

# Users' Group

# Werkgroep Belgian Grid

2 december 2025



## **Agenda**



- 1. Societal Electrification
- 2. Mixed sites
- 3. Contrat de raccordement
- 4. Fall-back flex
- 5. LFDD-groepen
- 6. Feedback ad-hoc workshop on Grid Forming
- **7.** Werkplan 2026
- 8. AOB
  - 1. Status digitalisatie: design notes balancing products
  - 2. Update congestieproblematiek

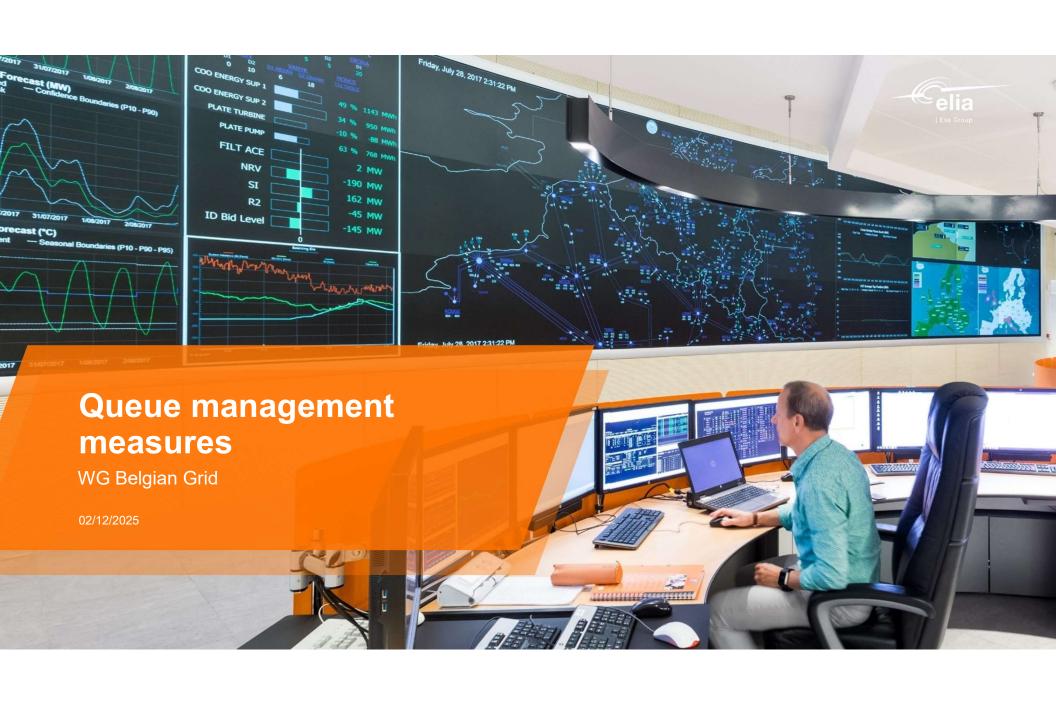


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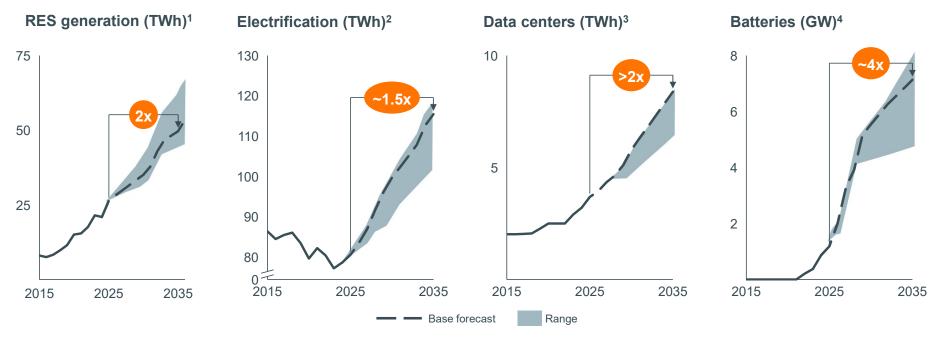






# Approved plans anticipated unprecedented levels of new generation, electrification, data centers, and storage capacities in Belgium

Projections based on societal choices as outlined in current plans



<sup>1.</sup> Includes Solar PV, onshore and offshore wind; Load factors: Solar PV 12%, Onshore wind 22%, Offshore wind 38% 2. Total electricity demand excluding data centers load 3. 2015-2019 load based on installed capacity 4. Both large- and small-scale battery storage

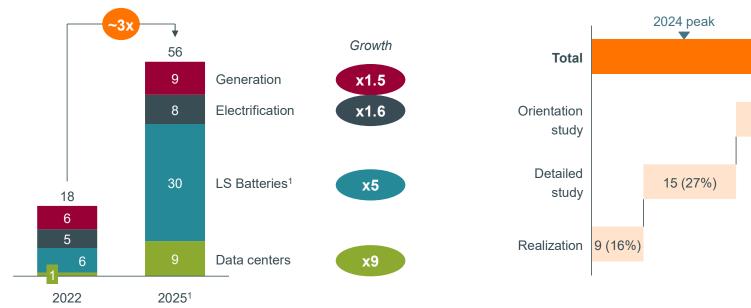
Note: Base forecast reflects Current Commitments scenario; Range built on Constrained Transition scenario (lower bound) and Prosumer Power (upper bound) Source: Elia Adequacy and Flexibility Study (2024-2034, 2026-2036); Elia Open Data Portal

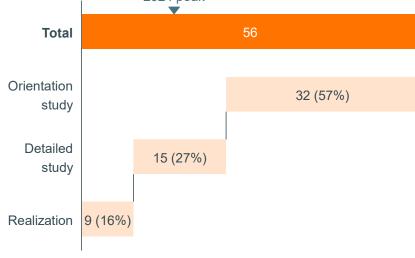


## However, capacities requesting a connection are surging beyond any previous forecast and approved plans, with 56 GW in the process today (~4.5x peak)

#### **Evolution of BE transmission queue size by grid user (GW)**

#### 2025 Belgium transmission queue size by stage (GW)<sup>2</sup>





Note: as of mid 2025

Note: Power factor for translation from MVA to MW assumed 0.95, which is typical for grid connections; Excludes (minor) change requests Source: Elia Transmission Belgium

<sup>1.</sup> Large Scale Batteries 2. As of August 2025



# This increase stems from a combination of three driving factors; Note: as of mid 2025 Elia already delivering more than foreseen in approved development plans



#### Surge in new assets

Data centers & batteries scaling much faster than expected



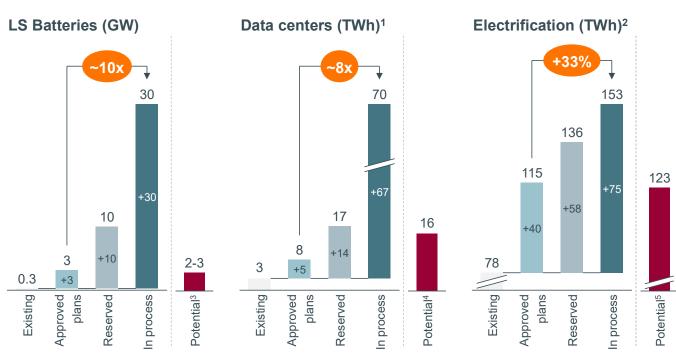
#### Speculative behavior

Anticipated or speculative projects inflating the queue



#### **Electrification progress**

Reservations more than on track with approved plans





<sup>1.</sup> Converted from GW to TWh using 85% load factor 2. Electrification figures based on total electricity demand minus data centers

<sup>3.</sup> EnergyVille 2040 value 4. From BCG The Power to Compute 5. From AdeqFlex (2026-2036), in "Current Commitments" scenario

Note: "Approved plans" refers to AdeqFlex (2024-2034) Study; "Reserved" coming from Elia's hosting capacity map; "In process" adding orientation studies on top of reserved Source: Elia Adequacy and Flexibility Study (2026-2036); EnergyVille Paths 2050 (April 2025); Elia Transmission Belgium; Boston Consulting Group The Power to Compute (May 2025)



## What do we mean by Connection Reform?

Alignment on needs and terminology is an important factor for transparent and coordinated solution development



#### What is Connection Reform?

The establishment of a new connection process. Replacement of the **grid connection procedure**, which no longer fits a today's energy landscape (due to increased connection requests (storage, electrification, data centers,... exceeding the volumes considered in the grid development plans) towards one that fits national needs based on fit-for-purpose criteria.



