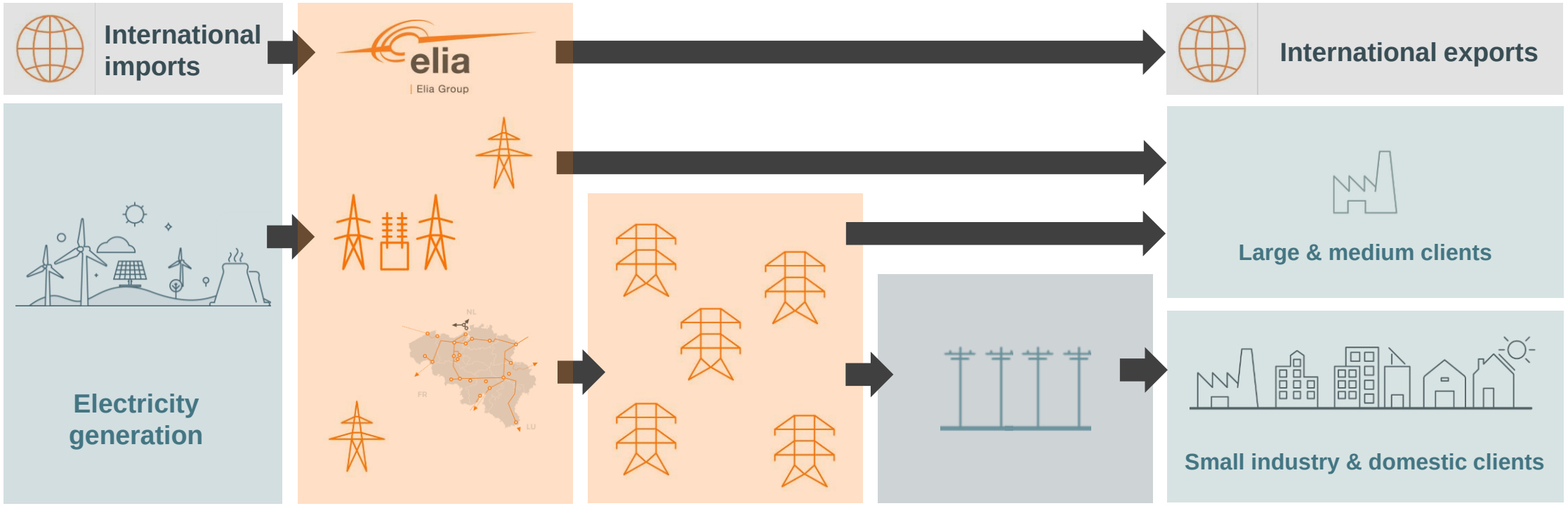
Principaux défis de la transition énergétique pour les gestionnaires de réseaux électriques

03/06/2025 | Markus Berger - Elia

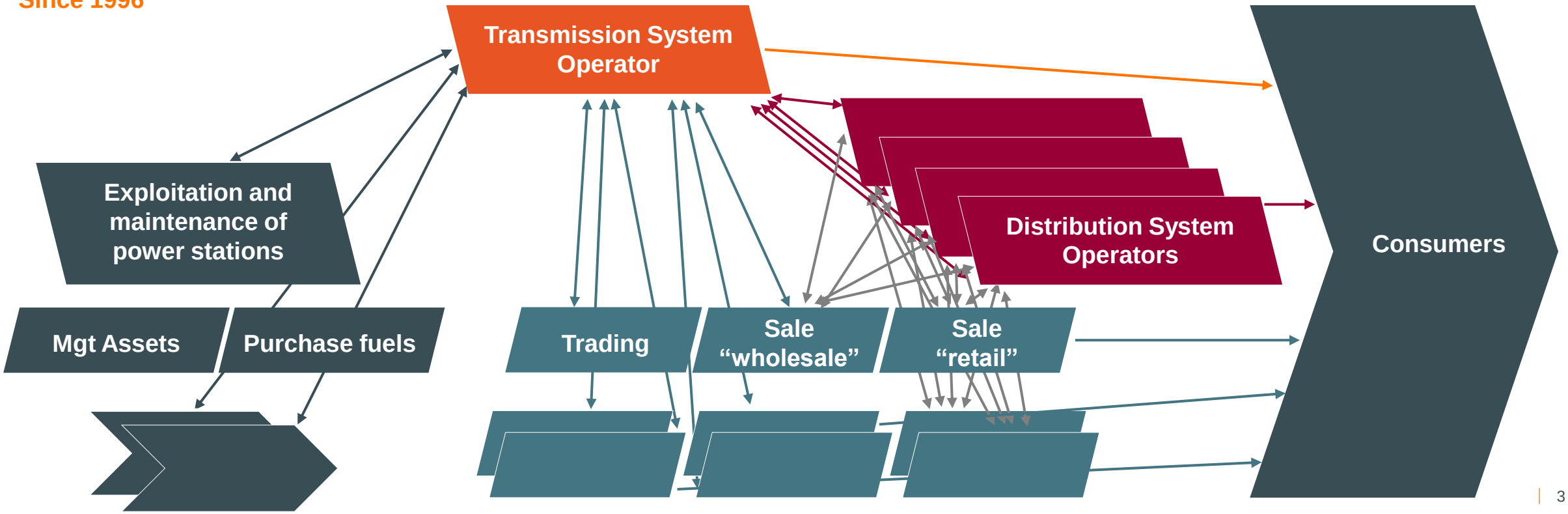
Transmission System Operator: central position in the internal electricity market



Transmission System Operator: why?

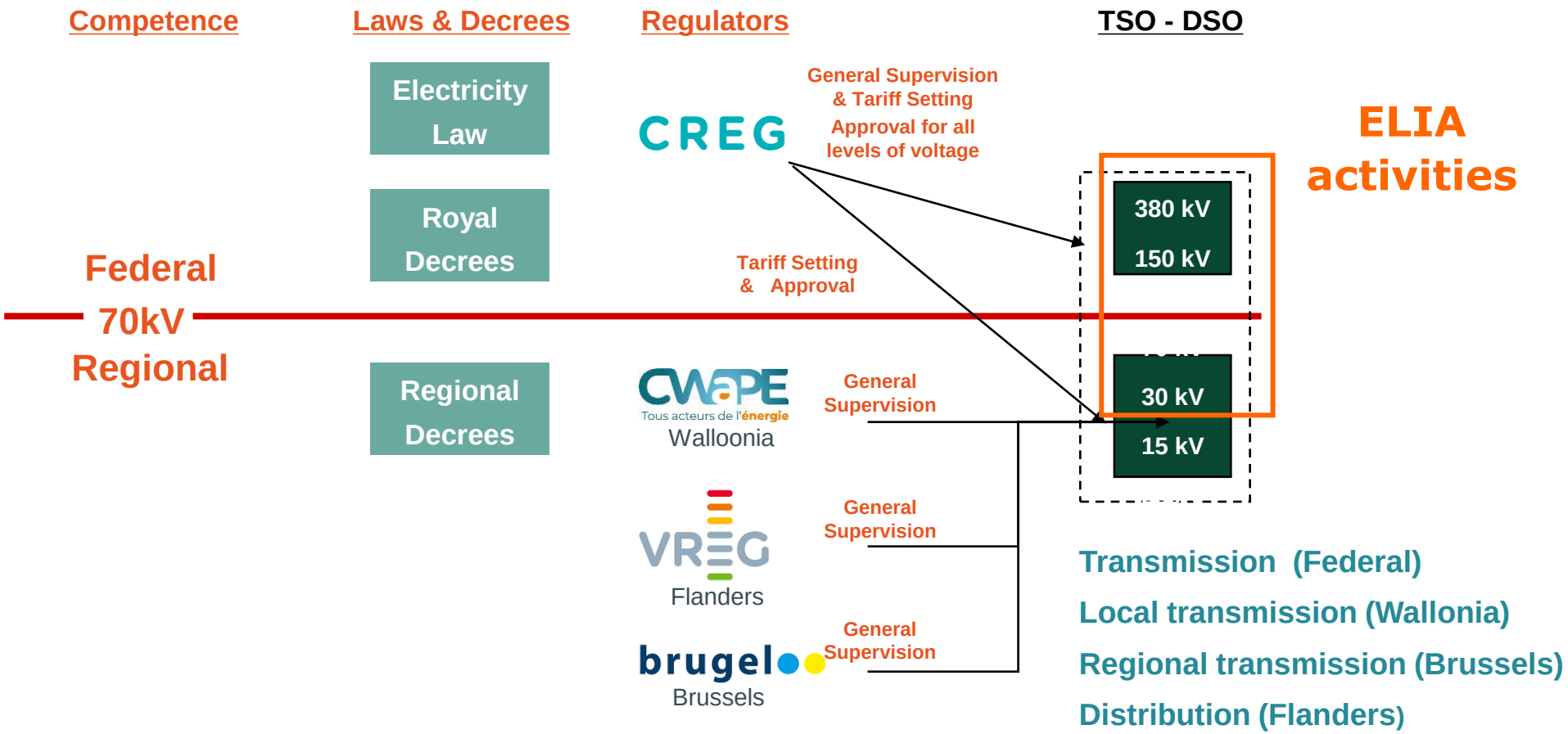
Free access to the grid for all market players

