Workshop on connections with flexible access

Workshop 15/11/2024

15.11.2024 | Elia

Agenda

1. Introduction

Updates on design presented in previous workshops

2. Revaluation of flexibility : updated process
3. EOS/EDS technical report
4. Grid Connection Study methodology : status

Additional evolutions foreseen as a next step

5. The impact on the BSP and CRM
6. Management of mixed sites
7. Specific needs of demand facilities

Long-term solution

Target Model

8. Optimized approach considering flexibility, from grid planning to operation

Enablers

9. Optimization of flexibility activations in operations
10. Definition of a consistent set of Congestion Management Products
11. Remuneration model
12. Methodological developments required in long-term grid planning

13. Roadmap – main principles
14. Conclusions and next steps

Agenda

	Topic	Presenter	Duration	Start time	End time
1	Introduction	Anna/Antoine	00:30	11:00	11:30
2	Revaluation of flexibility	Antoine	00:15	11:30	11:45
3	EOS/EDS technical report	Antoine	00:15	11:45	12:00
4	Grid Connection study methodology : status	Antoine	00:15	12:00	12:15
5	Impact on the BSP and CRM	Philippe	00:30	12:15	12:45
6	Mixed sites	Philippe	00:30	12:45	13:15
	Lunch break		00:30	13:15	13:45
7	Specifc needs for demand	Philippe	00:10	13:45	13:55
8	TOTEX	Jonathan / Anna	00:40	13:55	14:35
9	Optimization of flexibility activations in operations	Anna	00:40	14:35	15:15
10	Definition of products	Raphael	00:20	15:15	15:35
11	Remuneration model	Raphael	00:40	15:35	16:15
12	Methodological development	Jonathan	00:15	16:15	16:30
13	Roadmap	Anna	00:20	16:30	16:50
14	Conclusions and next steps	Antoine	00:10	16:50	17:00
		Total duration	**06:00**		

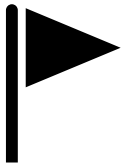
1. Introduction

Context and goal of this workshop

Context

- The last months Elia has **developed and clarified rules** applicable to **connections with flexible access** with the aim **to increase transparency**, **provide clear guarantees** to the concerned grid users and **improve some processes**.
- This led to:
  - The **publication and consultation of a design note**
  - The description of an **improved methodology for the grid study methodology**
  - A **proposal for Code of Conduct** in order to provide a **regulatory framework** setting those evolutions.

This proposed design is a **significant improvement** compared to the previous applicable rules and allows to "industrialize" the flexible connection agreements.



- This is the **first step of GUFlex.** Elia has proposed a **design**, the **regulatory trajectory** is ongoing and the **implementation phase** is being initiated in parallel.
- This **first step** towards industrialization of the connection with flexible access will be **followed by additional evolutions, in several steps.** Those will **take place gradually** depending on their urgency, their complexity and the priorities to be fixed in concertation with stakeholders.
- Short term improvements identified through interactions with stakeholders in the previous workshops and based on inputs in the public consultation.
- In parallel**, development of pilot projects** to address and learn from some specific cases could be investigated.
- **Finally** additional **more fundamental evolutions** will also gradually take place to evolve towards a **Target Model**. This Target Model aims at proposing a **consistent set of flexibility products** with an **optimal usage of flexibility** from the grid planning to the operations.

Context and goal of this workshop

Goal of the workshop

- First, provide an **update** on some design elements presented in previous workshops.
- Second, detail what Elia currently plan to tackle **as first short-term evolutions**
- Third, come back in more details that in the design note on the evolution Elia plan to have towards a **Target Model**, and the different enablers
  - The goal is to create awareness about the complexity and the interdependencies by listing, describing and discussing the identified elements that need to be further investigated and discussed with stakeholders.
- Finally, the main principles of the **roadmap** will be shortly addressed in anticipation of the next workshop in December which intends to dive deeper on the roadmap and prioritization, also based on stakeholders' input