#### Solutions to Queue Management are inclusive

Any connection reform discussions must take into consideration all grid operators, developers and consumers. To ensure consistency, harmonization and fairness, **regulators are pivotal in ushing new reforms**. Connection Reform policies can create efficiencies for the system and improve competitiveness if designed well at the onset, also with sufficient level of agility!



#### Solutions are already available or envisaged across the globe

International benchmark provides insights into already solutioned and envisaged practices related to connection reform, as **many others have experienced the same challenges**, so global parallels on queue congestion and queue management can be extracted.



## **Preliminary note**

- Following slides represent a starting point for discussion on queue management
- Whilst many ideas were already discussed with market parties (bilateral, working groups), regulators
  and policy makers, it is clear that a further stakeholder discussion is required (<u>co-creation</u>); the
  measures <u>vary in terms of impact on Grid Users and outcome</u>.
- The measures in the next slides will be discussed with market parties. They don't necessarily present the opinion of Elia, but are based on benchmarks, ideas,... They mainly serve as a starting point for debate.



Consistent set of measures at various stages of the connection process is required to improve the situation (in addition to efforts deployed to improve the current process itself)

## **Development Plans Grid Users Connection** Hosting Orientation Detailed **Connection Commissioning Capacity Map** Study Study contract Capacity Capacity Power put at disposal reservation allocation 10



## The measures can be grouped in 3 main categories



#### Align capacity reservation & allocation with policy

The swimming lanes ensure on long-term that grid capacity is developed and aligned with societal objectives put forward in grid development plans

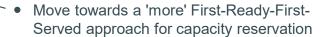


#### Queue management

Queue management within swimming lanes is essential to ensure that less mature or speculative projects don't hinder mature, ready to build projects so that they can be realise







Limit the duration of capacity reservation



#### Incentives to release unused allocated capacity (UIOLI/MASC)

Such incentives are essential to make sure that once capacity is allocated (in line with societal ambitions), that it is effectively used in an efficient way.



## **Presentation of the measure sheets**

# Measure Summary Status ▶ Description ▶ Maturity • Short description of the measure • Level of maturity of the measure (simple idea vs concrete action already presented to relevant parties) ✓ Objectives / expected impacts • Next steps • Qualitative and/or quantitative description of the intended goal and expected impacts of the measure. • Next steps envisaged for the measure in the coming months.





## **SL1 - Implement the swimming lanes**

#### **Measure Summary**

#### Description

- · Define relevant categories of grid users (swimming lanes).
- Refine/discuss application of the swimming lanes towards DSO level
- Set the width of each swimming lane at macro and local level based on approved scenarios or policy objectives (friches, offshore, interconnectors, electrification, ...).
- Pre-reserve the capacity corresponding to each swimming lane, if not fully used yet (existing + planned evolutions + reserved + allocated).
- Treat connection requests in function of the category(ies) they belong to.

#### ✓ Objectives / expected impacts

- Ensure on long-term that grid capacity is aligned with societal/political objectives put forward in the grid development plans or defined otherwise by political authorities.
- Secure capacity on the network to allow the realization of a political ambition or a legal obligation.
- Prevent that an unexpected growth of one category jeopardizes the objectives of other categories.
- Preserve residential electrification, not subject to any connection process.

#### **Status**

#### 

- Implemented at federal level via the Grid Connection Study Methodology (since 2024)
- New Datacenters category implemented in Nov. 2025.

#### > Next steps

- Together with regulators, authorities and DSOs, discuss whether and how to apply the swimming lanes approach towards DSOs (e.g. integrated TSO/DSO swimming lanes vs DSO-specific swimming lanes).
- Further implement, via the TF LRIO, the process of identification of local growth potentials (to secure political/legal targets, industrial policy,...)
  - Walstroom, nuclear, IC, offshore....





## QM1 - Tighten entry filters to the grid connection process

#### **Measure Summary**

#### Description

- · Add maturity criteria for the Orientation Study phase.
- Limit the maximum number X (e.g. 5) of simultaneous orientation studies (EOS) for a same (candidate) grid user and technology.
  - Need for a declaration of honor that no other affiliates have studies ongoing
  - Transfer of studies between companies to be framed more strictly?
- Targeted moratorium based on the state of the swimming lanes
  - E.g. if category represents in existing, reserved and allocated capacity >X (e.g. 3) the (local and/or macro) growth potential.
- Targeted moratorium if expected flex level in given zone above threshold
- Evaluate tariff incentives
- ..

#### ✓ Objectives / expected impacts

- Reasoned use of the Connection studies. The Hosting Capacity Map now offers the alternative for exploratory analysis.
- Focus the study effort on (realistic) projects with recognized societal support, while offering margin.

#### **Status**

#### 

- Land access checks can be implemented quickly at federal level after the entry into force of the CoC3.0.
- Limit on the number of EOS has been first introduced in WG BG in March 2024, with mixed feedback.
- Other limitations are ideas at this stage, neither specified, nor discussed with market players / CREG.

#### Next steps

• (Re)launch discussions on other limitations ahead of a possible CoC4.0.





## QM2 - Increase transparency of the queue

#### **Measure Summary**

#### Description

 Publish (e.g. via the Hosting Capacity Map web page) more detailed information about the queue: status of each swimming lane (already done at macro level), age distribution of capacity reservations, project list, position in the queue,...

#### ✓ Objectives / expected impacts

- Raise awareness among market players and society about the issues at stake.
- Support the prioritization of the measures as well as the impact assessment of their application.
- Queue management requires transparency towards GU on queue status.

#### Status

#### 

 These are ideas at this stage, neither specified, nor discussed with market players / CREG.

#### Next steps

• Launch discussions on this topic with CREG and market players taking confidentiality requirements into account..





## QM3 - Implement First-Ready-First-Served for capacity reservation

#### **Measure Summary**

#### Description

- Make capacity reservation conditional on meeting maturity and/or strategic alignment criteria (e.g. land rights, planning application, financial plan, final investment decision...)
- One-off payment or bank guarantee at the moment of the detailed study, but difficult for grid users before FID (feasibility uncertain)

#### ✓ Objectives / expected impacts

- Reduce the volume of grid hosting capacity reserved for uncertain / not mature projects (reduce zombie projects); ensure mature projects are not hindered by less-mature or speculative projects.
- Incentivize the (candidate) grid users to only reserve capacity for mature/realistic/societally decided projects.
- Prevent speculation & secondary market of capacity.

#### **Status**

#### 

- From the entry into force of CoC3.0, removal of existing capacity reservations & blocking of new capacity reservations is possible if no statement on honor signed by the land owner.
- Other possible maturity criteria have not been discussed with the market players at this stage.

#### > Next steps

- Identify other possible criteria than "land access" to check the maturity of a (candidate) grid user's project.
- Launch discussions on other possible maturity criteria ahead of a possible CoC4.0.





## QM4 - Limit the duration of capacity reservation

#### **Measure Summary**

#### Description

 Restrict capacity reservation to a defined time period, while giving room for exceptions, with regulatory approval.

#### ✓ Objectives / expected impacts

 Release grid hosting capacity by removing zombie projects from the queue.

#### Status

#### 

- Removal of expired capacity reservations possible at federal level as of the entry into force of CoC3.0.
- Exceptions required for projects with complex FID (e.g. industry,...)?

#### > Next steps

Implementation of the new limits set in CoC3.0.





## UC1 - Incentives to release unused allocated capacity (UIOLI/MASC)

#### **Measure Summary**

#### Description

- Introduce a financial incentive to release unused allocated capacity (MASC,...).
- Make the continuation of a capacity allocation conditional on realizing concrete project progress in due time (planning permission, contract for main equipment, construction plan, start of works,...)
- Sufficient 'nuance' should be brought in the process ('unused' capacity today can be for planned future projects as well)

#### Objectives / expected impacts

- Prevent displacing the problem from a capacity reservation issue to a capacity allocation issue.
- Release grid hosting capacity by removing capacity allocated to zombie projects.
- Dissuade immature projects from unnecessarily blocking capacity.

#### **Status**

#### 

- The concept of UIOLI is introduced in the CoC and CREG sees MASC as a possible element of it. Further implementation of UIOLI is expected via an update of the connection contract.
- MASC has been already widely discussed in WGBG since 2024 and a concrete proposal is available, considering inputs gathered.