Since 1996



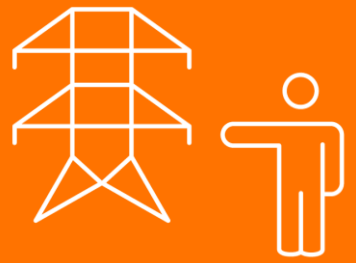
Regulation of Elia – Belgian Framework

A specific regulatory environment taking into account the Federal Belgian State



Key activities

Elia



1

Infrastructure management

Operation, maintenance, planning and expansion of the on- and offshore high voltage infrastructure.

2

Controlling the system

Secure operation and balancing of the whole electricity system, 24/7.

3

Developing the EU market

Front runner in the development of the EU electricity market (NEW & CEE regions) to make the EU energy system more competitive, secure and sustainable.

The Nominated Electricity Market Operators (NEMOs)

NEMO

- PX Entity (one or more) designated by the competent authority to **perform tasks related to single day-ahead (SDAC) or single intraday coupling (SIDC)** in the Member State.

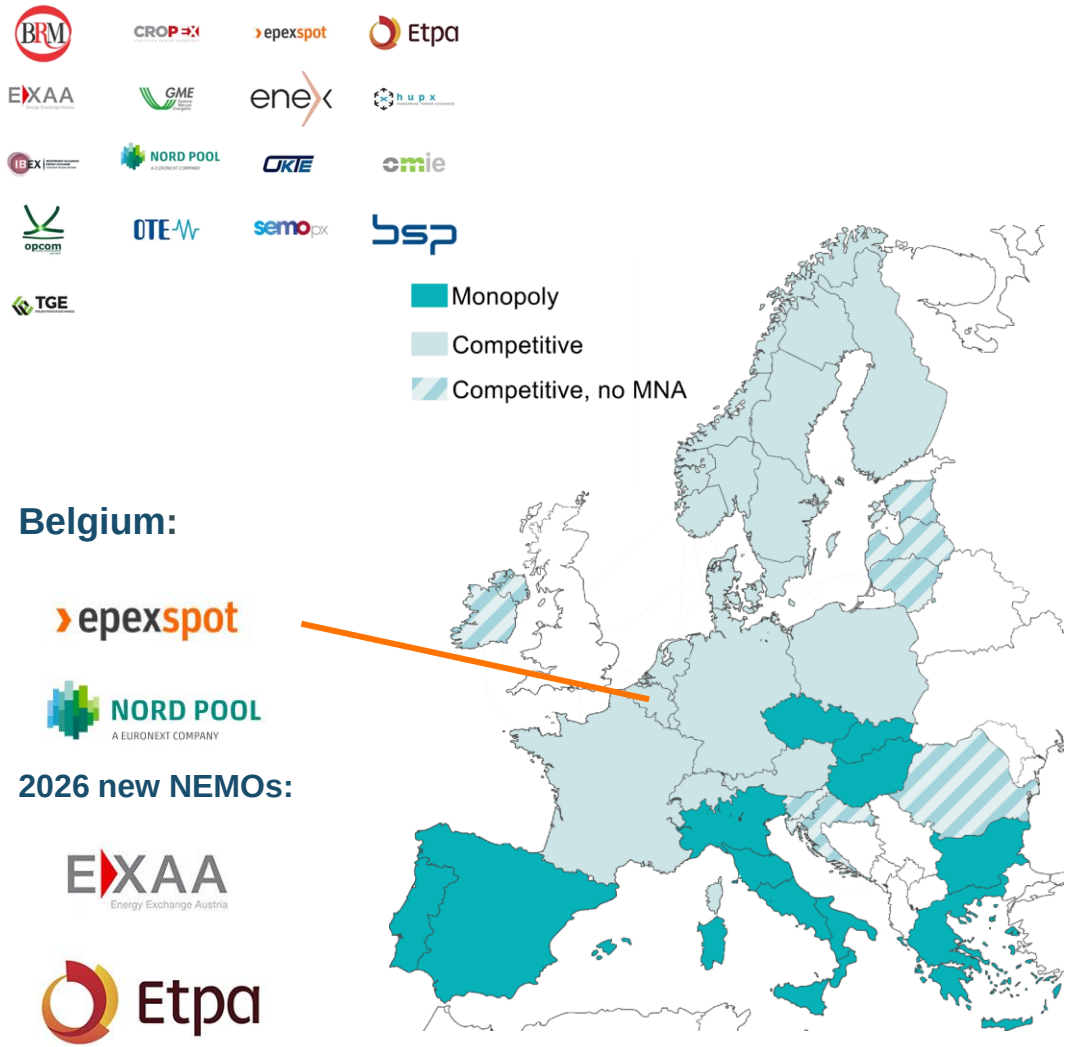
– **NEMOs are responsible for:**

- **Collection of orders** and interaction with market participants,
- Development of **market algorithms**,
- **Allocation of capacities** and **matching of orders** on DA and ID markets
- **Operating of DA and ID algorithms** together with TSOs
- Acting as **central counterparties** for clearing and settlement of the exchange of energy
- **Publication** of market data

– **NEMOs are challenged to ensure:**

- Satisfactory performance of **algorithms**,
- Cresting **local interfaces** for the market participants,
- Providing **transparent data** regarding the electricity trading
- **Cooperation** with each other (competition) and with TSOs

– ➔ Designation status of NEMOs may differ between day-ahead and intraday timeframe



Belgium:

epexspot

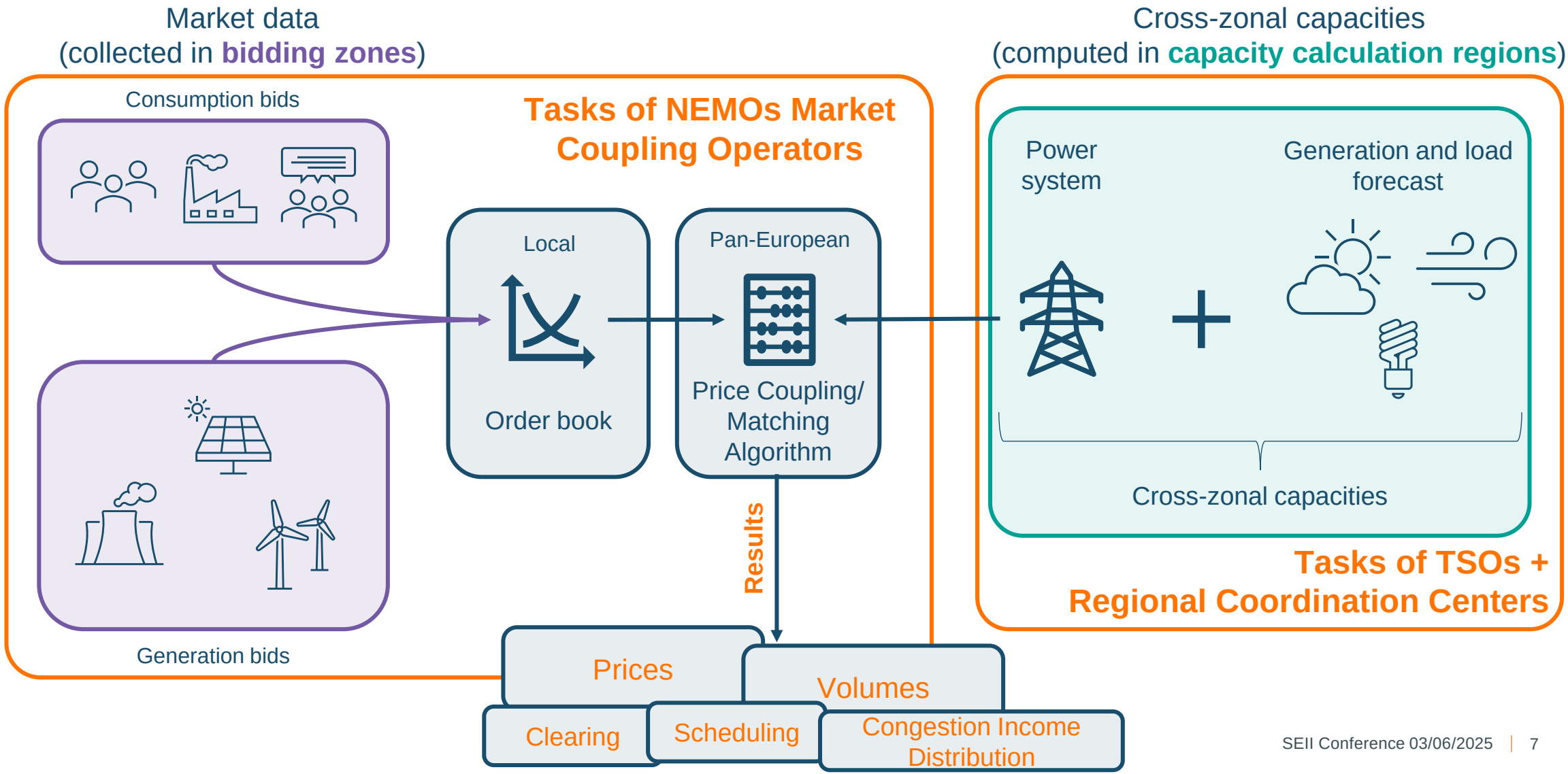
NORD POOL
A EURONEXT COMPANY

2026 new NEMOs:

EXAA
Energy Exchange Austria

Etpa

Day ahead & intraday algorithms – TSOs and NEMOs tasks



Solar energy: a decentralization roller-coaster?

In 2000, what was the prediction for global solar capacity in 2010?

4 GW ✓
8 GW
24 GW
41 GW

IEA predicted solar capacity to reach **4 GW** by 2010

What was the actual capacity for global solar in 2010?

4 GW
8 GW
24 GW
41 GW ✓

10 x what was predicted in 2000

In 2010, what was the prediction for global solar capacity in 2020?

87 GW
113 GW ✓
247 GW
324 GW

IEA predicted solar capacity to reach **113- 127 GW** by 2020

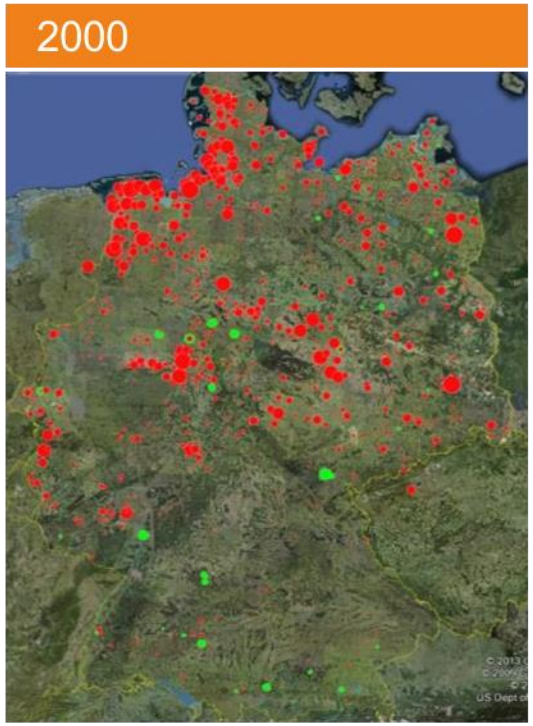
What was the actual capacity for global solar in 2013?

53 GW
87 GW
113 GW
136 GW ✓

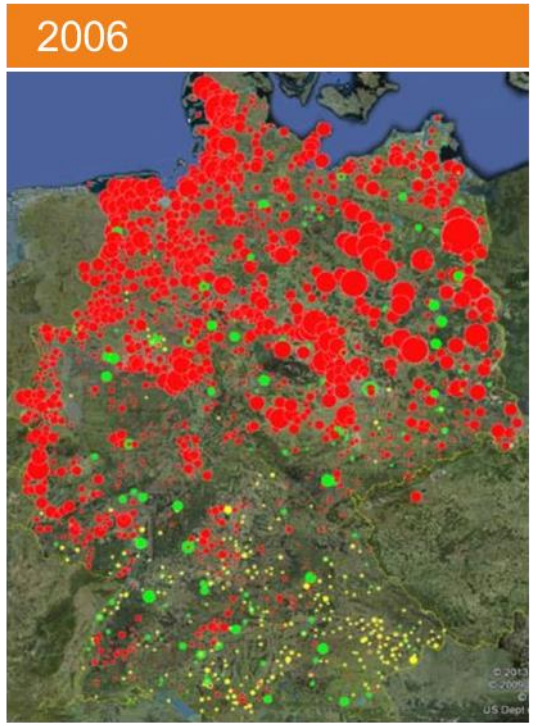
7 years before it was predicted only 3 years before

RES development in Germany

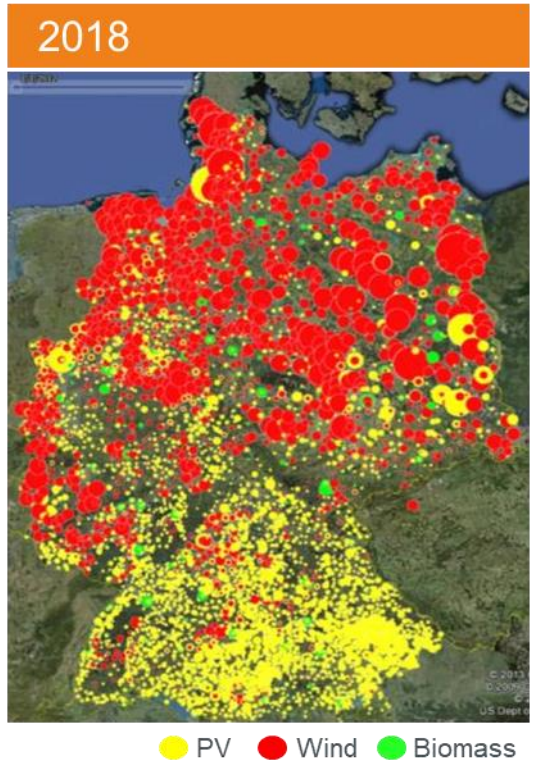
Area proportional to the installed capacities