Updates on design presented in previous workshops

2. Revaluation of flexibility needs

Updated process

Revaluation of flexibility needs : updated process

Communicated during the 10/10/2024 workshop

Reevaluation of the flexibility needs

New compared to design note

- Based on the feedback from the Market Parties and after further analysis, Elia believes the main benefit of the reevaluation is to evaluate the flexibility needs after cleaning up reserved capacities that will not lead to a connection.
  - A **single reevaluation** can be done following a **formal request** from the (candidate) grid user in **the context of a valid EDS/reserved capacity**
  - The revision can **result in better or in worse flexibility level** (in order to maintain a **balanced approach**). These **updated flexibility levels** will **replace the previous results** and be used for the remainder of the study and connection process.
  - To give CREG and the (candidate) grid user **sufficient time to analyze and decide**, the candidate (grid user) must **request a revision** during the **first validity period of its capacity reservation** (120 WD).
  - A reevaluation of the flexibility levels **may not result in a longer capacity reservation period.**

Feedback from Market Parties : the revaluation should also be possible **after** **signature of the connection contract**

Elia included the following updated proposal in the Code of Conduct v2

- The Grid User can ask for a **single reevaluation of the flexibility needs**. He can do **so between the delivery of the EDS** and **120 WD before the commissioning** of the connection. This way, the flexibility levels will be validated the latest at the commissioning of the connection.
  - This will in no case extend the duration of the capacity reservation (2x120 WD maximal)
- In addition, **the Grid User can choose** which **flexibility levels** must be contracted (initial levels from the EDS or reevaluation)

3. EOS/EDS technical report

EOS/EDS technical report

- The content of the confidential (for CREG only) and non-confidential (for Grid User) technical report was presented during the 10/10/2024 workshop
- Explanations were given in order to justify the difference regarding the content of the two reports
- Some Market Parties stated that all information should be shared with the Grid User for transparency purpose

Next steps

- Elia is **writing a note** that will substantiate the reasons why sharing additional information can be problematic.
- The **market parties** will have the opportunity to **provide their feedback** on this note
- Planning : note to be **shared by 22/11/2024**, **feedback** from Market Parties expected by **29/11/2024**, **conclusion** during the **11/12/2024 workshop**

4. Grid Connection Study methodology

Status

Grid Connection Study methodology : status

- The methodology document will be published on Elia website by the EOY at the latest
- The document will be based on the content of the design note with the following additions/modifications
  - Thresholds for considering the access as firm and for not considering some congestions as presented during the 10/10/2024 workshop
  - Other adaptations as presented during the 10/10/2024 workshop
  - Methodology for performing the reevaluation of flexibility levels
- After publication, the methodology will be applied for all the grid connection studies (including those already ordered but not yet performed)
- Elia commits to set up a process to update the methodology based on its own return of experience, and based on the feedback from regulators and market parties
  - The details are still to be developed and will be presented during the first half of 2025
  - When defining this process and its frequency, a balance will be sought between the stability of the methodology and the possibility to onboard rapidly new elements
  - Considering the extensive discussion that took place this year, which led to several key improvements, no further changes are foreseen in the short term before the first cycle of the update of the methodology. The focus is rather to start ASAP with the new approach which would not be possible if it is constantly left open for discussion

Additional evolutions foreseen as a next step

5. The impact on the BSP and CRM

Impact on balancing
Reminder of the context

- Elia proposed in the design note to apply the penalties related to the balancing irrespectively of Gflex activations, including beyond the contractual limits.
    - This is justified by the risks of strategic bidding, wrong incentives and impact on availability and dimensioning of reserves that need to be carefully analyzed and avoided
    - In addition, where the above risk is limited, there's a high complexity when defining how exactly to compensate the penalties or to adapt the requested balancing volume based on Gflex activations
- Elia added in the design note that further investigations of the interactions between congestion management and balancing will be part of the Target Model.
- However, based on the feedback of market parties and on discussions with the CREG, Elia is currently investigating the possibility to mitigate the impact on the BSP while respecting as much as possible the risks identified in the design note.
- Objective of this section is to share some reflections, which will be built on in the search for solutions.

Impact on balancing
Are quick wins possible?