#### ▶ Next steps

- Integrate MASC as soon as possible given the high volume of reservations today, that might evolve to allocations
- Identify possible criteria to check the project progress and discuss them with market parties.



## Other ideas

- Organization of tenders in specific zones of the network and for specific categories of grid users.
- ...

Not discussed here as not directly related to the queue management (yet relevant to increase overall efficiency):

- Simplification of Orientation Studies
- Batch treatment of studies to drastically reduce throughput times
- Digitalization & automation of studies (ongoing)



## Summary of the proposed measures & windows of opportunity







SL1 - Align capacity reservation & allocation with policy



- QM1 Tighten entry filters to the grid connection process
- QM2 Increase transparency of the queue
- QM3 Implement First-Ready-First-Served for capacity reservation
- QM4 Limit the duration of capacity reservation



UC1 - Incentives to release unused allocated capacity (UIOLI/MASC)



## Any further feedback or ideas?



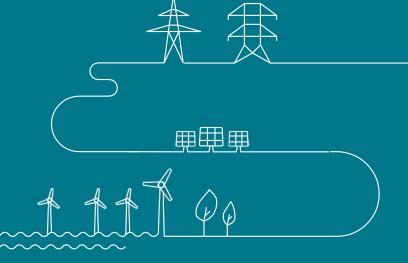


## **Next steps**

- Elaborate an implementation roadmap based on the expected benefits, the required effort and the time to impact of the different measures.
- Implement the roadmap, in close coordination and collaboration with the regulators, the authorities and the DSOs and in open and continued dialog with market parties via the WG Belgian Grid.



Thank you.



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## A connection request is not all about the PPAD!

#### Code of Conduct

Art. 17. § 1. Elke geïnteresseerde persoon, met inbegrip van elke transmissienetgebruiker, heeft de mogelijkheid om een aanvraag voor een oriëntatiestudie bij de transmissienetbeheerder in te dienen, respectievelijk met betrekking tot:

3° de aanpassing van de installaties van de transmissienetgebruiker en/of van hun exploitatiewijzen die een invloed kan hebben op de veiligheid, de betrouwbaarheid en de efficiëntie van het transmissienet, of de technische capaciteiten van deze installaties kan beïnvloeden;

Request should ALWAYS be done in order to check:

- Pcc
- Dynamic stability
- NC RfG, DCC, ...
- Modernisation
- ..





## Link with the study methodology: connection request

	For the assessment of the connection request with respect to	
	Offtake capacity	Injection capacity
Profile for the consumption part	constant consumption profile	zero profile
Profile for the conventional generation part	zero profile	constant production profile
Profile for renewable generation	specific production profile (PV, Wind, etc.)	specific production profile (PV, Wind, etc.)
Profile for the storage system	constant consumption profile	constant production profile

Table 2: Combinations of the profiles for connection request of mixed installation

In terms of production or consumption profile for the existing, reserved or allocated capacities in the local zone of influence:

- The capacity of existing (in operation for more than one year) consumption facilities or non-renewable non-market driven generation are represented by a realistic profile based on historical measurements and a projection of this profile for future years such that all its capacity is used at least once in the future year.
- The capacity of reserved, allocated or recently connected facilities (in operation for less than one year) consumption facilities or non-renewable non-market driven generation are represented by a profile that is representative of the sector of activity and such that all its capacity is used at least once in the future year.
- The capacity of existing, reserved or allocated renewable generation are represented by a realistic specific profile such that all its capacity is used at least once in the future year.
- The capacity of existing, reserved or allocated conventional generation or storage facilities are represented by a profile generated as part of a simulation of the future functioning of the electricity market.

In most cases the connection request is studied with flat profile, so a connection request within the PPAD is fine! Elia is taking a potential financial risk by a change in the profile used in other connection requests.



## Link with the study methodology: connection request



In most cases the connection request is studied with flat profile, so a connection request within the PPAD is fine! Elia is taking a potential financial risk by a change in the profile used in other connection requests.



## Link with the study methodology: potential

	Connection request in line with the growth potential considered for the establishment of the local infrastructure project portfolio	Connection request outside the growth potential considered for the establishment of the local infrastructure project portfolio
Existing firm and flexible capacities & firm reserved or allocated capacities & expected low-voltage growth potential	Considered present for the study	Considered present for the study
Reserved or allocated flexible capacities in their growth potential	Considered present for the study	Considered present for the study
Reserved or allocated flexible capacities outside their growth potential	Not considered for the study	Considered present for the study
Injection or consumption growth potential of the same type of technology	Not considered for the study	Not considered for the study
Injection and consumption growth potential of other technologies	Considered present for the study	Considered present for the study

There is a difference in the study methodology whether a request is within or outside the growth potential.

For a reserved capacity **in the future**, the category should not change from within the potential to outside of the potential.

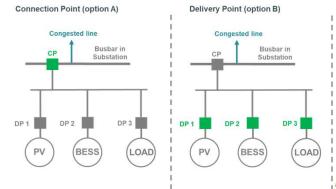
f.e. a connection request for 100MW load cannot be transformed into 80MW load + 20MW battery by the 'in service date'



## **GUFlex Design applied to Mixed Sites**

- Elements presented during TF Grid Flex of 04/11/2025
  - Location of Setpoint & Location of Delivery Point
  - How to calculate activated volumes (for BRP perimeter correction, GU contribution & GU compensation)
  - Grid user contribution applied to mixed sites
- Two options have been presented allowing the GU to :
  - Choose which assets deliver the flexibility
  - Freely use load, storage or injection units to react to a setpoint
- □ The GU can opt for option A, Option B or a combination of both. This "modular design" addresses specific needs for different use-cases (including à priori CDS).
- Next Steps: market parties are invited to provide their comments on the proposed design

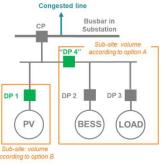
#### Setpoint location and volume calculation - Recap



- Volume calculation: Option A
- No hierarchy defined by GU for activation
- Potential use case: GUs with custom on-site asset optimization
- Volume calculation: Option B
  Hierarchy of DP 1, 2 & 3 to be defined
- by GU

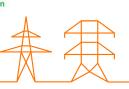
  Potential use case: Different BESS
- Potential use case: Different BESS with BRP split operated by different actors

DP 1 and Headmeter DP 4: covering DP 2 & 3 (hybrid option A & B)



- Volume calculation: Option B for DP 1 and Option A for DP 4
- Hierarchy of DP 1 and DP 4 to be defined by GU
- Potential use case: existing site with additional third-party asset. New asset can be contractually isolated

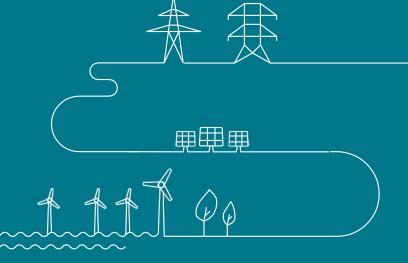








Thank you.



# elia

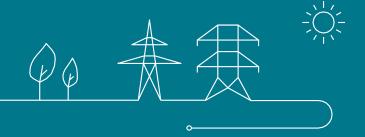
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## **Aansluitingscontract**





#### Contrat de raccordement: Version 2.0



- Amélioration terminologie et style;
- Art. 4.1 Déclarations et garanties Clarification (CDS // Installations reliées aux Installations du Cocontractant);
- Art. 6.5 Protection des données personnelles Explicitation des données traitées;
- Art. 12.1 Mise en demeure et/ou suspension de l'exécution du Contrat en cas d'Installations non conformes ou dommageables – Clarification obligations (Installations du Cocontractant // Installations reliées aux Installations du Cocontractant); travaux effectués sous la responsabilité du Cocontractant;
- Art. 24 Désignation de l'OPA/SA Clarification des obligations si Cocontracant est propiétaire des Installations // ne l'est pas;
- La signature du contrat se fait de manière électronique;
- Annexe 7.6 Engagement écrit à communiquer dans les plus brefs délais si écarts de prix après commande.