- ~30,000 plants
- 1,665 MW wind power



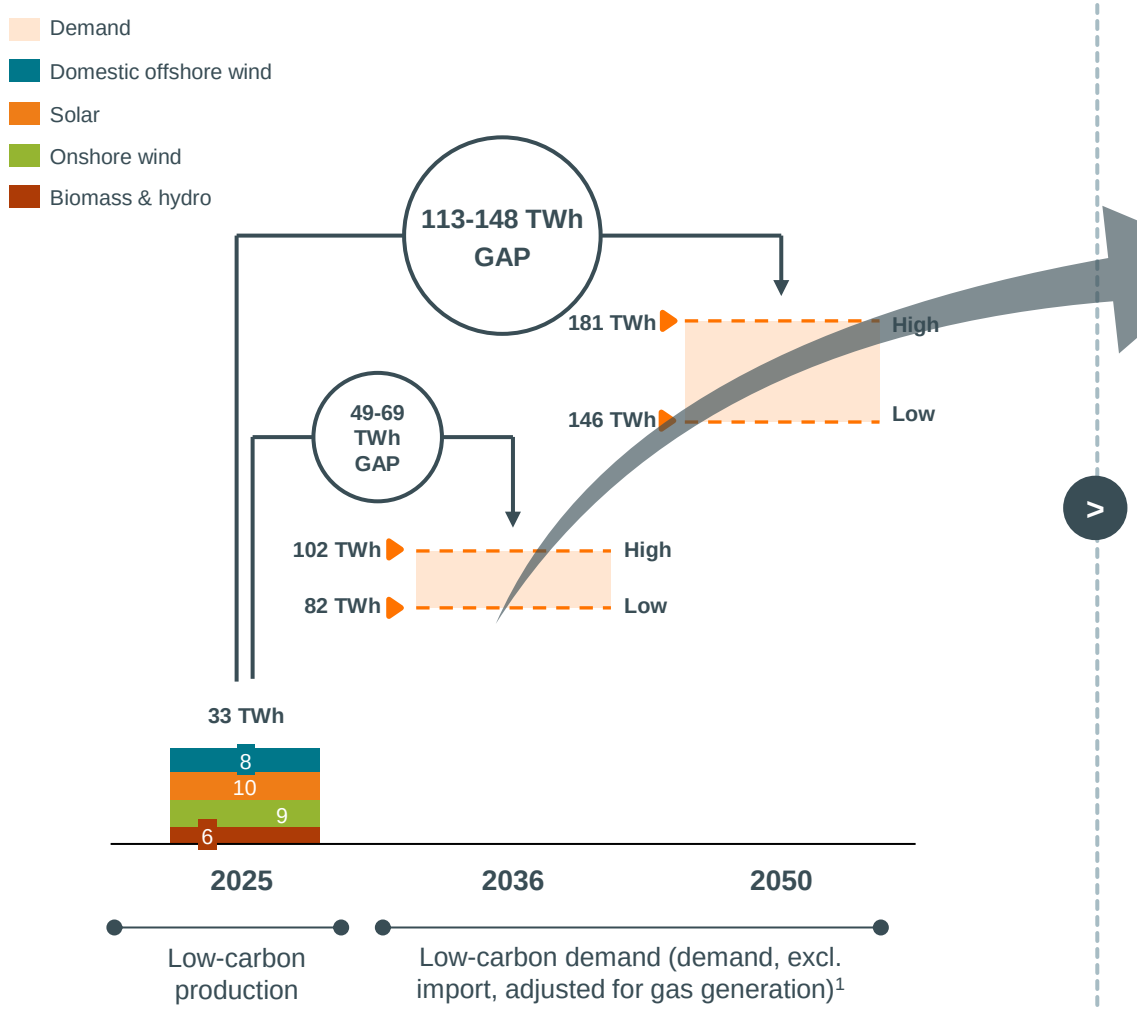
- ~221,000 plants
- 2,233 MW wind power



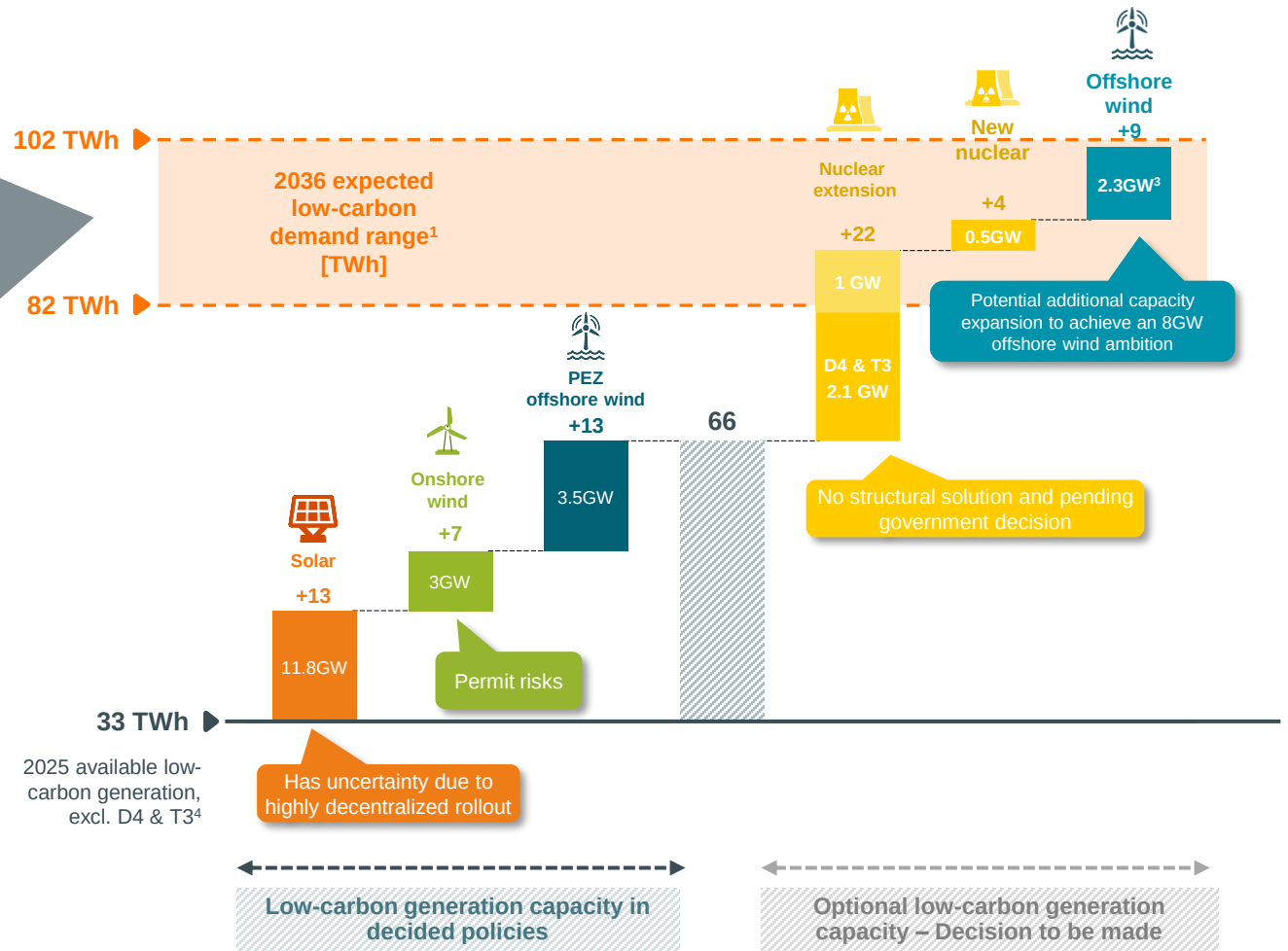
- > 1,600,000 plants
- 49,628 MW wind power
- 41,687 MW PV

Belgium GAP | PEZ offshore wind contribution will be needed to close the low-carbon electricity gap in a cost-efficient way by 2036

Low-carbon generation gap[1] by 2036 & 2050 [TWh]



Domestic low-carbon generation potential, 2036 [TWh][2]



1. Based on Elia "Blueprint 2024 study" , Energyville "Paths 2050" central scenario, Federaal Planbureau "Energievooruitzichten tegen 2050" & ENTSO-E "TYNDP2024" scenarios, assuming 10% imports, 25TWh gas generation in 2036 and unabated gas generation for 2050 and linear interpolation between periods; 2. Based on blueprint 2024 study, central scenario of domestic RES; 3. Additional offshore wind capacity beyond currently installed 2.3GW and PEI 3.5GW to achieve 8GW ambition; 4. Currently available low-carbon generation expected to be available in 2036 as well, excl. 15 TWh from D4 & T3 as current extension only runs until 2035

Développement des infrastructures

Green Substations

On the road to a net zero society

Expansion et intégration du réseau OFFSHORE

- Ile Princesse Elisabeth — 27-29
- Nautilus — 2030
- Triton Link — 31-32
- Offshore Energy Hub — 2035
- Projets à long terme — >2035
  - 3e Hybride interconnector
  - To 8 GW HEB North sea

