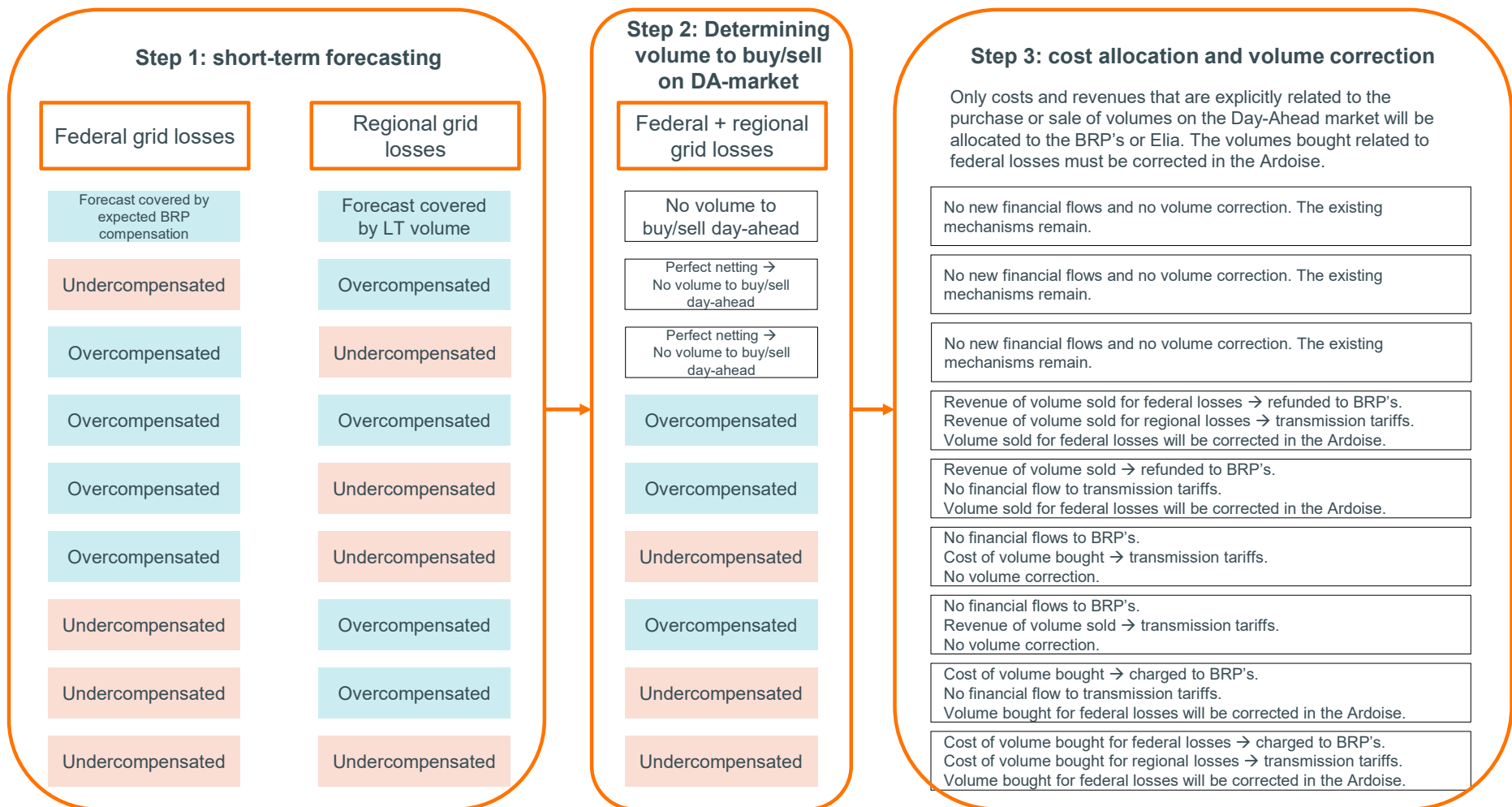
Cost allocation



*Note: the implicit allocation already happens through the existing mechanisms.



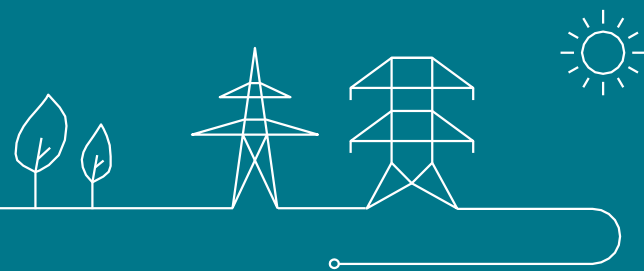
Cost allocation of Day-Ahead procurement: possible cases



Next steps

- 27/6 (today): presentation in WG Belgian Grid
- < 1/9: any feedback from market actors is welcomed, in particular on any aspects that are in the scope of the methodology that requires approval by VREG
- < 30/9: submission of (updated) methodology to VREG triggering the approval process
- Meanwhile, alignment with CREG remains also crucial.
- Target Go-Live for DA procurement: Q1 2025

Federal Development Plan



Agenda



1. EOS/EDS Capacity Reservation: discussion (C Bastiaensen)
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7. AOB (Hosting Capacity Maps – I Verbruggen,...)





Federal Development Plan of the Belgian transmission system 2024-2034



FEBRUARY 2023



Preparation of Federal Development plan 2028-2038

01



Timing FDP 2028-2038

02



What will certainly change?