#### Contrat de raccordement: Version 2.0

#### Raccordements flexibles

- Décision (B)2899 de la CREG (04/2025)
   demande à Elia de présenter une
   révision du contrat en avril 2026
- Le réexamen en Q1 2025 n'avait pas pour but de mettre en œuvre les modifications du CoC!
- La nouvelle révision dépend de l'approbation du contrat soumis en octobre 2025

#### Article 7 Responsabilité

- Les remarques de fond reçues seront intégrées dans un exercice d'harmonisation des dispositions sur la responsabilité dans les contrats régulés
- Nouveau texte sera consulté et discuté en workshop avant consultation
- Le texte consulté en Q1 25 est resté inchangé

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## Contrat de raccordement: Version 3.0

## Scope



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#### Raccordements flexibles

- Design discutée en TF Grid Flex
- Modifications prévues:
  - Art. 1 Définitions : « Congestion Modulation Point », « Congestion Setpoint », etc.
  - Art. 16 Description du raccordement : à adapter pour intégrer CoC Art 60§1 11 sur paramètres du raccordement flexible
  - Art. 16bis [nouvel article portant sur les raccordements flexibles]: intègre modalités d'implémentation telles que présentés au TF Grid Flex (CoC Art 60§1 11bis, 11 ter en 11 quarter; Art. 61sexies)
  - Annexe 1 Description des Installations
  - Annexe 2 Accords spécifiques relatifs à l'exploitation
  - Annexe 7 Modalités d'exécution et délais en cas d'installation d'un nouveau raccordement ou modification



### **Groupes LFDD**

- Révision 2023 (2.0) (rappel):
  - Groupes LFDD non repris car design encore en développement
  - Ajout d'une Annexe 11 Obligation LFDD du Cocontractant
  - Le processus de préparation et signature de l'Annexe 11 se déclenchera dès l'approbation du contrat type
- Révision 2026 (3.0):
  - Modifications Art. 8.2.2 Obligation LFDD
  - Nouvel Annexe 11bis



## MASC/Capacités de raccordement dormantes

- Point de départ: présentation <u>WG BG 27 mars 2025</u>, juin 2025 et conversations bilatérales
- Système de gestion de l'utilisation des capacités d'injection/prélèvement allouées
- Garantie financière pour allocation de capacité:
  - Proportionnelle à l'impact causé
  - Applicable à tous les niveaux de tension et à tous les usagers àpd 25MW (nouveau raccordement)
  - Rétroactivité limité aux projets qui n'ont pas encore atteint les 3 étapes
- Étapes importantes à franchir:
  - Preuve de propriété ou usage du terrain
  - Obtention permis et licences nécessaires
  - Commande des principaux équipements
  - NEW MSI date linked to permitting: grid user should have the possibility to choose between a fixed date for the MSI or a commit on a fixed delay to reach MSI after obtention of the permit (e.g. permit + 2 years)



## MASC/Capacités de raccordement dormantes

- Modifications / ajouts prévus:
  - Art. 1 Définitions ("Mise en Service", définition des étapes à franchir)
  - Art. 3 Durée et Entrée en Vigueur
  - Art. 18 Réalisation, Modification, Mise à Disposition et Gestion des Installations de Raccordement
  - Nouvelle Annexe (formulaire type)
- Garantie financière basé sur le principe BRP
- Étapes importantes à franchir basé sur les définitions et principes CRM



#### Power quality

- Pas de changements de fond Synergrid C10/17 d'application
- Améliorations afin de clarifier l'Annexe 5 Power
   Quality:
  - Possibilité d'indiquer « Stade [1/2/3] » avec les limites correspondantes sous forme de tableau pour les stades 2 et 3
  - Stade 2: suppression du 3<sup>ème</sup> paragraphe (ref. a « impédance équivalente » avait prêté à confusion)

Tijdens de door Elia uitgevoerde meetcampagne zijn de emissieniveaus van de Medecontractant geëvalueerd hetgeen bevestigt dat de door de studie van de power quality geraamde emissieniveaus worden gerespecteerd.

#### 2 STORENDE INSTALLATIES IN STADIUM 2

[Te verwijderen indien niet van toepassing]

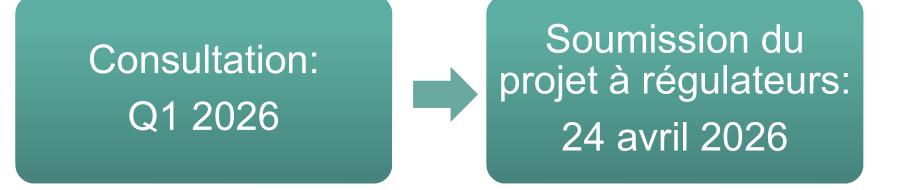
Dit Artikel is van toepassing op storende Installaties van de Medecontractant die zijn aangesloten op Aansluitingspunt(en) [•] die stadium 1 limieten overschrijden, maar niet stadium 2 limieten.

Het referentie-kortsluitingsvermogen voor de evaluatie van de emissieniveaus van de Installaties van de Medecontractant bedraagt [•] MVA. De evaluatieprocedure van de emissieniveaus wordt beschreven in de technische rapporten IEC 61000-3-6, IEC 61000-3-7 en in de procedure Synergrid C10/17 "Voorschriften "Power Quality" voor de gebruikers aangesloten op de hoogspanningsnetwerken".

[e/De stadium 2 emissie limieten die van toepassing zijn worden in de tabel hieronder weergegeven. De impact van de equivalente impedantie van de Installaties van de Medecontractant op de storingsniveaus op het Elia-Net valt eveneens onder de verantwoordelijkheid van de Medecontractant. Tijdens de door Elia uitgevoerde meetcampagne zijn de emissieniveaus van de Medecontractant geëvalueerd in combinatie met de equivalente impedantie van de Installaties van de Medecontractant, hetgeen bevestigt dat de door de studie van de power quality geraamde emissieniveaus worden gerespecteerd.

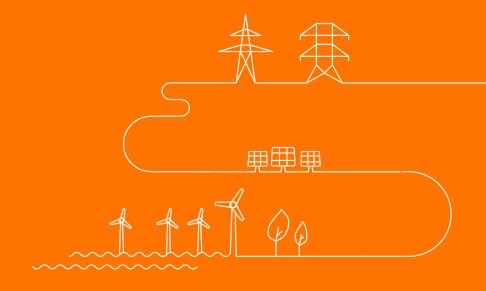
<u>Parameter</u>		Emissielimieten stadium 2		
Flicker	Pst	[•]		
Flicker	PIt	[•]		
Unbalance (% van U <sub>1</sub> )		[•]		











## **Agenda**



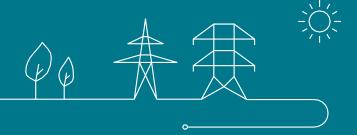
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  - 2. Update congestieproblematiek





# Fall back flex

This is what the potential subhead looks like



#### Fall-back flex PVN



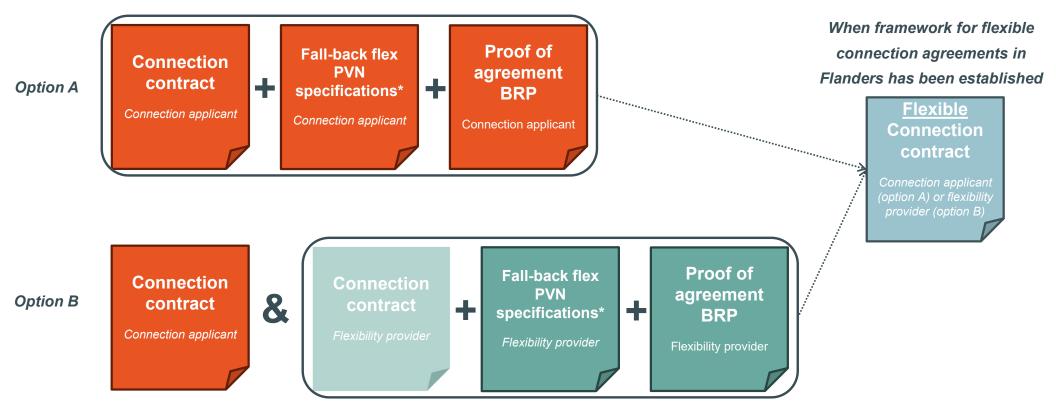
## Temporary solution for flexible connection conditions in Flanders