Poursuite du développement des interconnexions ONSHORE

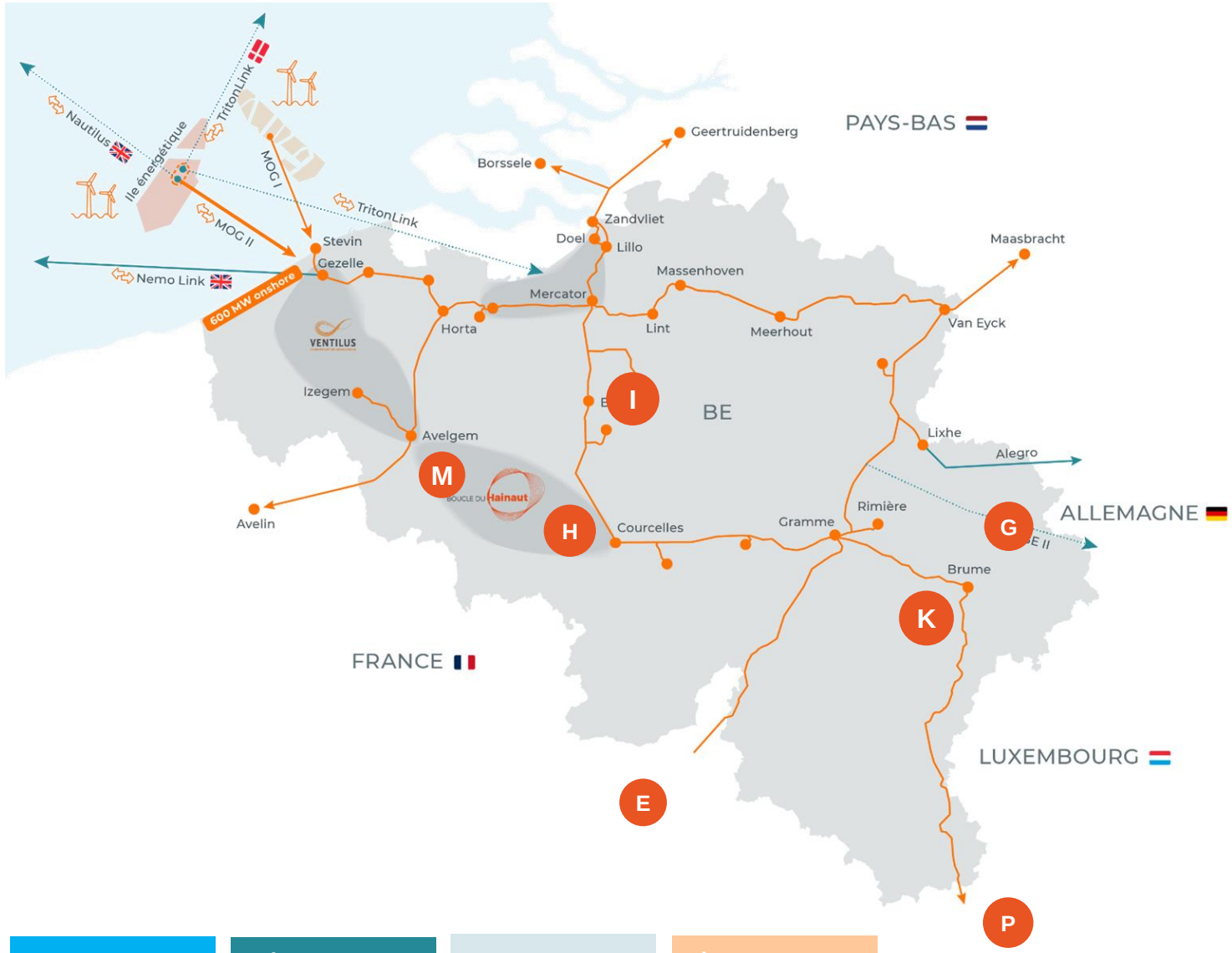
- E Renforcement de l'axe Lonny-Achène-Gramme — 30-32
- Renforcement de l'axe Van Eyck - Maasbracht — 32-34
- G 2e liaison avec l'Allemagne — 37-38
- P Projets à long terme — >2035
  - Explorer toutes les frontières — 2040
  - Belgique - Luxembourg

Création d'une capacité d'accueil

- H Nouveaux postes électriques 380kV
- Nouvelles capacités de transformation
- Connections des utilisateurs du réseau

Backbone interne

Optimiser le potentiel existant	Réalisation des liaisons manquantes	Assurer la stabilité du système	Assurer la flexibilité du système
I Renforcement du backbone centre-est	Ventilus — 28-30	Régulateurs de tension	CCMD
Renforcement du backbone Anvers	M Boucle du Hainaut — 29-30	Compensateurs synchrones — 28-30	Flex in Market
K Renforcement du backbone Sud-Ouest	Nouvelle expansion Gezelle - Van Maerlant — ~2035		La fibre partout
Placement d'Ampacimon	Corridors supplémentaires — TBD		Intelligence Artificielle



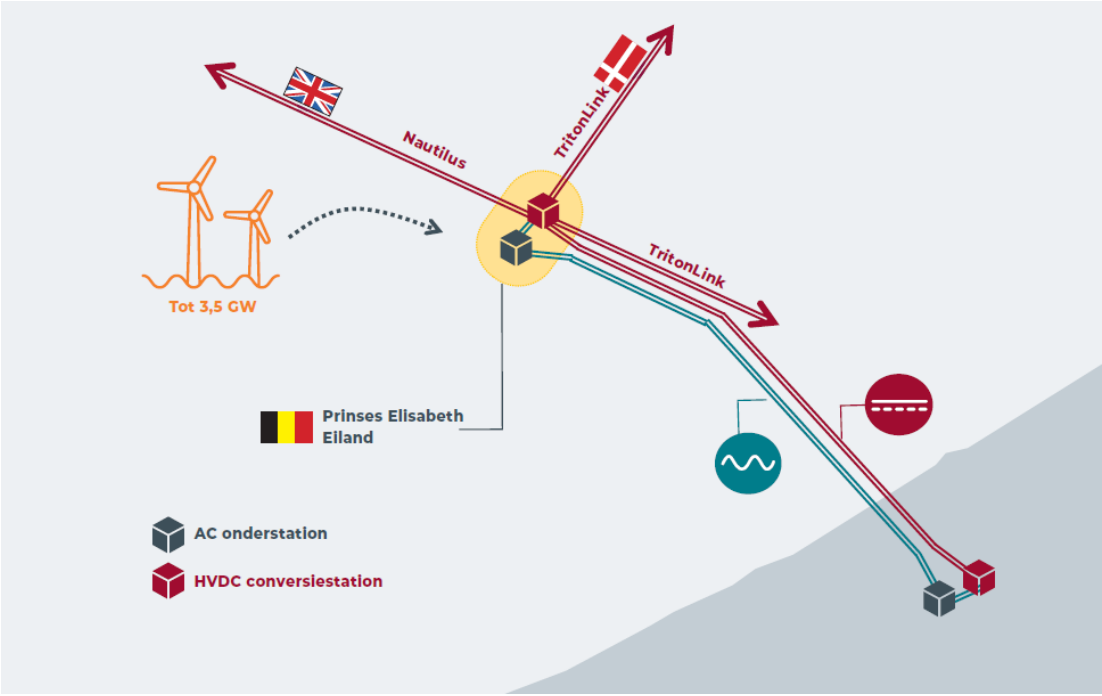
Planifié | À approuver | Conditionnel | À titre indicatif