03

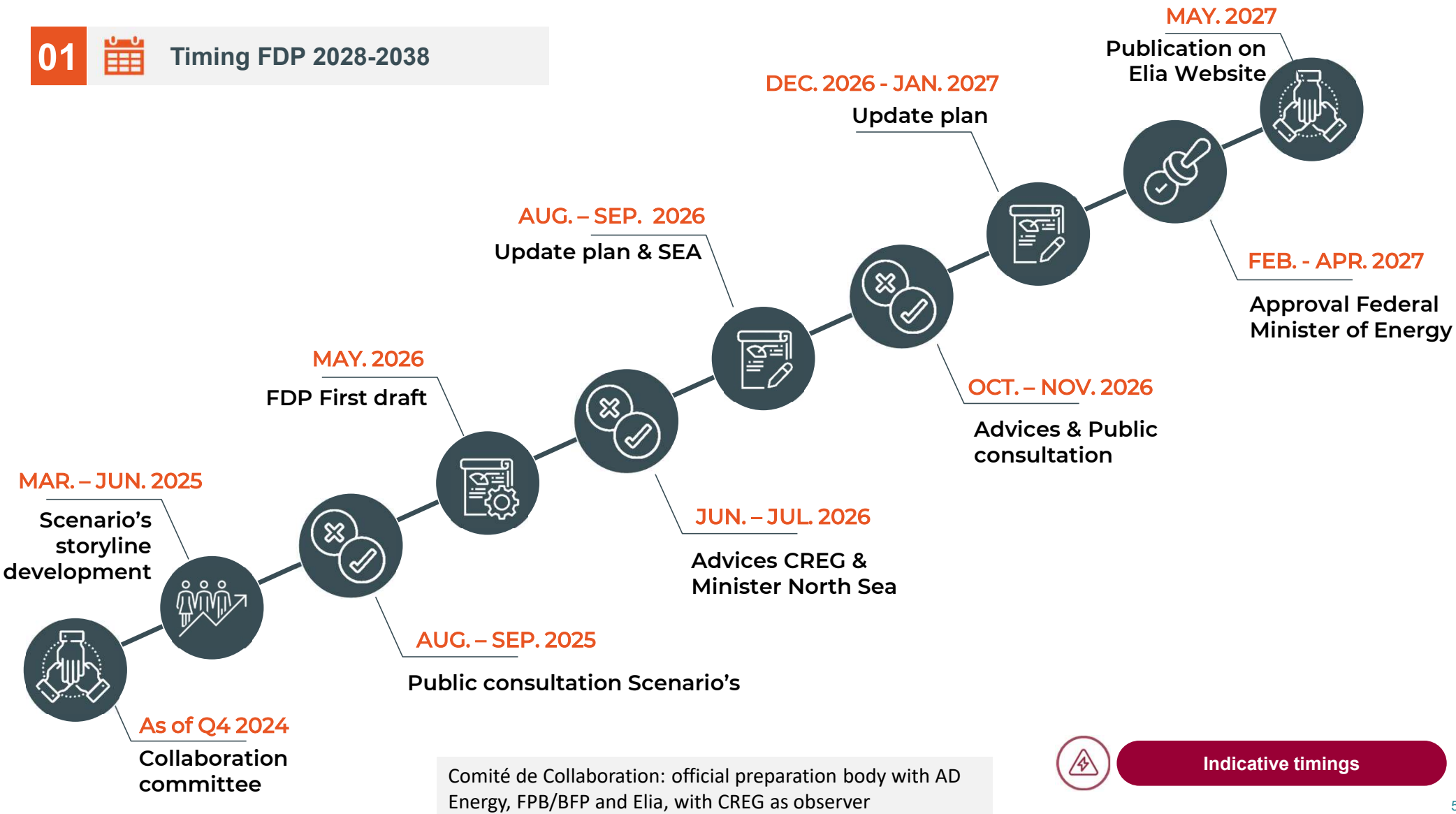


Experience Feedback

01



Timing FDP 2028-2038





1

Scenario development with stakeholders

Enhanced Stakeholder engagement during Scenario building proved an important building block for stakeholders!

2

Identification of system needs

Identification of system needs chapter generated high interest & supported the approval of the internal projects.

3

Transparency

Increasing readability & transparency is a key feedback topic for stakeholders

4

Modalities of new legislations

Impact of several revised legislations still under scrutiny: EED, EMDR, ...

Foreseen improvements

▶ Increase interaction with relation to **geographical distribution of future load**

▶ Increase involvement of **Regions**

▶ Improved **coordination with DSO's** on hypothesis

▶ Energy efficiency 1st principle: **Flexibility as alternative to infrastructure**

▶ Publication of **regional scenario data** for Wallonia, Brussels and Flanders

▶ Include KPI "**Grid Losses**" & "**High-level variants**" for interconnector CBA's



This is not yet the final list!



Objective



Capture key feedback & priorities in order to start preparing implementation trajectories, which should start now as some topics might require development of a new or modified methodology!



We will not yet decide on the scope of the next FDP, but only on what the priorities are to be investigated further! Scope will be decided in collaboration with the CdC*.

(*) CdC = Comité de Collaboration: official preparation body with AD Energy, FPB/BFP and Elia, with CREG as observer

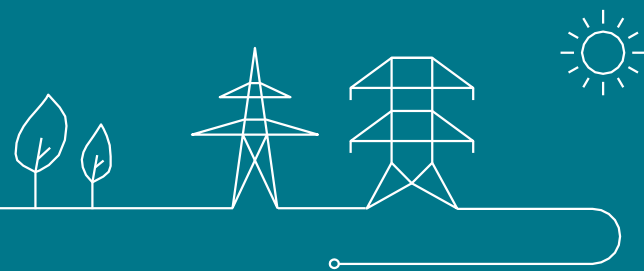
Enquête

<https://www.menti.com/al81b9smyuv5>



Discussion based on poll results

Access Contract



Agenda



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Toegangscontract 2021 – 2022

- Trigger:
 - Inschrijven van de Drop-off procedure = compromis geschreven door FEBELIEC en FEBEG;
 - Structuur van het Toegangscontract harmoniseren (gebaseerd op de structuur van het Aansluitingscontract);
 - Verwijderen van de bijlage zonder inhoud.
- 2 publieke consultaties: 9 juli – 3 September 2021 en 11 februari – 13 maart 2022
 - Ter goedkeuring ingediend op 26 april => ingetrokken;
 - NL vs. FR beter op elkaar afstemmen, redactionele verbeteringen, alfabetisch plaatsen van definities, Bijlage 6 aanpassen conform Waalse regelgeving, ...;
 - Opnieuw ter goedkeuring ingediend op 27 juli 2022;
 - Goedgekeurde versie: 27 oktober 2022.