- Apply **CRI filtering** in case of Gflex activation
  - Gflex can be used for local congestions, not necessarily corresponding to the electrical zones.
  - The real-time nature of Gflex makes it difficult to filter bids.
  - aFRR energy bids are currently not systematically filtered in order to decrease the risk of unavailabilities.
- Consider Gflex activation as a **forced outage**
  - Elia believes this mechanism is not suited for Gflex activations, a.o. because they can occur for a short period and a limited reduction of power, potentially not impacting balancing activations at all (see examples further).
- **Cancel penalties** in case of Gflex activation
  - In the current design of the balancing products, this would allow the BSP to keep its remuneration (as remuneration is based on requested volumes and not on delivered volumes) while being exempted from penalties.
  - Particularly for large BSPs which have several Delivery Points, this would lead to an "overcompensation", potentially even incentivizing the BSP to use Delivery Points behind a flexible connection in its portfolio to decrease penalties.
- **The grid user may request a compensation of penalties and loss of remuneration on BSP activities**
  - In order to do so, we should be able to quantify the impact of a Gflex activation on the BSP. For the reasons explained further, Elia currently doesn't see how to design a consistent set of rules achieving this objective.
  - Case-by-case management to be avoided.

Impact on balancing
Scope of the analysis

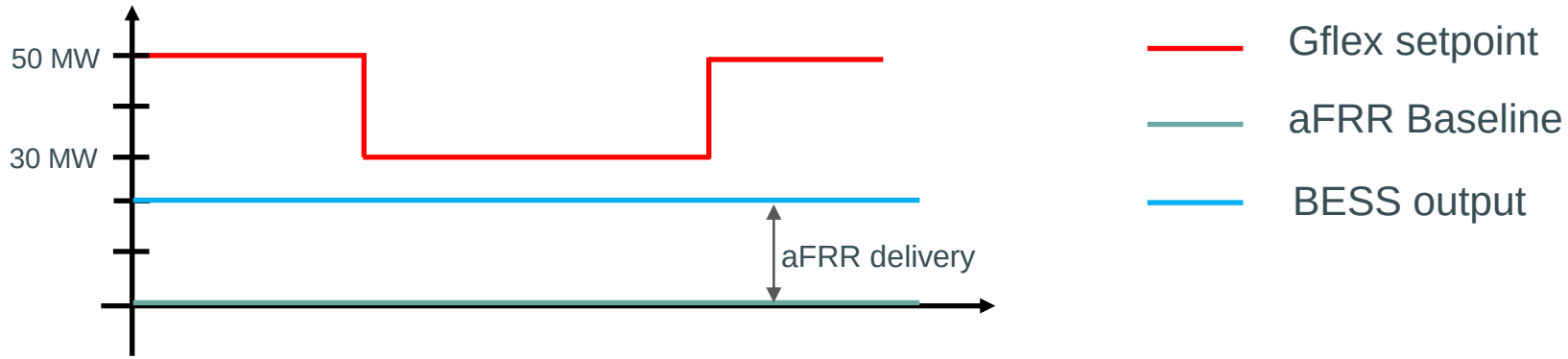
- The analysis needs to include at least the following elements:
  - The principles to be applied
    - ✓ Authorize participation to balancing markets in case of significant flexibility levels?
    - ✓ Distinguish energy markets and capacity markets?
    - ✓ Distinguish within and beyond the contractual limits?
    - ✓ Only waive penalties, or also waive remuneration?
  - Determination of (a proxy of) the impact of the Gflex activation on the penalties / remuneration of the BSP
  - Resulting incentive for the BSP to deliver the service, taking into account the impact on the BRP
  - Impact on baselines:
    - ✓ Impact of the Gflex signal on the FRR baselines
    - ✓ Cases of double remuneration and double perimeter correction

➔ Transversal topic touching upon designs of congestion management, BSP & BRP

Impact on balancing

Illustration of complexity of the activation control

- Assume a BSP with 1 single bid containing 1 single Delivery Point, which is a 50MW BESS
- The BSP offers a 20MW bid aFRR UP and is fully activated (aFRR Requested = 20MW)
- Its aFRR baseline is at 0MW