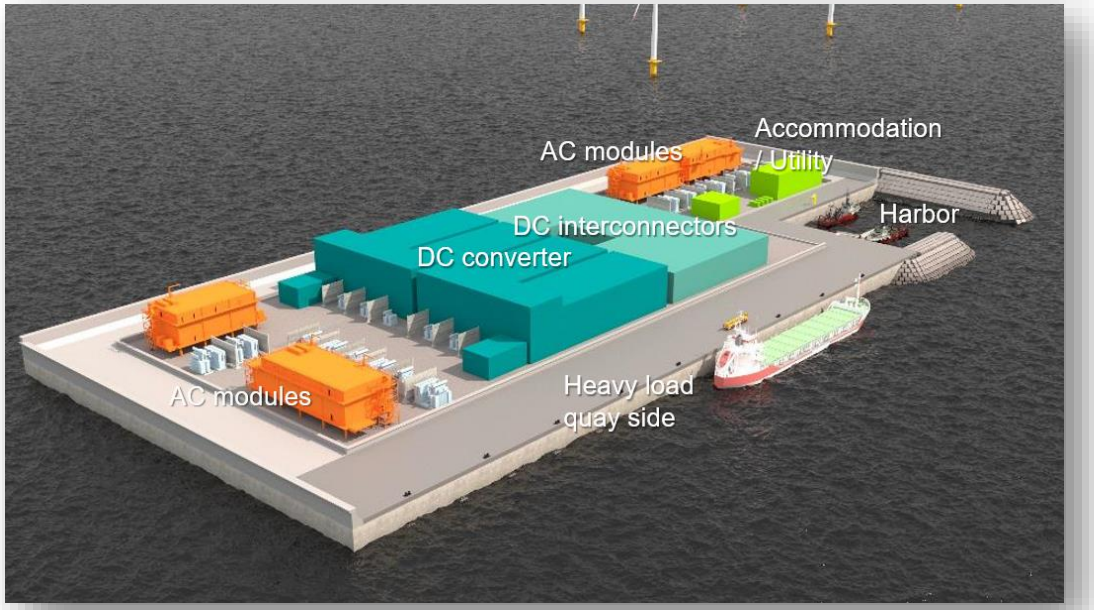
Context

Princess Elisabeth Zone

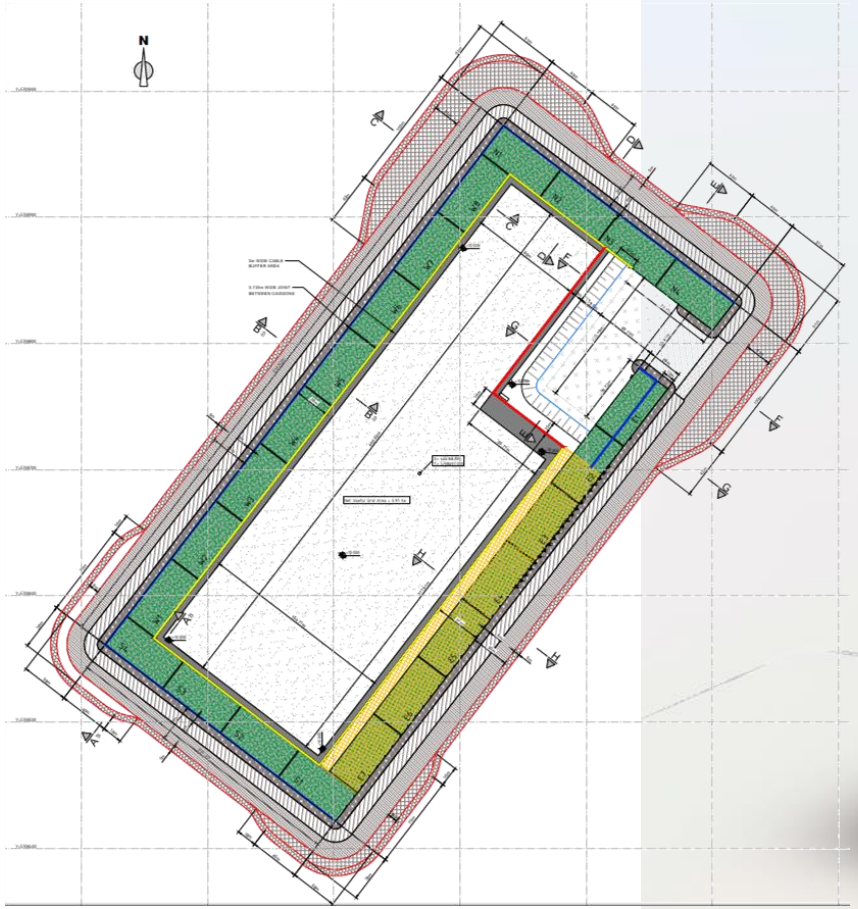
The Energy Hub

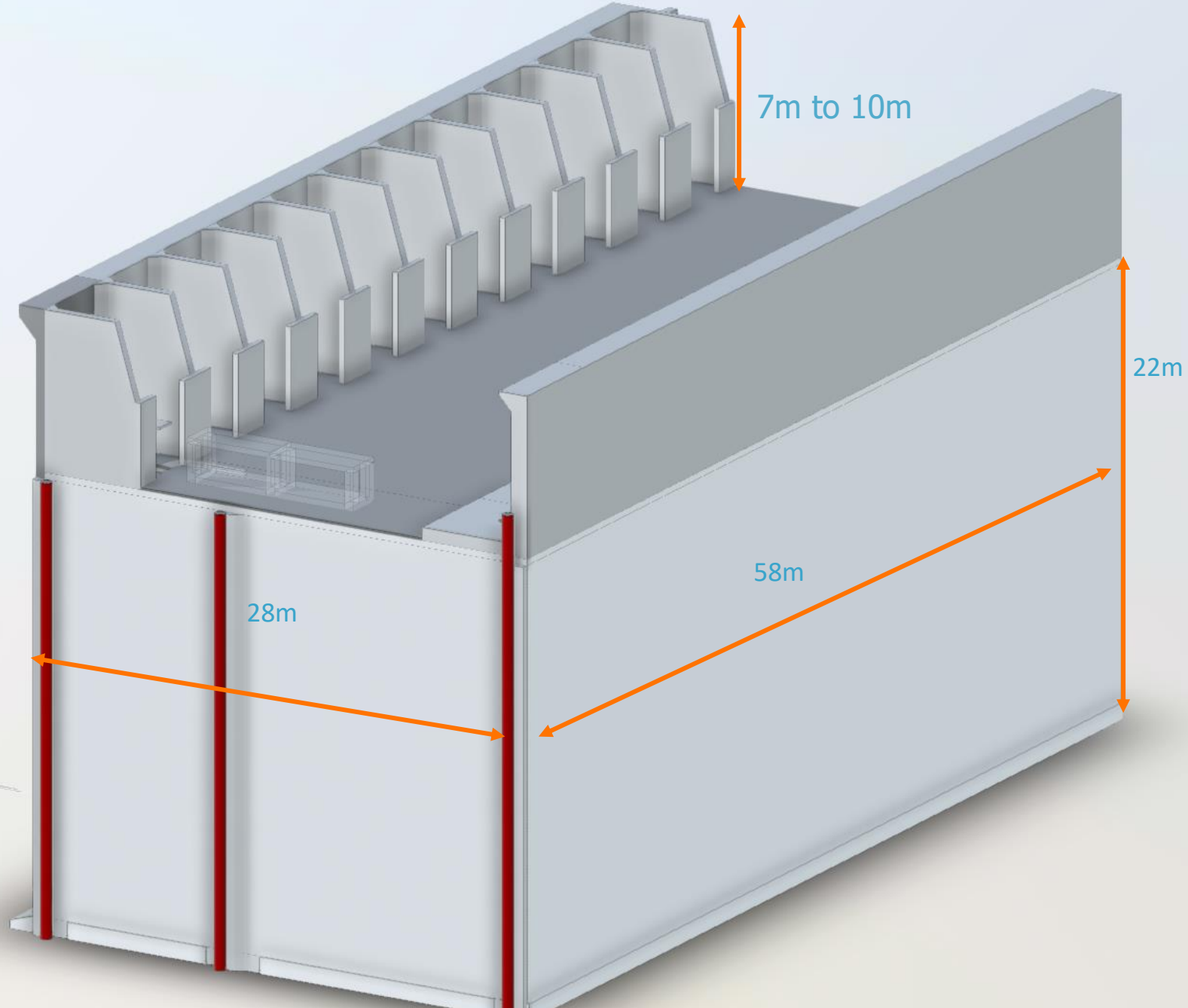
The Princess Elisabeth Island will house the transmission infrastructure to connect up to 3.5GW of offshore wind from the Princess Elisabeth wind zone and to provide a connection point for interconnectors (such as Nautilus and Triton Link). Therefore, a mix of AC (alternating current) and HVDC (high voltage direct current) is envisaged to achieve these goals.