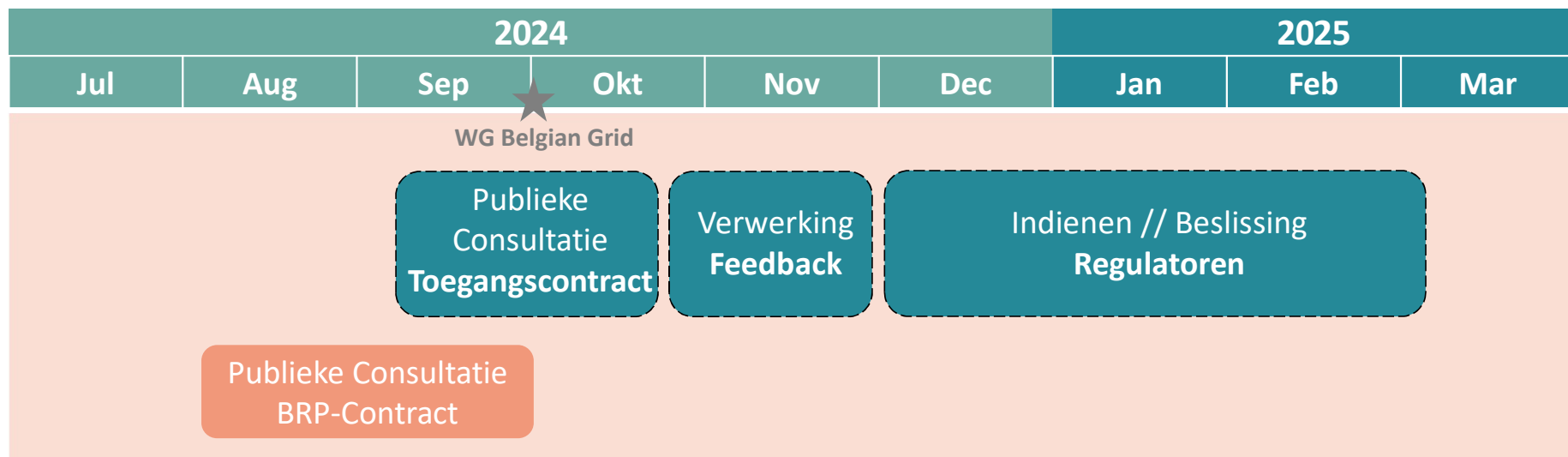
Toegangscontract 2024

- Trigger:
 - **Aansprakelijkheidsartikel** inschrijven n.a.v. de oefening die met de CREG plaatsvond;
 - **Definities** en **Algemene Bepalingen** tussen het Toegangscontract en het Aansluitingscontract **aligneren**;
 - Inschrijven van het principe van **Multiple BRP** (*Letter of Intent*);
 - Digitaliseren van Bijlage 1: Contactgegevens van de Toegangshouder en Elia => **Digitaal Platform**;
 - Verwijzingen naar de **Gedragcode** toevoegen (timing: vóór 31 december 2024);
 - Verwerken opmerkingen Beslissingen Regulators bij vorige goedkeuring.

Toegangscontract 2024 – planning

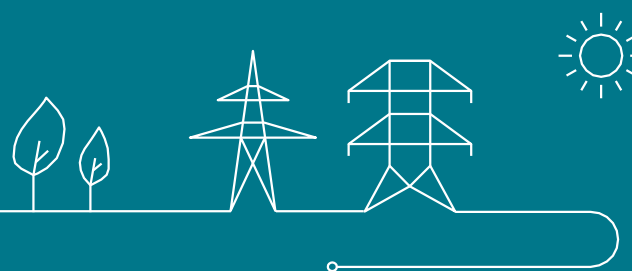
Publieke consultatie: 16 september – 18 oktober 2024

- 2 weken overlap met de publieke consultatie van het BRP-Contract;
- Track-changes;



Disclaimer: kan onderhevig zijn aan veranderingen.