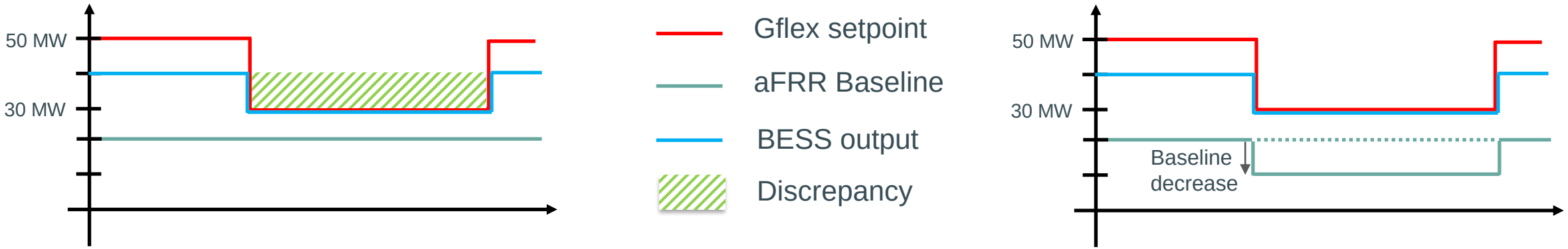
➔ The service can still be perfectly delivered

➔ Bringing any correction to possible penalties related to activation control and/or to remuneration of the BSP will negatively impact the incentive to deliver the service

Impact on balancing

Illustration of complexity of the activation control

- Assume a BSP with 1 single bid containing 1 single Delivery Point, which is a 50MW BESS
- The BSP offers a 20MW bid aFRR UP and is fully activated (aFRR Requested = 20MW)
- **Its aFRR baseline is at 20MW**



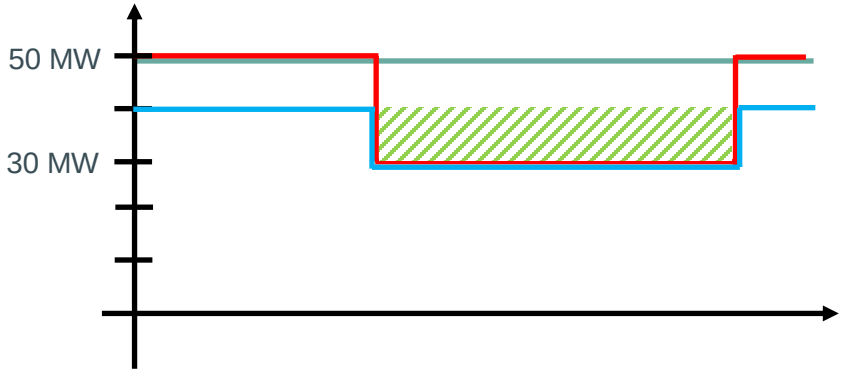
➔ The BSP has a discrepancy, which can only be identified by considering jointly the aFRR request and the (declarative) baseline

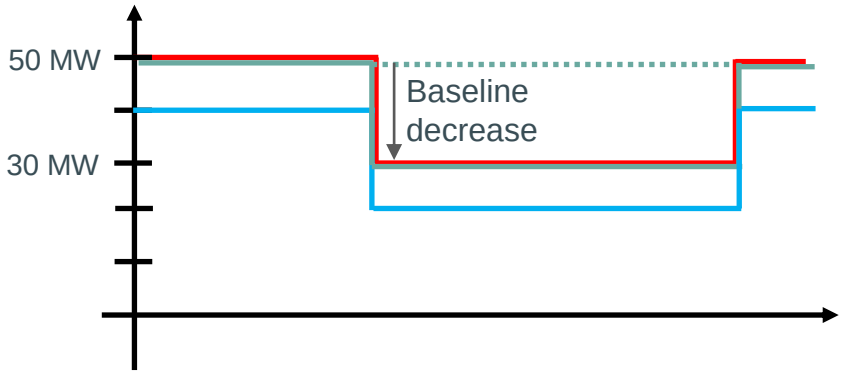
➔ The only way to avoid it is to decrease the baseline, which wouldn't be an appropriate solution for the system if it's not compensated in energy. Note: it anyway doesn't work for mFRR

Impact on balancing

Illustration of complexity of the activation control

- Assume a BSP with 1 single bid containing 1 single Delivery Point, which is a 50MW wind park
- The BSP offers a 10MW bid aFRR DOWN and is fully activated (aFRR Requested = -10MW)
- Its aFRR baseline is at 50MW