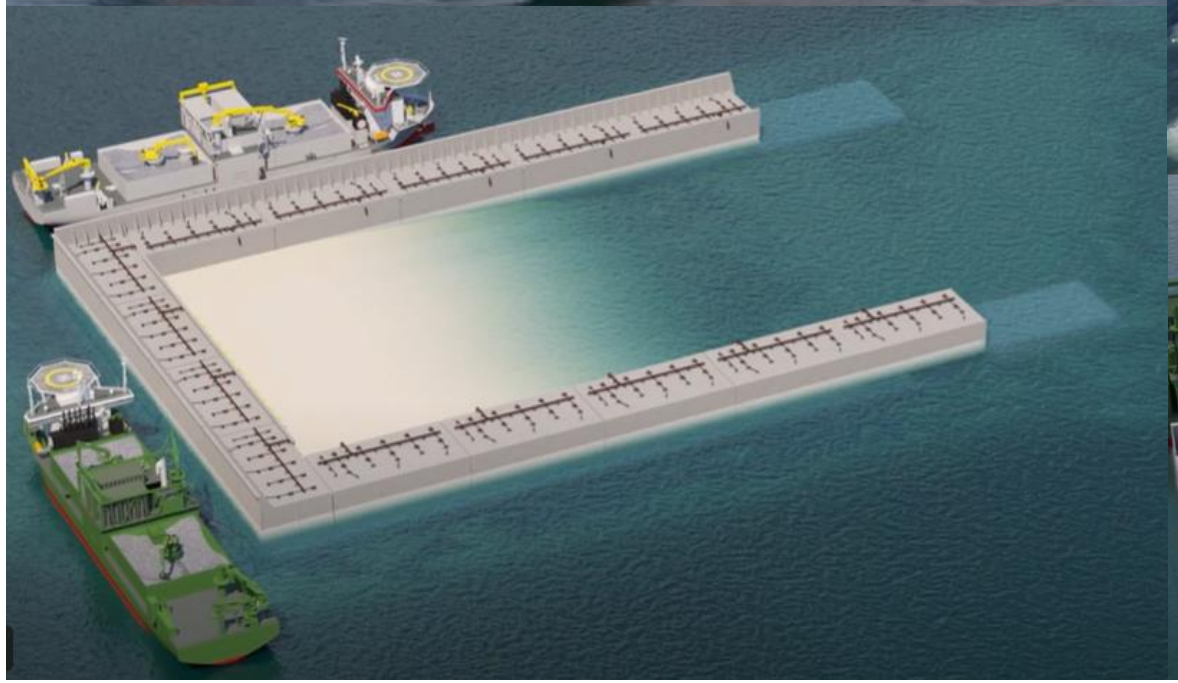
Typical caisson

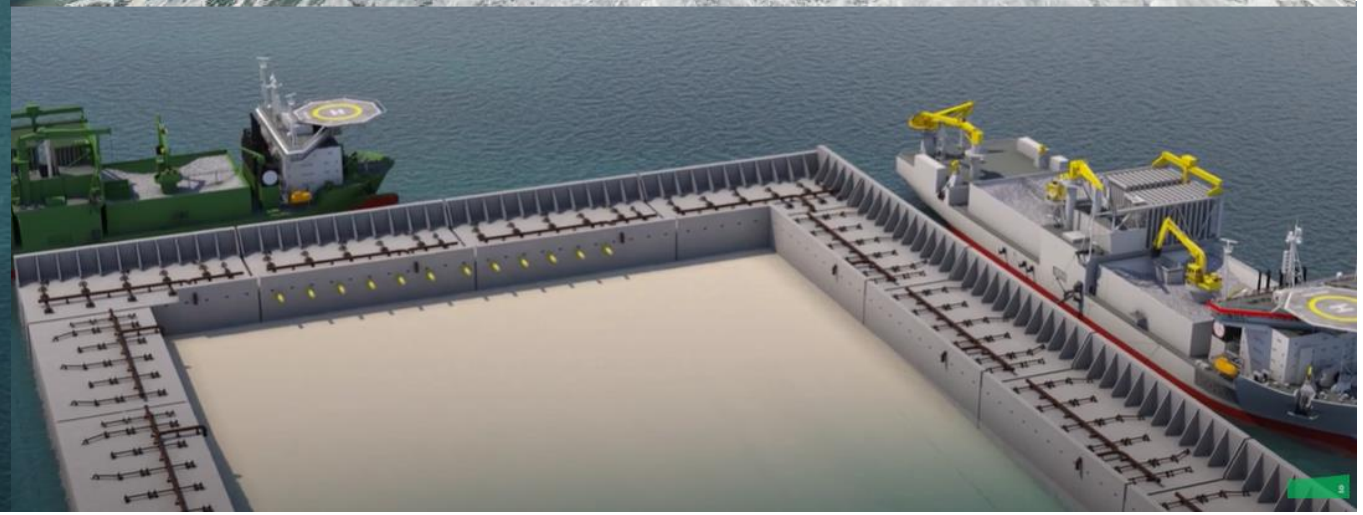




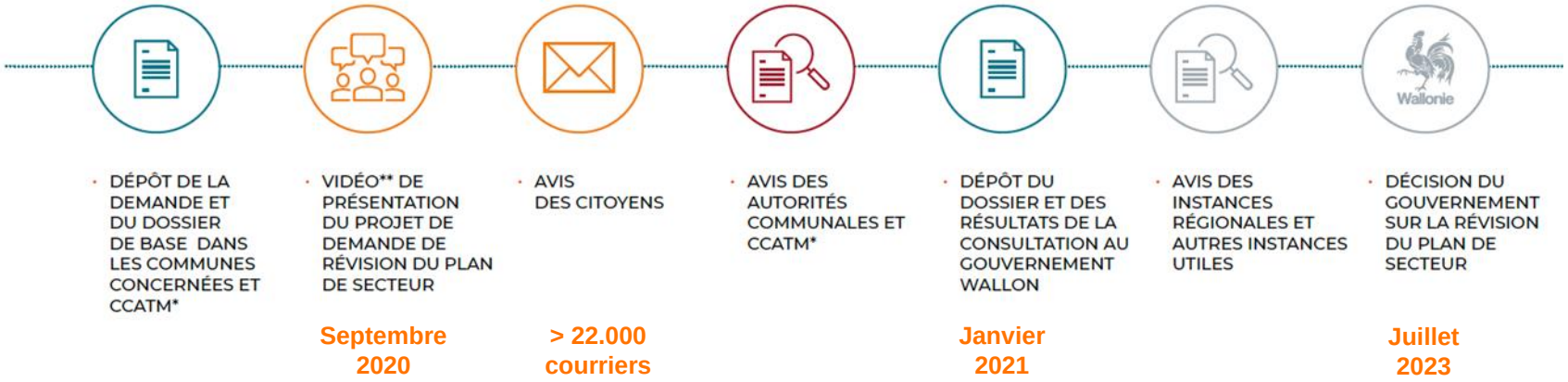

BOA
DEME
BOA

Offshore installation works: 2025-2026





La procedure en Wallonie – plan de secteur



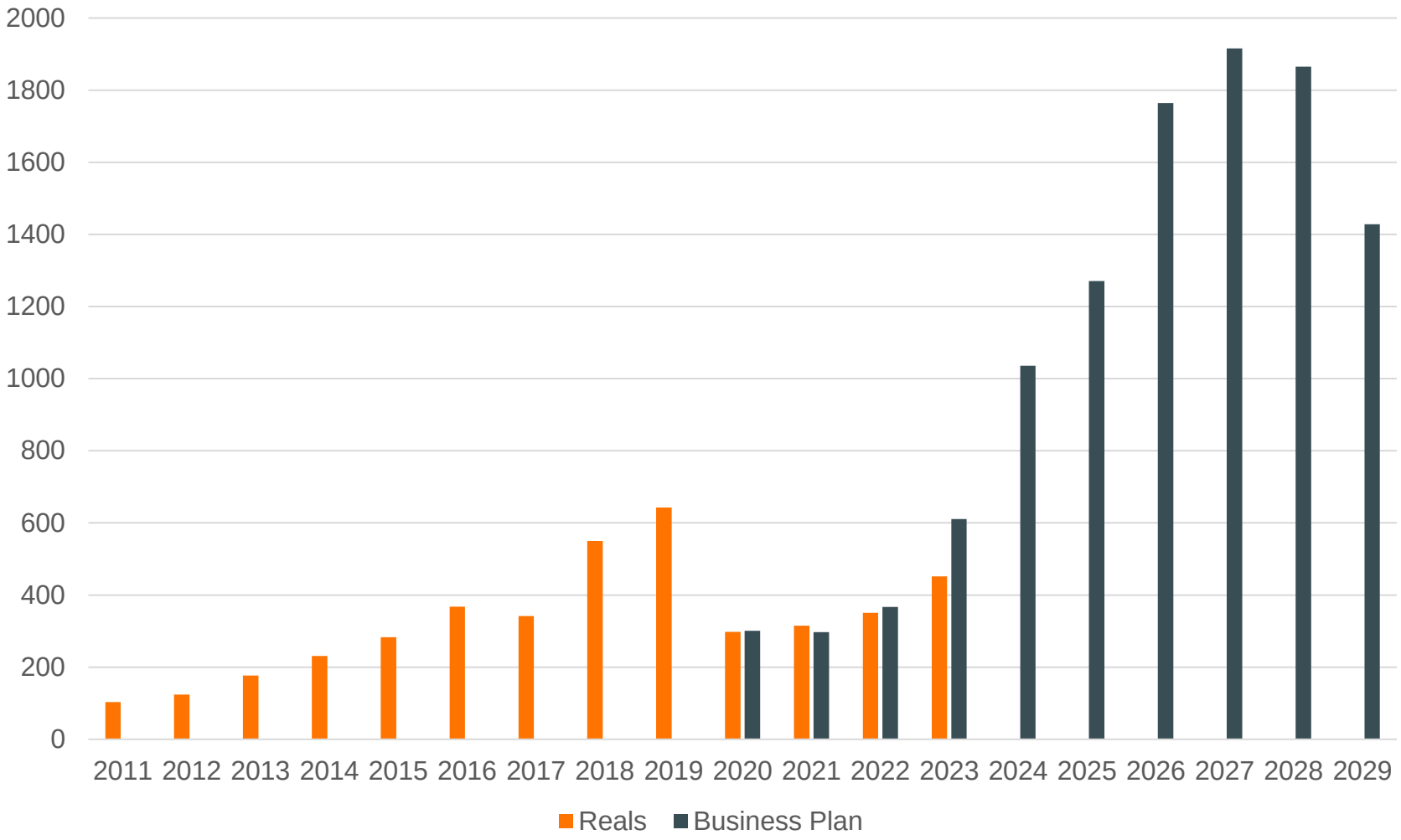
Le ministre a :

- **Indiqué que le RIE serait jugé incomplet. La motivation n'est pas encore connue.**
- **Initié un dialogue avec Revolht sur la technologie, lequel s'est finalisé en avril. Le rapport final devrait être remis au ministre en juin.**

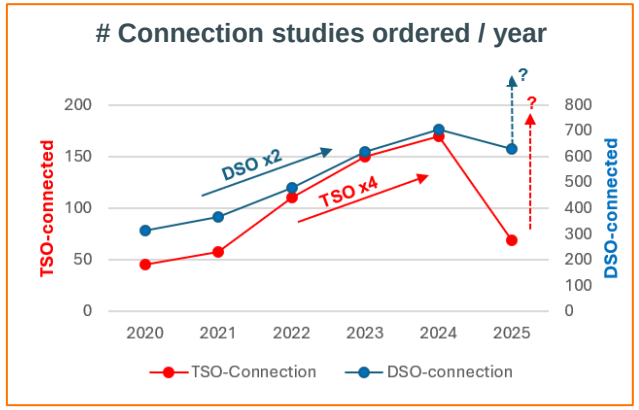
Etapes suivantes :

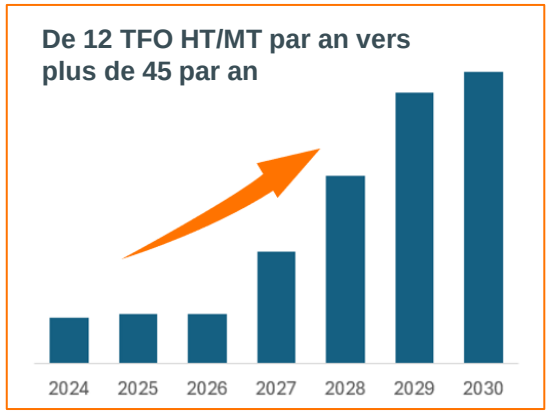
- **Décision du ministre : technologie ? – compléments au RIE**
- **Adaptation et dépôt du RIE**

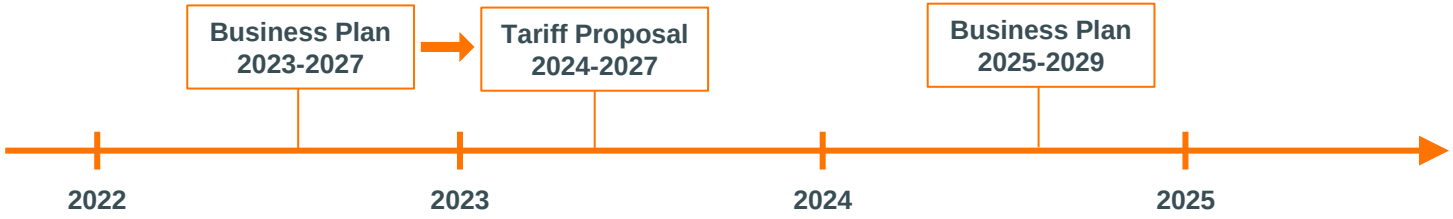
Business Plan 2022: overview CAPEX – 20 years

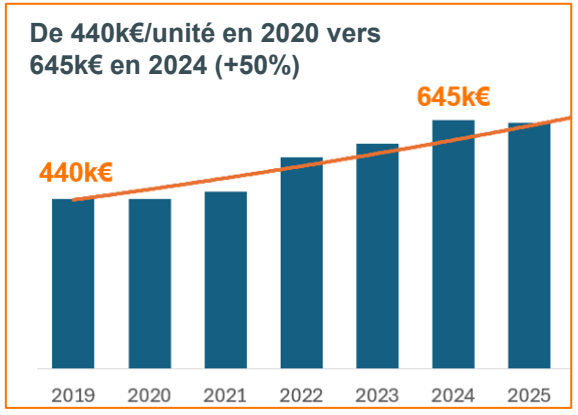


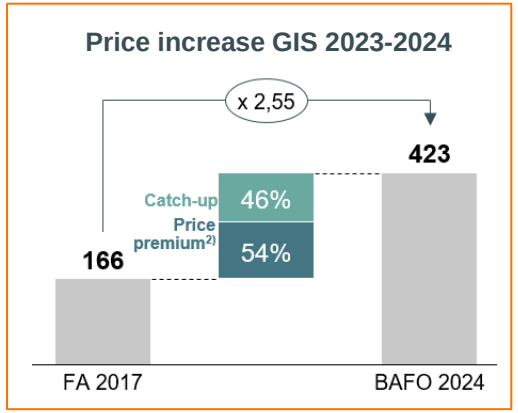
L’augmentation réelle des demandes des clients a un impact sur le portefeuille d’investissement











- L’augmentation réelle des demandes des clients en 2023-2024 a été supérieure aux provisions prévues dans le TP2024-2027
- Une augmentation des **besoins de renforcement** sur **réseau verticale** par rapport au TP2024-2027
- Les **augmentations de prix réelles** en 2023-2024 sont nettement supérieures aux dispositions prévues dans le TP2024-2027

Elia Group

Grid management

System operations

Market facilitation

Trusteeship

REGULATED ACTIVITIES

50hertz

- Northern/Eastern Germany TSO operator
- On- and offshore transmission systems
- 80% owned by Elia Group (20% KfW)
- Monopolistic position in Northeast Germany

elia

- National TSO
- On- and offshore transmission systems
- 99.99% owned by Elia Group
- Monopolistic position in Belgium

nemolink

- 50/50 JV between Elia and National Grid (UK)
- Grid interconnection between BE and UK
- 50% owned by Elia Group

NON-REGULATED ACTIVITIES

egi

- International energy market consultancy and engineering services

realto

- European market platform
- Exchange and valorization of data and digital services
- 100% owned by Elia Group

WindGrid

- 100% subsidiary of Elia Group
- Focusing on international offshore developments

Thank you.