Derogation types A & B >110kv



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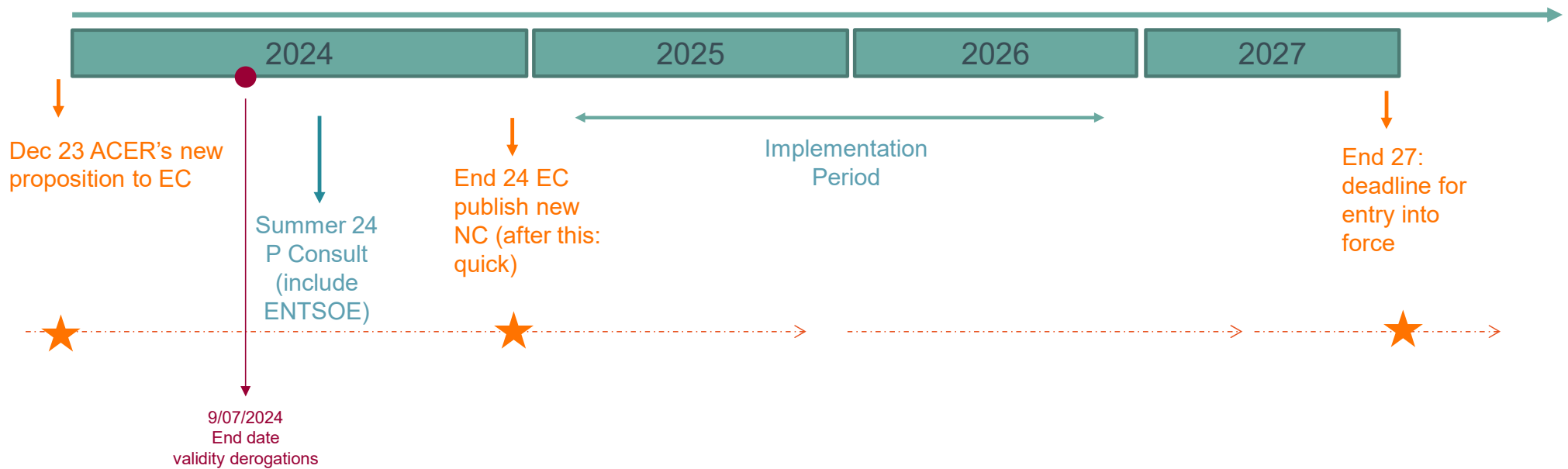


Historical Background

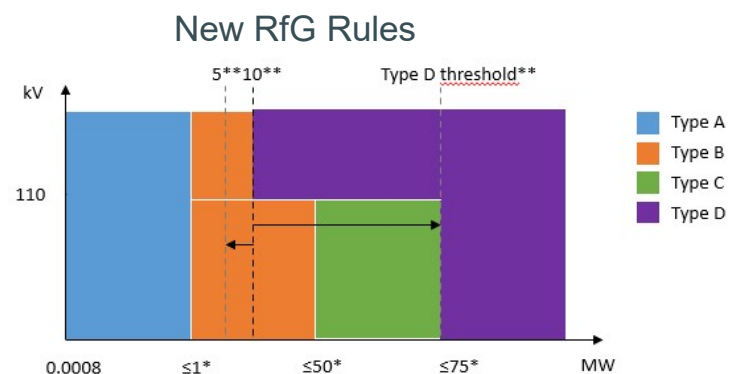
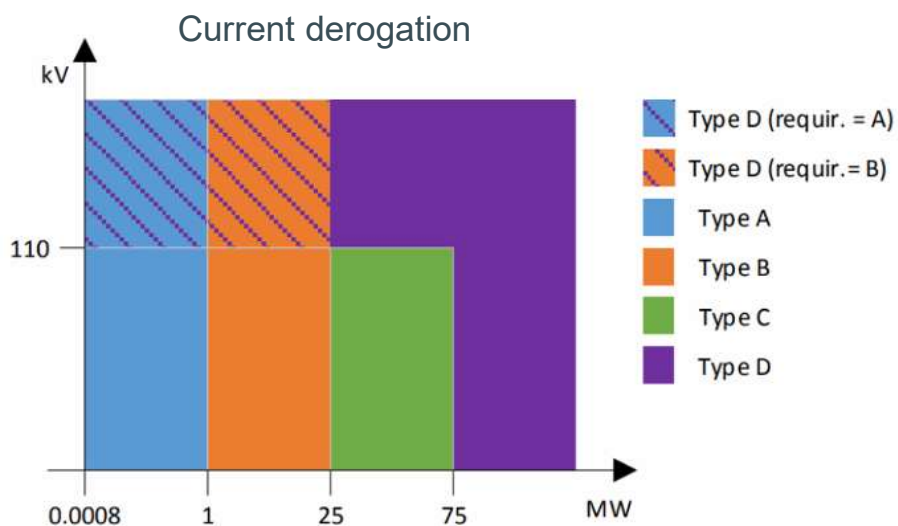
- Approved Requirements for Generators : 14/04/2016
- Revised Federal Grid Code: 22/04/2019
 - 2019: Derogation for new units* type D units < 25MW and connected \geq 110kV
 - valid until July the 9th of 2024 ([Décision \(B\)2028](#))
- Published Substantial Modernisation Guidelines: 01/04/2021
 - 2021: Derogation for existing units* type D units < 25MW and connected \geq 110kV
 - valid until July the 9th of 2024 ([Décision \(B\)2358](#))

- Cfr. Art 63 RfG &
- [Criteria drafted by CREG](#)

Timelines new RfG



Visualization of new rules (cfr Art. 5 – Limit for thresholds)



*The TSO can set this MW threshold value up to the value shown here

**Connection voltage shall be considered above a MW threshold, which shall be set at:

- Default: 10 MW
- Can be reduced to:
 - 5 MW
 - Type C threshold (not shown in graph for simplicity)
- Can be increased to any value between 10 MW and Type D threshold

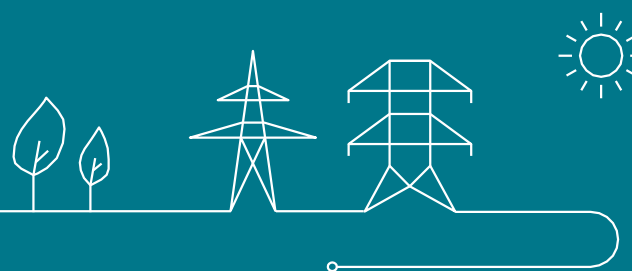
Annex 4 Amendments to the RfG Regulation General Provisions Paragraph 9

Thus, with the proposed amendment, the cumulative character of the capacity and voltage criteria (in their present form) which can lead to some disproportionate technical requirements for smaller PGMs compared to their actual impact on the system is remedied by introducing a capacity threshold below which only the maximum capacity of the PGM is considered to determine the significance