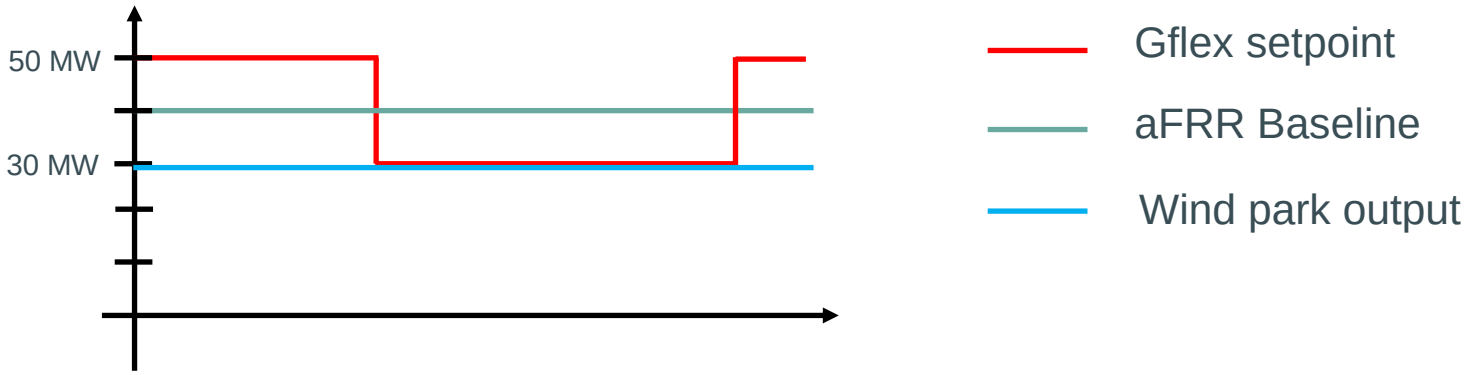
➔ The BSP has a discrepancy for overdelivery… except if the baseline is set to the Gflex setpoint, in which case the BSP will decrease its output even further

➔ Depending on whether corrections can be found for this case, the impact on the FRR baselines will have to be analyzed

Impact on balancing

Illustration of complexity of the activation control

- Assume a BSP with 1 single bid containing 1 single Delivery Point, which is a 50MW wind park
- The BSP offers a 10MW bid aFRR DOWN and is fully activated (aFRR Requested = -10MW)
- Its aFRR baseline is at 40MW



➔ When the FRR baseline is not adapted, the BSP can deliver the service while respecting the Gflex setpoint…

➔ … but this leads to a double perimeter correction and to a double remuneration if beyond the contractual limits from the flexible access (one for balancing, one for Gflex)

Impact on balancing

Illustration of complexity of the activation control

- The examples illustrated are assuming a BSP with 1 single bid with 1 single Delivery Point
- The situation becomes even more complex when considering several Delivery Points in different bids
  - Balancing designs are portfolio based
  - The impact might be inexistent in some situations, while in other situations it might actually be even more important than the volume of that Delivery Point, as the BSP might use it to ensure the ramping requirement of its aFRR portfolio.
  - The only information Elia can deduct on the Delivery Points that the BSP will use to deliver the service is based on declarative information (ex: DP_{aFRR} signal)
- This is also the reason why it appears in first instance not be appropriate to take the Gflex activations into account in the aFRR Requested to the BSP.

  Note: this option could not be applied to mFRR, as the Gflex signal is not known when sending the mFRR Request

Impact on balancing

- The workshop of December will focus on:
  - The principles to be applied
  - If conclusive, a possible pragmatic proposal to mitigate the impact on the BSP and the analysis of its effectiveness
  - A proposed approach and planning for further interaction with market parties on the topic

Impact on CRM

- The risks identified in the design note for CRM are similar than for balancing
- Elia is currently analyzing the correlation between adequacy needs and congestion needs in order to quantify the risks. A preliminary conclusion is that the typical **drivers of GFlex activations** appear to be **negatively correlated with scarcity**, but this needs to be further confirmed.
- Based on this and on the reflections related to the impact on the BSP, Elia will propose an approach.

6. Management of mixed sites

Mixed sites
Some definitions

Access Point

The physical location on the grid where electricity offtake or injection is possible. An access point is defined by both its voltage level and its physical location.