- VNR conditionally approved "Fall-back flex PVN" on September 24<sup>th</sup> (https://www.vlaamsenutsregulator.be/nl/document/besl-2025-62)
- Thanks to this approval Elia can now offer a flexibility solution towards connection applicants on the local transport grid in Flanders requesting a connection for which a flexibility need is identified, with the following main characteristics:
  - Solution only available for Elia grid users connected to the local transport grid in Flanders 
     ← Fluvius has a similar solution for its grid users, also called "Fall-back flex";
  - Connection applicants will have to make a choice between **option A** (providing flexibility themselves without remuneration) or **option B** (request to launch a tender "marktvraag");
  - Technically, the flexibility provider is required to respond to <u>real-time modulation signals</u>, cf. requirements of the GUflex product that exists on federal level;
  - Fall-back flex PVN is a <u>temporary solution</u>, awaiting the establishment of a framework for flexible connection in Flanders (transposition of article 6a of the Directive (EU) 2019/944 estimated publication of the Flemish Decree Q1 '26;
  - · The connection of grid users providing Fall-back flex PVN will be converted into a flexible connection when this framework is established.
- In the context of option B, Elia has launched a market consultation "marktbevraging" among its PVN grid users in concertation with the VNR from October 28<sup>th</sup> until November 28<sup>th</sup>
  - Mind "marktbevraging" (all PVN grid users, yearly process) 
     ← "marktvraag" (per EDS requesting option B, eligible grid users based on "marktbevraging" results)

### **Fall-back flex PVN**



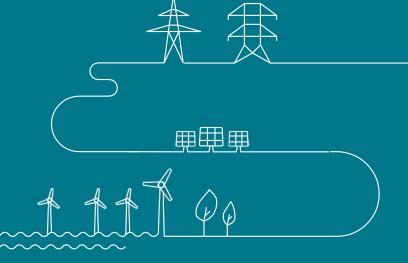




<sup>\*</sup>Fall-back flex PVN specifications template available on Elia website (webpage on Connection Contract): <a href="https://www.elia.be/en/customers/connection/connection-contract">https://www.elia.be/en/customers/connection/connection-contract</a>



Thank you.



## **Agenda**



- 1. Societal Electrification
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# Content

- 1. Introduction
- 2. LFDD Groups
- 3. Exchange of information Use of EPIC
- 4. Contractual Framework
- 5. Next steps

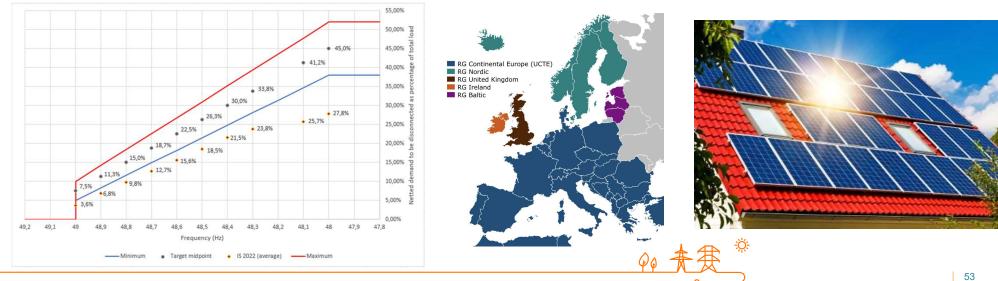


# Introduction



## **Context**

- Increasing renewables in DSO grids lower the netted demand that can be disconnected in case of a frequency collapse in the European electric grid.
- Elia does not meet the LFDD requirements of the EU netcode E&R1 of 45%
- Elia identified multiple actions to get compliant with the EU legislation.
- The LFDD plan is part of the System Defence Plan that was approved by the Minister of Energy in January 2024.



<sup>&</sup>lt;sup>1</sup> E&R = Emergency and Restoration



# Elia has proposed multiple actions in parallel to increase the LFDD volume

- Add remaining substations in rural and urban areas (DSO grids) except from large city centers.
- Accelerate selective load shedding with flow sense detection and blocking of reverse flows in DSO grids.
- Remove rural substations with dominant reverse flow
- Add industrial load
- Call for reasonable LFDD targets in EU legislation and make use of new technologies to minimize LFDD action

Elia's objective is to comply with the EU Netcode with minimum societal and economic impact





## Elia allows several ways to comply with the LFDD obligation

#### **Standard LFDD obligation:**

Disconnection of 30% of the instantaneous gross consumption in 2 steps:

- 6% in step 8 (48.3Hz)
- 24% in step 9 (48.1Hz)

OPTION 1: Load shedding on own site

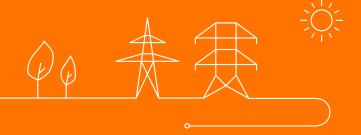
OPTION 2: Create an LFDD Group and transfer the obligation to another party

→ FOCUS OF THIS PRESENTATION





# **LFDD Groups**





Elia updated 4 parts of the connection agreement: Definitions, Article 8.2.2, Annexe 11 and Annexe 11 bis

#### **Definitions**

• Main changes relate to the definition of the LFDD group (see further slides)

#### Article 8.2.2

Contains the description of the standard obligation and the general obligations regarding LFDD-groups

- Addition of the possibility for the CDSO to fulfil the obligation by a CDS user
- Updates to the LFDD obligation as part of a group: changes to a group, planned or unplanned significant changes,...

#### **Annexe 11**

Grid user indicates his choices to disconnect, in 1 or 2 steps or his choice to disconnect at 49Hz.

No major changes

#### **Annexe 11 Bis**

Grid user indicates the details of the LFDD group

• Updates to details to be provided for each party to the group + planned or unplanned significant changes





## The main principles of the LFDD Groups - Definitions

#### **Definitions**

Article 8.2.2

Annexe 11

Annexe 11 Bis

A group consists of **two parties** where one party transfers his LFDD obligation ,fully or partially, to another party.

4 types of groups are considered:

- A co-contractor and another grid user
- A co-contractor (who is not a CDSO) and a CDS user
- A CDS user (CDSO is co-contractor) and a grid user (who is not a CDSO)
- Two CDS users (CDSO of transferring party is co-contractor)





**Definitions** 

Article 8.2.2

Annexe 11

Annexe 11 Bis

## Fulfilment of the obligation of the Co-contractor as CDSO

A CDSO does not need to form a group with its CDS users to fulfil its obligation. The CDSO can rely on its CDS user to fulfil its obligation based on a bilateral agreement (or other). The CDSO remains responsible towards Elia for the fulfilment of its obligation.

		То					
		Grid user	CDSO site A	CDS user 1 on site A	CDS user 2 on site A	CDS user on site	
From	Co-contractor	Annexe 11bis	Annexe 11bis	Annexe 11bis	Annexe 11bis	Annexe 11bis	
	Co-contractor/CDSO site A	Annexe 11bis		No	No	Annexe 11bis	
	CDS user 1 on site A (with CDSO as co-contractor)	Annexe 11bis	No		No	Annexe 11bis	
	CDS user 2 on site A (with CDSO as co-contractor)	Annexe 11bis	No	No		Annexe 11bis	
	CDS user on site B (with CDSO as co-contractor)	Annexe 11bis	Annexe 11bis	Annexe 11bis	Annexe 11bis		



**Definitions** 

Article 8.2.2

Annexe 11

Annexe 11 Bis

## Changes to the composition of an LFDD group

- Changes to the composition of the group are allowed at any time if there is no impact on the choices in ANNEXE 11
- If those changes have an impact on the choices in ANNEXE 11, then they can only be submitted within a specific period after an update of the SDP. (unless it is demonstrated that a change is necessary for technical reasons)

#### Significant change in consumption: planned or after incident

 A significant change in consumption is considered when the party which accepted the LFDD obligation cannot shed anymore 50% of the transferred volume.

**Example:** If party A expects part B to disconnect 5MW, but because of an outage he can only disconnect 1MW anymore, then mitigating measures need to be taken. (see further slides)



**Definitions** 

Article 8.2.2

**Annexe 11** 

Annexe 11 Bis

Annexe 11:

**VERY IMPORTANT:** Even if you transfer your obligation to a third party through a group, you must indicate in ANNEXE 11 at which frequencies your load will be disconnected. (49Hz or in 1 or 2 steps at 48.3Hz and 48.1Hz)

In other words: everybody must complete annexe 11.

If annexe 11 is not yet signed, Elia will consider the standard choice (disconnection at 2 frequency level of 6% and 24 % respectively)

In the event of an activation of the LFDD system, Annexe 11 will be the source of information to check the amount to be disconnected.