Elia's suggested way forward

- By 09/07/2024 ask CREG formally for an extension of both derogations:
 - with very limited re-work of the content of the request but update of numbers (ex. units concerned) and validity check of used argumentations
 - In case of modernization, requirements for type A & B will apply
 - without launching a public consultation as it is only the period that will be extended, no change in the thresholds
- Duration of the derogation: until implementation new RfG, currently estimated end 2027 (with max period of 5 years – 9/06/2029)

Type A/B PGM conformity process



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Introduction and context



Context

- An increasing number of PGMs are expected to connect in the near future, partly due to:
 - The additional workload from the [PV obligation in Flanders](#)
 - Units selected in the Capacity Remuneration Mechanism
- The current conformity process are sometimes complex for grid users to follow, due to:
 - Dependencies with other installations (e.g., PGMs in an industrial facility)
 - Lack of a central park controller
 - External factors (e.g., availability of solar/wind resources)



Aim of today's meeting

- Elia presents a new *additional* approach to streamline the conformity process for Type A/B, which:
 - Is clearer and simpler to follow for grid users
 - Continues to ensure compliance with the same network code/FRT/General Requirements

NB: the requirements do not change, only the way they are assessed

PSOS proposal for new Type A/B conformity process



1. Synergrid homologation certificates (in combination with settings reports and commissioning test reports) replace compliance tests



2. Compliance tests remain a possible alternative to the provision of Synergrid certificates



3. Type A users must provide data and compliance proof certificates, but no models/simulations. Type B users still need to provide models and simulation results on top



4. Passing criteria have been added to the checklists and simulation procedures

2. Compliance tests remain a possible alternative to the provision of Synergrid certificates

Not all PGMs are Synergrid homologated

- The current conformity process, which includes testing, is maintained for those grid users that cannot provide Synergrid homologation certificates
- Synergrid C10/26 mainly contains inverter-based resources and CHPs
 - Many SPGMs will be unable to provide Synergrid homologation certificates and will need to follow the current process
 - Typically, SPGMs have central power park controllers so it is easier to perform the compliance tests

The current Limited Operational Notification (LON) process is unaffected by the changed conformity process

- If non-compliant behavior is observed, Elia reserves the possibility to perform compliance tests
- These tests can be used to avoid revoking / freezing the FON

3. Type A users must provide data and compliance proof certificates, but no models/simulations. Type B users still need to provide models and simulation results on top

Type A users shall still provide data and compliance proof documents, but are exempt from providing any type of models

- Due to their size < 1 MW, the small grid impact of Type A PGMs does not justify requiring the provision of models

Type B users must still provide RMS / EMT models and a simulation report

- Certificates do not give all the information at the connection point
 - Some C10/11 requirements are not fully in line with Elia's requirements
 - The current simulations will be maintained also to serve as model validation
- } Simulations fill the gap between certificate and Type B requirement

Model validation

- For Types B-C, we ask confirmation that the simulations are performed with the provided models
- Models are not validated further (except Type D)

Requirements for which Synergrid homologation is sufficient*

- Frequency withstand capability
- RoCoF withstand capability
- Maximum allowable power reduction
- LFSM-O
- Automatic connection and reconnection
- Reactive power capability

Requirements for which Synergrid homologation is not sufficient

- Voltage withstand capability
- Fault Ride-Through
- Fault current & dynamic voltage support
- Post-fault power active recovery
- Loss of Main protection by RoCoF

* The current simulation requirements for LFSM-O, active power set point and reactive power capability are maintained to serve as model validation

4. Passing criteria have been added to the checklists and simulation procedures

The passing criteria are added to the checklist and simulation documents which will be communicated to the grid users

- Directly visible passing criteria should increase the clarity for grid users on the expected behaviour
- Checklist now contains an extra “passing criteria” column with:
 - Compliance proof: Synergrid and/or factory tests
 - Simulation proof: reference to the passing criterion mentioned in the simulation procedure document
 - Testing proof: Synergrid certificate *or* reference to the passing criterion mentioned in the testing procedure document

The structure of simulation/testing documents are updated

- Expected simulation: more clarity about the simulation procedure
- Results provision: clear explanation of the format of the results
- Passing criteria: clear criterion per requirement on how to comply

Simulation procedure

3.1.2. Limited Frequency Sensitive Mode-Over (NC B/G Art. 13(2)(a-g)) Elia Requirements for General Application 3.1.1.4

Simulation method

With regard to the LF-SM response simulation, PPM shall use simulations to demonstrate its capability to modulate the active power output at high frequency levels according to the Network Code requirements.

For each of the simulated scenarios, the initial active power to be considered is 90% P_{max}. Two frequency responses are tested as per the following scenarios:

- Scenario-1: 500 mHz step-change over-frequency deviation maintained for 40 seconds and ramped returning to 50 Hz over 30 seconds.
- Scenario-2: 1300 mHz step-change over-frequency deviation maintained for 40 seconds and ramped returning to 50 Hz over 30 seconds.

The two scenarios are depicted in Figure Figure 4 below.

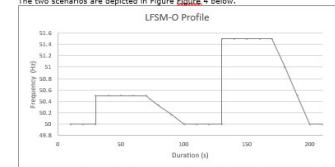


Figure 4: The frequency against time profiles for the LF-SM simulation, with scenario 1 on the left-hand side and scenario 2 on the right-hand side of the figure.