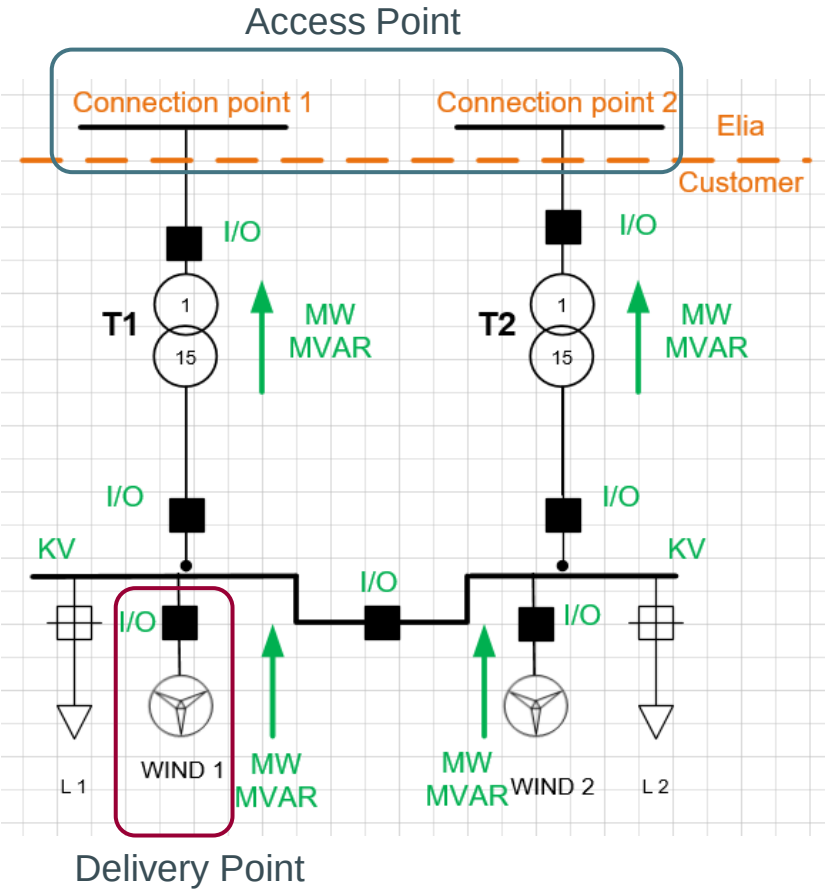
Connection Point

The location where the connection equipment is interconnected with the Elia grid is referred to as the ‘connection point’.

Delivery Point

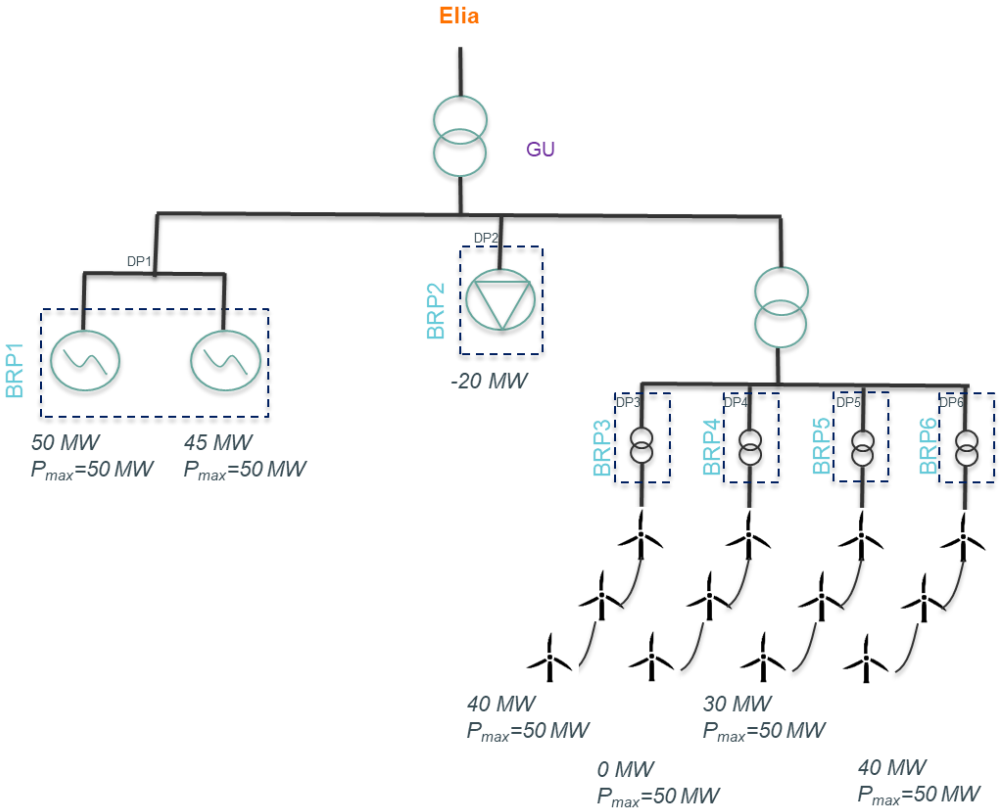
A point on an electricity grid or within the electrical facilities of a Grid User, where a service is delivered. This point is associated with one or several metering(s) and/or measures, according to dispositions of the contract related to this service, that enable(s) ELIA to control and assess the delivery of the concerned service;