**Definitions** 

Article 8.2.2

Annexe 11

**Annexe 11 Bis** 

Annexe 11 Bis:

## Significant change in consumption: planned or after incident

When forming a group, it must be considered that the receiving party during certain events (outage, incident) will not be able to fulfil its <u>transferred obligation</u>. The parties have three options:

- Option 1: The original party takes back the obligation during the event
- Option 2: The original party finds a back-up option with a third party
- Option 3: The receiving party finds a back-up option

Elia expects to know who the back up party is and this party will also have to sign the Annexe 11bis.





**Definitions** 

Article 8.2.2

Annexe 11

**Annexe 11 Bis** 

Annexe 11 Bis:

#### In the event of an activation of LFDD

Elia will use the available information in ANNEXE 11bis to know at which site it must control the disconnected volume during the ex-post analysis.

#### **Amount of Annexe 11bis**

There is not limit on the amount of Annexe 11bis that can be signed

#### **Chain of transfers**

A party cannot transfer a transfer, unless it is done following a significant change in consumption (incident / outage).





# **Exchange of information - Use of EPIC**





## **Exchange of information - Use of EPIC**

EPIC will be upgraded to allow all parties to:

- Register the choices from ANNEXE 11
- Register the information regarding the LFDD Group
- Register all activations of back ups during significant change of consumption





# **Contractual framework**





## Two new annexes about LFDD in the connection agreement

- Annex 11: => AVAILABLE IN NEXT UPDATE OF CONNECTION AGREEMENT in Q1 2026
  - Individual or via LFDD group → to be specified to Elia
  - Disconnect obligatory volume in either 2 steps 6% at 48,3 Hz and 24% at 48,1 Hz or in 1 step 48,3 or 48,1 Hz to be decided by Elia
  - Voluntary volume disconnected at 49,0 Hz (cfr mailing 16/11/23)
  - Summary: % to be disconnected at 49 Hz; 48,3Hz and 48,1 Hz
- Annex 11 bis => => AVAILABLE IN NEXT UPDATE OF CONNECTION AGREEMENT in Q3 2026 (best estimate)
  - Specification of LFDD group





Thank you.

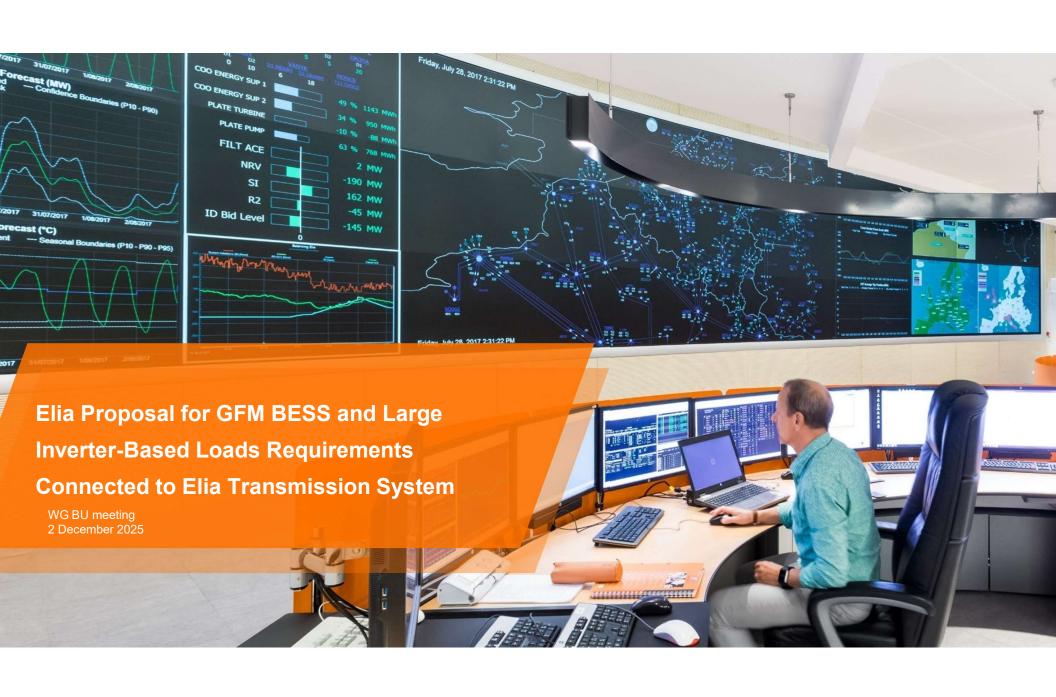


## **Agenda**



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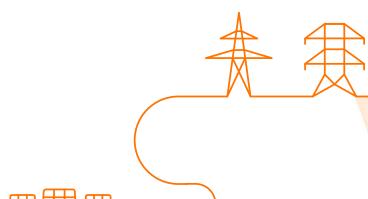






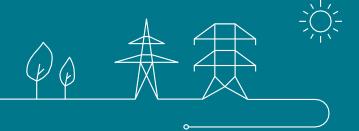
# **Agenda**

- Overview on Elia fast-track approach
- Key outcomes of 24/10 Stakeholder Workshop
- Next steps





# Overview on Elia fast-track approach





#### Elia Fast-Track Approach

#### Technical requirements for GFM BESS and transmission system connected inverterbased loads

#### Context

- 1. Rapid integration of inverter-based resources, also in Belgium
- 2. Delay in EU network codes RfG2.0 and DC 2.0 implementation

Elia must act now with "fast-track" requirements for GFM BESS & LIBL<sup>1</sup> connected at the transmission system.

#### **Principles of Fast-Track Approach**

System Security, Proportionality, Non-Discrimination & Technical Maturity

#### Scope

- **GFM BESS:** Type D units connected at the transmission system\*.
- LIBLs: Aggregated inverter-based loads >75 MW connected at the transmission system.



<sup>\*</sup>Transmission system is above 70kV.



#### **Process overview**

**Benchmarking and alignment with European initiatives**, including ACER proposals, ENTSO-E recommendations, and practices of other European TSOs, to ensure consistency and proportionality with developments in neighboring countries.

**Technical assessments and specification development** for grid-forming type D for BESS and LIBLs of ≥75 MW, connected at the transmission system, focusing on system-stability needs, performance capabilities, and the operational impact of these technologies.

**Stakeholder dialogue** through the Working Group Belgian Grid and a dedicated workshop on 24 October 2025 where the proposed draft technical requirements on GFM SPM and LIBL, were presented and stakeholder's feedback was collected and addressed as much as possible.

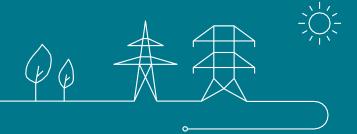
Formal discussions with public authorities and regulatory authorities, including FOD Economy, FORBEG and CREG, to present the proposed technical requirements, gather feedback, and ensure regulatory alignment; informing DSOs about the new requirements though the regular **Synergrid** CE10 meeting.

 The legal justification for Elia's recommendation to include the new requirements in the EDS appendix is currently under discussion with FOD and CREG.





# **Key Outcomes of 24/10 Stakeholder Workshop**



### Key Outcomes of Stakeholder Workshop on 24/10 and Elia Responses (1/2) e lia

Stakeholders were broadly supportive of Elia's approach to introduce interim requirements for GFM BESS & large inverter-based loads, recognizing the importance of maintaining system stability in a low-inertia context. However, several concerns emerged:

#### 1. Clarity and alignment of definitions

Participants asked for clearer definitions and transparency on Elia's proposed values references.

#### Elia response:

- Most definition-related points have been clarified in the updated slides (highlighted in red).
- Elia added explicit references to ENTSO-E sources and other TSO grid codes.
- The CDSO responsibility with respect to load has been discussed internally and is removed from the proposal.

#### 2. Proportionality and cost justification

Stakeholders questioned the absence of a cost–benefit analysis and stressed that obligations should be proportionate to system impact and applied primarily to large, transmission-connected assets.

#### Elia response:

- Additional explanations were added under the Proportionality section to confirm that no oversizing or energy reservation is required.
- Based on OEM feedback, the additional implementation cost is expected to remain below 10 % of total project cost, ensuring a
  balanced and economically justified approach.



### Key Outcomes of Stakeholder Workshop on 24/10 and Elia Responses (2/2) e lia

#### 3. System-need justification

Participants requested a clearer rationale for why each capability is required and suggested market-based approaches for some services.