Results provision

The simulation compliance report shall include 3 completed with values resulting from the simulations. The value of ΔP_{exp} [MW] shall be pre-filled by the client based on the installed capacity, following (1).

$$\Delta P_{exp} = \frac{10W \cdot \Delta f \cdot \Delta t}{\sqrt{3} \cdot U_n} \times P_{ref} \quad (1)$$

where:
 P_{ref} = reference active power output, which is set at $0.9 \times P_{max}$
 ΔP_{exp} = expected value of the simulated power reduction
 s = droop parameter, set at 5%
 U_n = nominal frequency, 50 Hz
 Δf = frequency deviation

Δt = frequency activation threshold, 0.2 Hz

Table 4: LF-SM-D scenario results.

Scenarios	T _d [s]	Δf [Hz]	T _{exp} [s]	ΔP _{exp} [MW]	T _{rem} [s]	ΔP _{rem} [MW]
Scenario 1 step -90.5 Hz	As fast as technically possible	≤ 25	≤ 20s			
Scenario 2 step -51.5 Hz	As fast as technically possible	≤ 25	≤ 20s			

In addition, simulation curves for each of the scenarios shall be provided in the simulation report.

Passing criterion

Elia considers that the Type B PPM installation complies with this requirement, if:

- ΔP_{exp} matches ΔP_{min} with a tolerance band of less than 5%, and;
- the measured timings do not exceed the expected timings as pre-filled in 2.

Checklist

	B	H	J
Equipment and protection requirements - Annex 3B	Open	Open	Is compliant if the connection installations (only) are compliant with requirements - Annex 3B
Specific protections scheme agreed via simulations or by protocol	Open	Open	Is compliant when GU has shown a proof that he implemented the change
Simulation models	Open	Open	Is compliant if it meets the PSOS criteria as presented in the model requirements document
Model documentation/Userguid	Open	Open	Is compliant if it meets the PSOS criteria as presented in the model requirements document
Frequency withstand capability	Open	Open	Is compliant if Synergrid homologation C10/26 or a factory test report is provided, demonstrating that the PPM inverter or SPGM equipment can remain connected when exposed to frequencies down to 48.5 Hz (30 minutes), 47.5 Hz (30 minutes) and up to 51.5 Hz (30 minutes). In addition, a report shall be provided which states the over- and under-frequency protection settings after installation.
Rate of Change of Frequency (RO	Open	Open	Is compliant if Synergrid homologation C10/26 or a factory test report is provided, demonstrating that the PPM inverter or SPGM equipment can remain in connected when exposed to rates of change of frequency up to 2 Hz/s for 500 ms. In addition, a report shall be provided which states the RoCoF protection settings after installation.
Maximum allowable Power Red.	Open	Open	Is compliant if Synergrid homologation C10/26 or a factory test report is provided, demonstrating that: - PPM: the PPM may not reduce its active power output at frequencies above 49 Hz. Below 49 Hz, a maximum active power reduction of 2%/Hz is admissible. In case no technical limitations to maintain active power are existing, active power reduction should be provided.
Voltage withstand capability	Open	Open	Is compliant if it meets PSOS criteria as presented in the simulation document.
LF-SM-D	Open	Open	Is compliant if it meets PSOS criteria as presented in the simulation document.
Reactive Power Capability	Open	Open	Is compliant if it meets PSOS criteria as presented in the simulation document.
Fault Ride Through	Open	Open	Is compliant if it meets PSOS criteria as presented in the simulation document.
Fault current & dynamic voltage	Open	Open	Is compliant if it meets PSOS criteria as presented in the simulation document.
Post-fault power active recovery	Open	Open	Is compliant if it meets PSOS criteria as presented in the simulation document.
Communication exchanges (cont	Open	Open	Is compliant when agreed to and communication between EMS and client is

Conclusion

In summary, the newly-proposed compliance process will:



Decrease the complexity of following Type A/B compliance processes for grid users



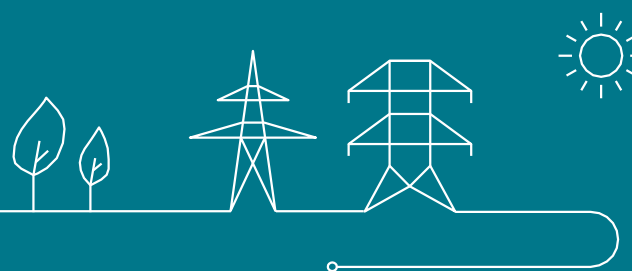
Leave the process unchanged for non-Synergrid certificated PGMs



Streamline the Type A/B compliance processes and potentially reduce the timings

Questions?

AOB – Hosting Capacity Maps



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Hosting Capacity Maps

2024 changes & publication – WG Belgian Grid

27/06/2024 | I. Verbruggen, J. Sprooten



Context

- In Dec 2023, Elia published a hosting capacity map for generation (of different types), load and storage
 - [Capacité d'accueil du réseau \(elia.be\)](https://www.elia.be/fr/actualites/la-capacite-daccueil-du-reseau)
- Feedback from stakeholders and CREG was taken into account while developing the methodology & tools
- Live feedback from stakeholders during the demonstration phase in WG Belgian Grid was very positive.
- A functional mail (hostingcapacitymap@elia.be) has been created to collect questions and receive further feedback.
- A roadmap was presented:
 - S1 2024: Feedback and planned improvement for next yearly publication in WG Belgian Grid
 - End 2024: Updated hosting capacity map
- Other drivers are:
 - EU Draft Regulation 2019/943, paragraph 4a: Increase to monthly publication frequency from 202X onwards
 - EU Action Plan for Grids – Action 6: “ENTSO-E initiative on harmonised definitions for available grid hosting capacity for system operators and to establish a pan-EU overview by mid 2025”