A delivery point is limited to one type of primary energy source.



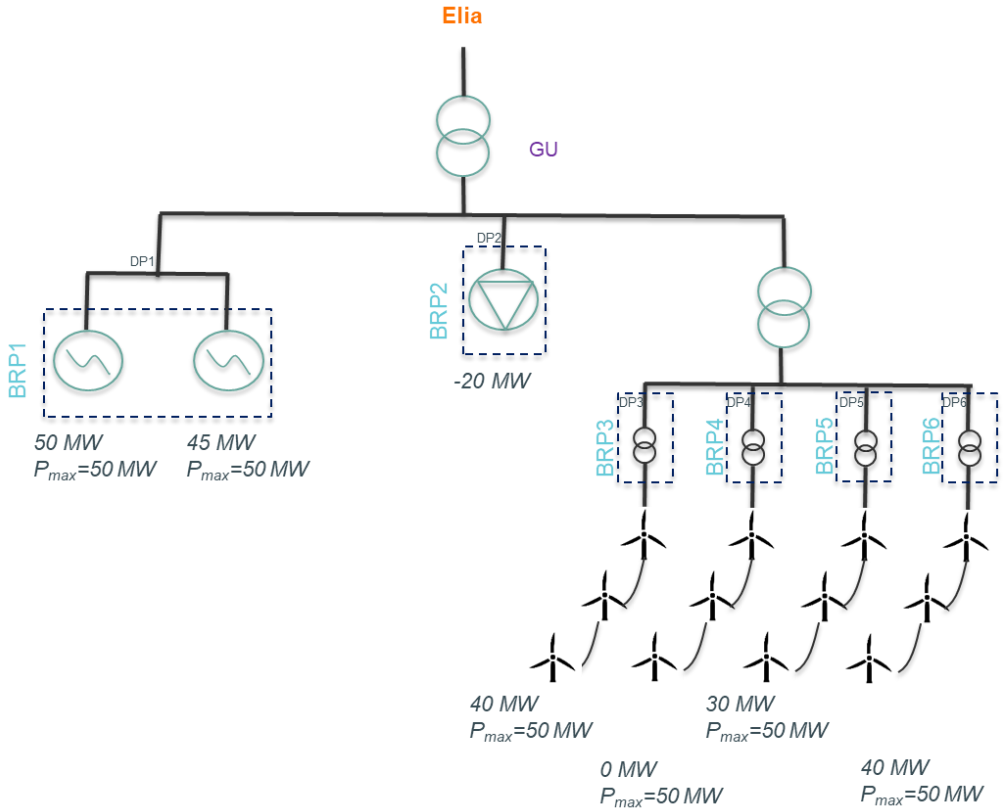
Mixed sites
Context

- Most of the discussions held up to know focused on cases where there is only one asset behind the flexible Access Point
- There are cases of “mixed site”, where there are different assets in the industrial site of a grid user behind the Access Point, possibly from different technologies, for which a need for flexibility has been determined
- A major difference between Gflex and Redispatching, is that the activation of Gflex occurs at the level of the Access Point instead of the Delivery Point. This allows Grid Users to choose which units to use to respect the Gflex setpoint