#### Elia response:

- Detailed system-need justifications were already included in each grid code section, explaining how each requirement supports Belgian grid stability and system restoration.
- The section "Main principles for fast-track implementation" now provides detailed "System need justification".
- Elia's approach is consistent with ENTSO-E "Project Inertia II" position paper (2025), which calls for enhanced grid-forming capabilities and minimum inertia levels across Europe to safeguard system stability and restoration capability in a decarbonised, inverter-dominated grid.

#### 4. Technical feasibility and implementation

Stakeholders raised technical concerns on HVRT voltage profile feasibility and post-fault recovery dynamics, noting current OEM limitations. They also emphasized the need for gradual, coordinated implementation and continued dialogue.

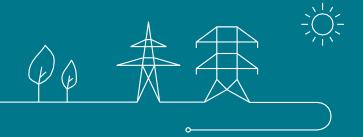
#### Elia response:

- Clarifications were added on HVRT requirements, confirming alignment with ENTSO-E practices.
- Elia acknowledged current technology limits and indicated openness to case-by-case flexibility.
- Elia will continue stakeholder engagement through the public consultation process and subsequent follow-up discussions.





## **Next steps**





### Roadmap for GFM BESS & TCIB Load Capability Requirements Implementation



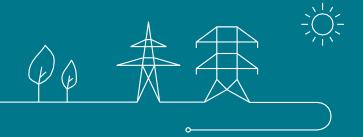
#### Early 2026 Submission to FOD, adapted:

- General Requirements for BESS
- General Requirements for Load
- Federal Technical Regulation





## **Appendix**





### Overview of new technical requirements

#### Additional requirements for GFM BESS

Phase angle jump capability (voltage source behavior )

Voltage magnitude step capability (voltage source behavior)

Phase angle jump withstand capability (withstand capability)

High voltage ride-through capability (withstand capability)

Contribution to synthetic inertia

Black-start with soft energization capability

#### **Additional requirements for LTC IBLs**

Frequency withstand capability

RoCoF withstand capability

Voltage phase angle jump withstand capability

Behaviour after faults

High-Voltage Ride-Through (HVRT)

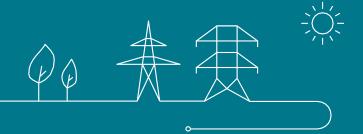
No contribution to sub-synchronous oscillations

LFSM-UC





## Thank you



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### Werkplan 2026

- Societal Electrification
  - Update Grid connection methodologie
  - Connection Process Reform
    - · Align capacity reservation & allocation with policy
    - Queue management
    - Incentives to release unused allocated capacity (UIOLI/MASC)
- Capac methodologie
- Verderzetting TF LRIO roadmap verbeteringen
- Ontwikkelingsplannen (al dan niet via een nieuwe TF)
- Aansluitingscontract v2
  - GU Flex
  - MASC
- Europese netcode RfG/DCC 2.0/(DR): oa:
  - · Bestaand vs nieuw
  - Modernisatie
  - Roadmap implementatie
- Tarieven
- Aansluitingscontract v3?/Gedragscode v3?/...

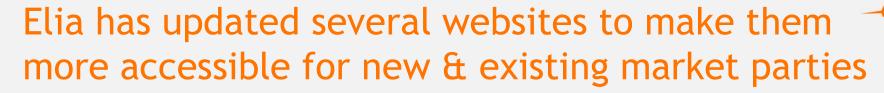


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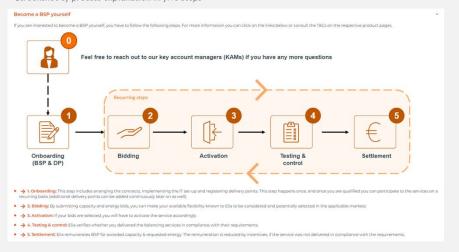


#### **Explicit balancing**

URL: https://www.elia.be/en/electricity-market-and-system/system-services/keeping-the-balance

What changed? After a brief intro to explicit balancing, the webpage now explains the process of becoming a BSP in give steps across products. This is intended to give an accessible understanding to new players, whilst the design notes deep-dive on specificities of individual products (FCR, aFRR, mFRR)

Screenshot of process explanation in five steps



#### Capacity remuneration mechanism

URL: https://www.elia.be/en/electricity-market-and-system/adequacy/capacity-remuneration-mechanism

What changed? After a brief intro to explicit balancing, the webpage now explains how to participate in CRM in five steps, with more detail per step in a separate page. A 'Quick facts' section also addresses directly common questions.

Screenshot of process explanation in five steps



### For more information per explicit balancing product, you can refer to the following sources

#### Product page

A dedicated page on elia.be gathers in one place all key documents for each product.

### FCR product page

mFRR product page

aFRR product page

#### Design note

A design note is a 40-80 page document that dives deeper on various aspects of the product.

Can be found on the product page\*:

FCR	design	note
-----	--------	------

aFRR design note

mFRR design note

NEW

NEW

#### Terms & conditions

The T&Cs define the legally binding rules and supersede information in the other educational documents that Elia makes available.

Can be found on the product page\*:

FCR terms & conditions

aFRR terms & conditions

mFRR terms & conditions

elia

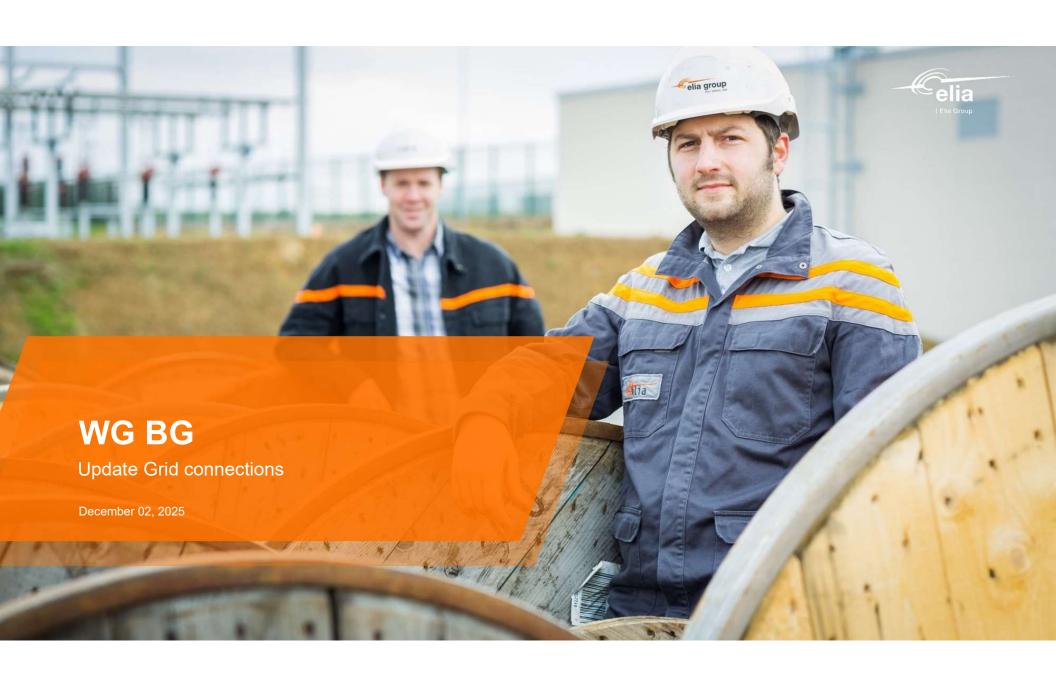
<sup>\*</sup> You can find the link to the latest version of the design note and the T&Cs on the respective product pages

### **Agenda**



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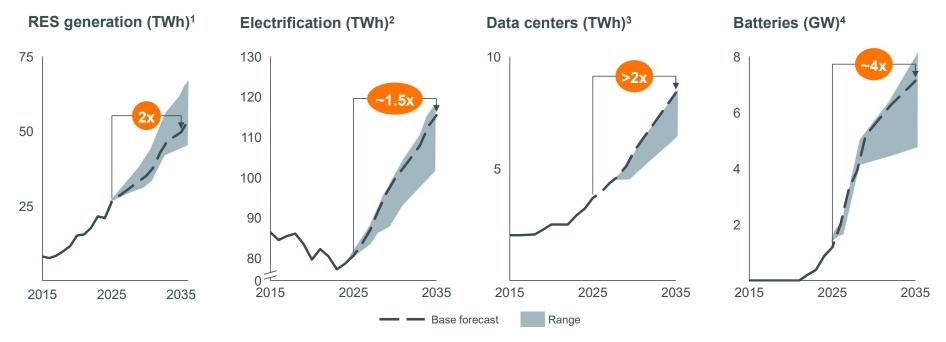