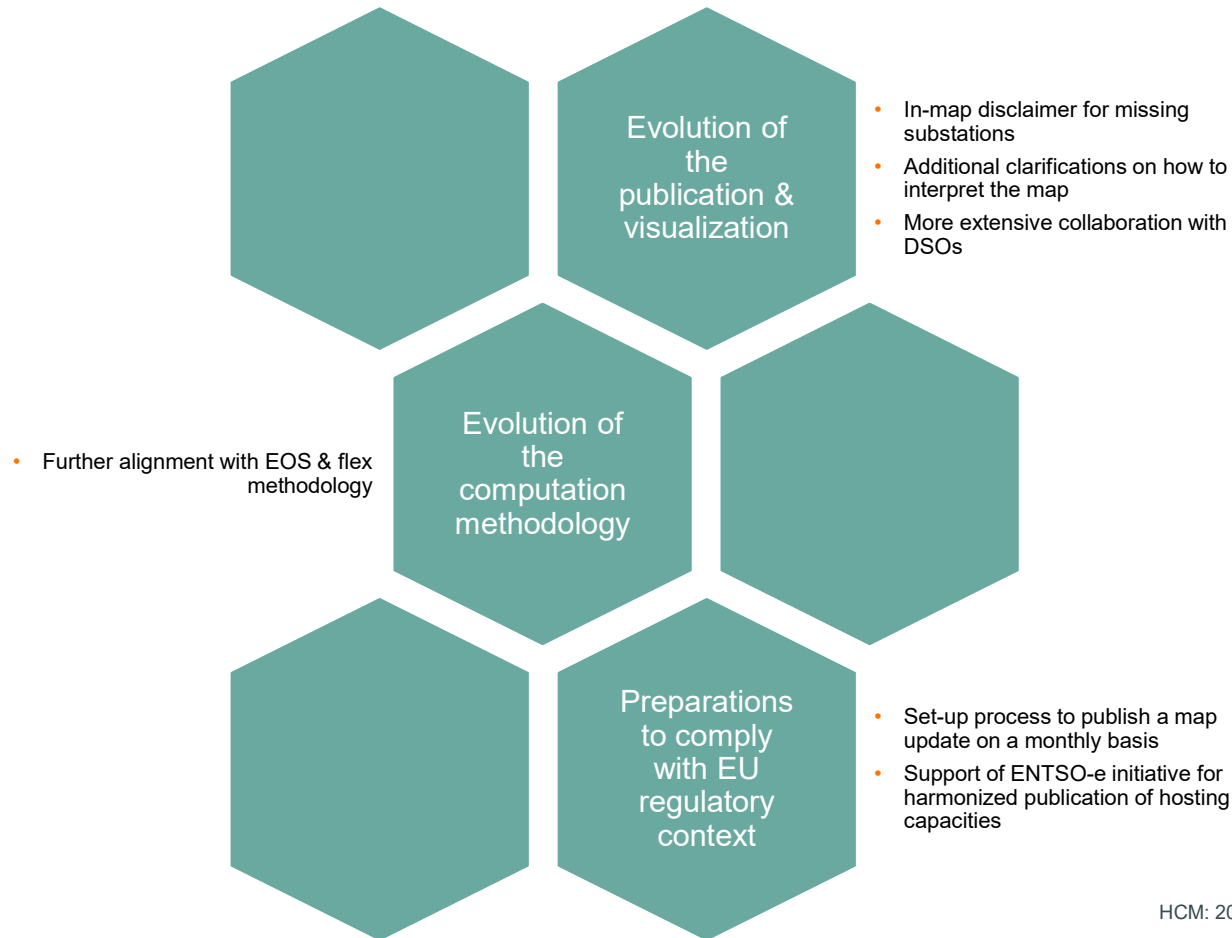
Summary of questions and feedback received

Through mailbox “hostingcapacitymaps@elia.be”

- “Some existing substations are not showing on the map”
 - Reason: Client substations, tap nodes, substations to be dismantled, all where no new connections are offered
- “Unclear how to interpret the map in combination with those published by the DSOs”
- “Some incoherences between the map & study results”
- Through WG BelgianGrid 12/’23 & 01/’24:
 - “What will be the update frequency?”
 - “More detailed information per substation desired”
 - “Interest to include DSO-level connections”
 - “Interpretation of map for embedded generation within existing demand user”



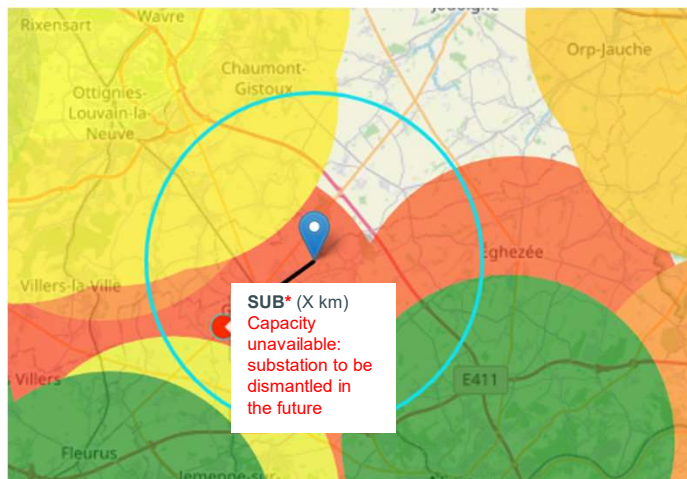
Proposed changes for 2024



Evolution of the publication & visualization

Unavailability for connection request

- Show all Elia-owned substations
- Disclaimer for substations where capacity will disappear / remain unavailable on the long-term



*Mock-up

Additional clarifications on the web page

- Update of the FAQ
- Additional clarifications on how to interpret the map

DSO collaboration

- Discussions to exchange results and consistently account for congestions across TSO-DSO interfaces

Additional information per substation

- Information not combined in a single database



Evolution of the computation methodology

Maximum alignment with EOS / EDS studies

- Definition of a local zone of influence around the location of the computed hosting capacity:
 - to identify other existing & future grid users (with or without a reservation),
 - who have a significant impact on the hosting capacity result.
- Selection of limiting network elements:
 - according to the potential influence of a new grid connection on the network elements' loading.