## Approved plans anticipated unprecedented levels of new generation, electrification, data centers, and storage capacities in Belgium

#### Projections based on societal choices as outlined in current plans



<sup>1.</sup> Includes Solar PV, onshore and offshore wind; Load factors: Solar PV 12%, Onshore wind 22%, Offshore wind 38% 2. Total electricity demand excluding data centers load 3. 2015-2019 load based on installed capacity 4. Both large- and small-scale battery storage

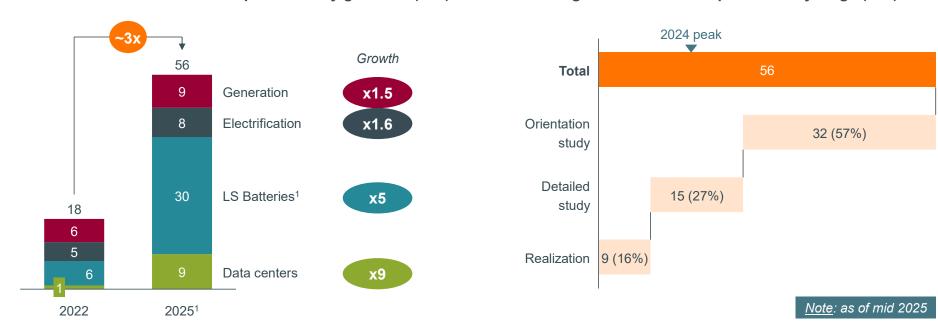
Note: Base forecast reflects Current Commitments scenario; Range built on Constrained Transition scenario (lower bound) and Prosumer Power (upper bound) Source: Elia Adequacy and Flexibility Study (2024-2034, 2026-2036); Elia Open Data Portal



## However, capacities requesting a connection are surging beyond any previous forecast and approved plans, with 56 GW in the process today (~4.5x peak)

#### **Evolution of BE transmission queue size by grid user (GW)**

#### 2025 Belgium transmission queue size by stage (GW)<sup>2</sup>



<sup>1.</sup> Large Scale Batteries 2. As of August 2025
Note: Power factor for translation from MVA to MW assumed 0.95, which is typical for grid connections; Excludes (minor) change requests
Source: Elia Transmission Belgium



## This increase stems from a combination of three driving factors; Note: as of mid 2025 Elia already delivering more than foreseen in approved development plans



#### Surge in new assets

Data centers & batteries scaling much faster than expected



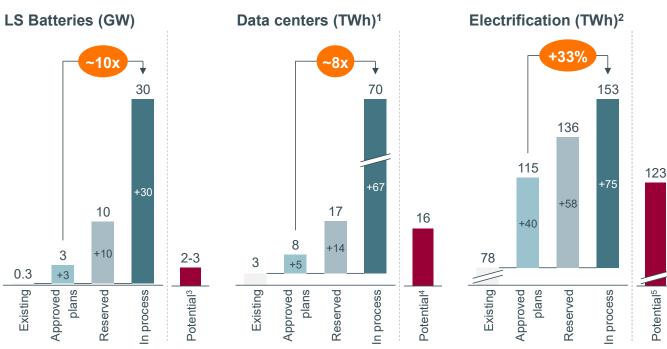
#### Speculative behavior

Anticipated or speculative projects inflating the queue



#### **Electrification progress**

Reservations more than on track with approved plans





<sup>1.</sup> Converted from GW to TWh using 85% load factor 2. Electrification figures based on total electricity demand minus data centers

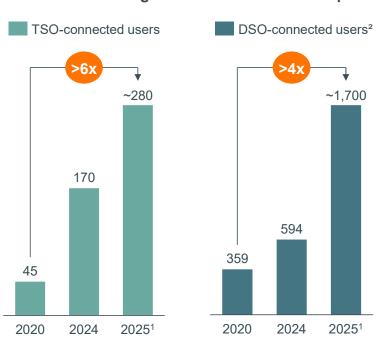
Note: "Approved plans" refers to AdeqFlex (2024-2034) Study; "Reserved" coming from Elia's hosting capacity map; "In process" adding orientation studies on top of reserved Source: Elia Adequacy and Flexibility Study (2026-2036); EnergyVille Paths 2050 (April 2025); Elia Transmission Belgium; Boston Consulting Group The Power to Compute (May 2025)

<sup>3.</sup> EnergyVille 2040 value 4. From BCG The Power to Compute 5. From AdeqFlex (2026-2036), in "Current Commitments" scenario



## Today's surging requests are creating connection study backlogs and delaying physical connections

#### New transmission grid connection studies requested (#)1



#### **Backlog in connection studies**

- Connection studies are performed to assess what is possible, as well as when and where, but a "first-come, first-serve" basis approach often leads to suboptimal outcomes
- Part of the requests are linked to speculative, duplicative or unrealistic projects, distorting the size of the queue and taking study capacity away from "real" projects

#### **Delays in connections delivery**

- Despite a significant ramp-up in CAPEX delivery, lead times for the physical delivery of connections are increasing
- Current and planned grid infrastructure is insufficient to accommodate all requests in the queue, that would require significant further upgrades

<sup>1.</sup> Full year data extrapolated from August YTD 2. Connection requests on the distribution system transferred to Elia; Source: Elia Transmission Belgium



## Beyond scaling our capacity further, we urgently need societal choices, structural process reform, and more flexible connections



### More study capacity

Further scale our connection study throughput to better serve the increase in connection requests



### Accelerate CAPEX delivery

Further scale connection delivery capacity to convert ordered connections into physical assets faster



### Societal choices

Decide for what type of capacity and for how much capacity to prepare the grid for, and allocate/prioritize both study and grid capacity to those choices

Steer capacity in line with societal and industrial goals



### Active queue management

Evolve the process to one that doesn't let immature/speculative requests clog the system for "real" projects, and that is efficient for both developers and T/DSOs

Keep the queue credible, predictable, and manageable



### Unlocking flexibility at scale

Unlock flexibility to reduce stress on the grid and reinforcements, both from industrial & non-industrial users on the high-voltage and lower voltage grids

Limit the overall need for required grid reinforcements

 Issue faster study decisions and increase transparency Faster realization of connections and grid reinforcements



## To get back to a 'clean' queue and enable faster connections, we propose a structural reform package with multiple measures already tested elsewhere

More study capacity	Accelerate CAPEX deliver		Active queue management	Unlocking flexibility at scale
Workforce expansion	Fast-track permitting	Integrated policy-to grid planning	lose-it	Temporary flexible connections
Lower granularity	Strategic supply chain mgt.	Align capacity allocation with police	First-ready, first-served	Permanent flexible connections
Study automation	Expand delivery capacity			Flexibility market mechanisms
Batch study processing	Getting more out of existing asset			Technical intervention tools
	Dynamic CAPE portfolio mgt.	X Observa markets	tion in other to date <sup>1</sup> Many Some Few	

<sup>1.</sup> Based on benchmark analysis of 18 markets, of which 6 in the US, 1 in Australia, and 11 in Europe; Source: BCG publication "Mind the Queue", September 2025





# Recent achievements & focus points

- Detailed design and implementation of <u>flexible connection agreement</u> ongoing, with deep engagement with the market
- Readiness for proof of concept for non-flexible (new) grid users
- New Code of Conduct released soon, creating opening for first improvements regarding connection process (max duration of reservations, MASC, proof of terrain,...)
- Swim lane improvement: new category for data centers
- Monthly HCM update
- Introduction of Fallback Flex PVN to connect grid users in a flexible way, awaiting transposition of EU law into Decree / CoC
- Discussions on Decree (fast track + transposition) ongoing
- Set-up by Elia of a task force gathering the 4 regulatory authorities to discuss and align
- Processes and tools are being upgraded to manage the surge in connection requests (distribution, PVN and federal grids)









### Werkgroepen Belgian Grid 2026

03/03/2026 9-12u 17/06/2026 9-12u 22/09/2026 13-16u 08/12/2026 9-12u

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