Preparations to comply with EU regulatory context

Monthly updates

- Preparations are ongoing to decrease the required computation and validation times:
 - Yearly base-computation with most recent BE-level scenario
 - Monthly update with changes of local load & generation scenarios, based on linearization technique (PTDF*)

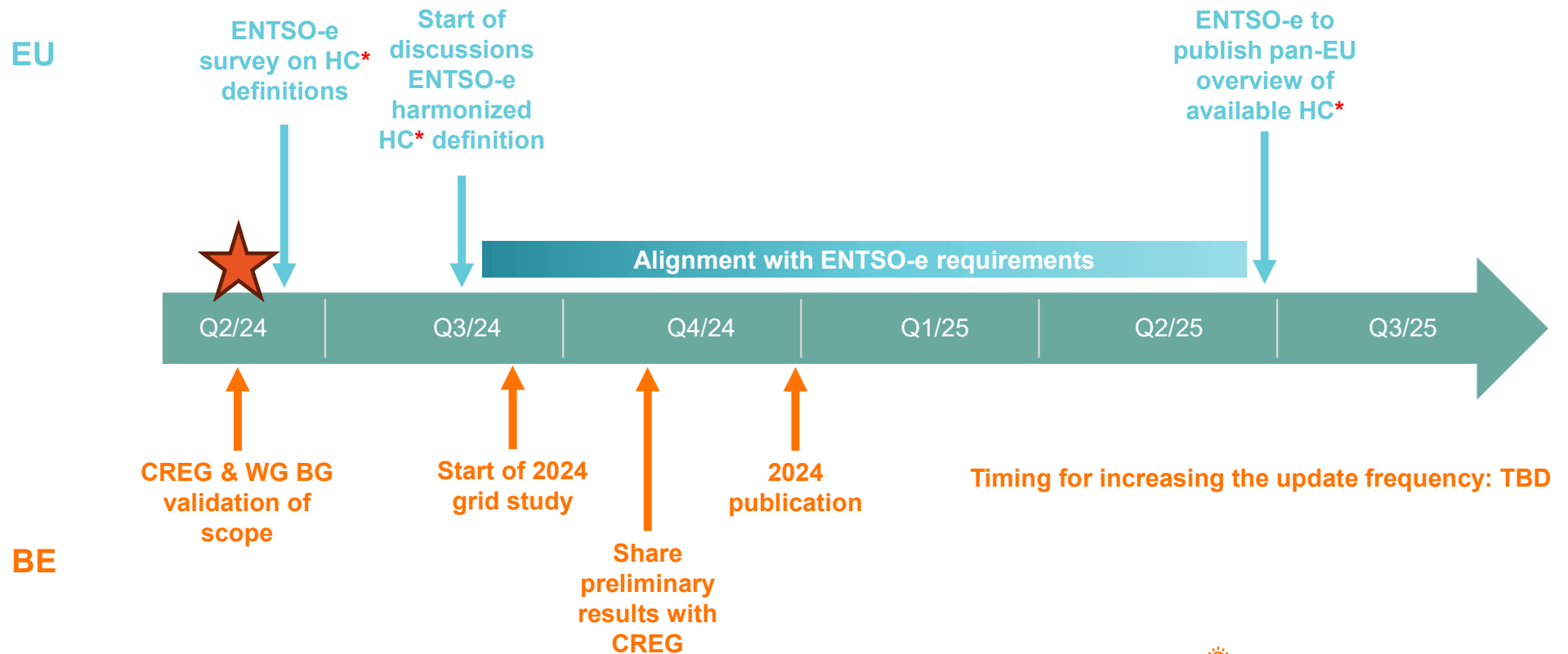
EU level-harmonized hosting capacity publication

- Elia is involved in the discussions to
 - Harmonize definitions of hosting capacities to the extent possible under different national contexts
 - Set up an EU-level publication of hosting capacities by mid-2025

*Power Transfer Distribution Factor



Mid-term roadmap Hosting Capacity Map



*HC = Hosting Capacity



Thank you



Grid connection studies: Definition of a local zone of influence

Concretely, a local zone of network influence is defined around the location of the connection request. The purpose of this zone is to identify other existing and future Grid Users (with or without reserved capacity) that have a significant influence on the conclusions of the grid connection study.



Grid connection studies

The following metrics are used to determine the influence of connection request on grid elements:

- For congestion located at a voltage level equal to or higher than the voltage level of the proposed connection point for the request, the critical network element will only be considered if the product of the PTDF of the applicant on this element by the ratio of the power of the request to the power of the network element is greater than a threshold (unless no other means are available in real time).

$$U_{CNE} \geq U_{GU}; \left(|PTDF_{GU,CNECGU}| \times \frac{S_{nom_{GU}}}{S_{nom_{CNECGU}}} \right) > x \%$$

- For congestion located at a voltage level lower than the voltage level of the proposed connection point for the connection request, the critical grid element will only be considered if the PTDF of the connection request on that element is above a threshold (unless no other means are available in real time).

$$U_{CNE} < U_{GU}; \quad PTDF_{GU,CNECGU} > y \%$$

The appendix of the orientation study clarifies the thresholds x & y in force at the time of the study.



Thank you.



Volgende meetings

Werkgroep Belgian Grid

- 01/10/2024 09:30u – 12:30u
- 13/12/2024 09:30u – 12:30u