Mixed sites
Context

- Applying the principles described in the design note and in the Code of Conduct to mixed sites is not always straightforward. The following processes are impacted:
    1. The contractual responsibility ➔ a proposal is made in the next slide
    2. The grid connection study
        - ✓ The current approach is described in section 5.1.2 of the design note
        - ✓ Consistency with the way volumes are calculated in operation will need to be ensured ➔ first we need to analyze the possible approaches to determine the volumes
    3. The determination of the volume corresponding to the activation
        - ✓ Elia has initiated the analysis in section 6.4.3.2 (BRP perimeter correction)
        - ✓ Objective is to pursue this analysis and to discuss it in more detail with market parties



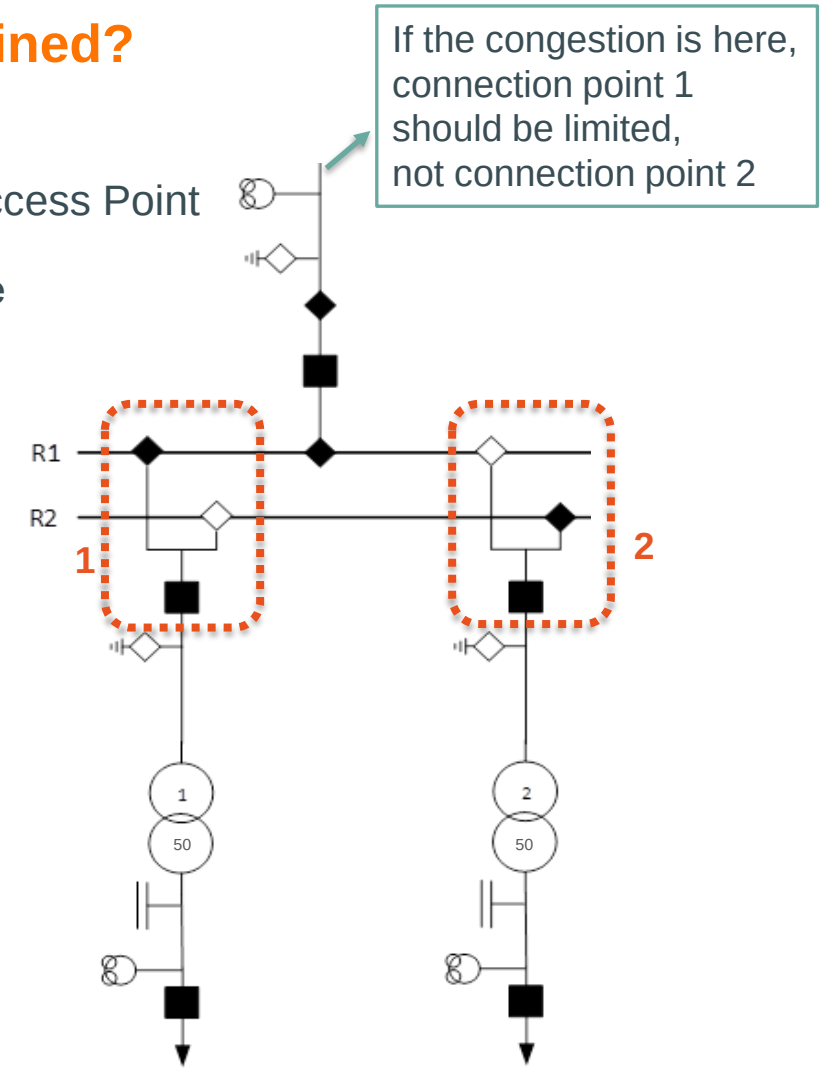
Mixed sites

At what level should the responsibility of the setpoint be defined?

- Contractually, the constraint is expected to be respected at the level of the Access Point
- As explained above, It's important for (some) Grid Users to be able to choose which units to use to respect the Gflex setpoint ➔ switching to Delivery Point is restrictive for Grid Users, while not strictly necessary for Elia
- However:
  - For some Access points, several TFOs are connected on different busbars ➔ single signal to Access Point is ineffective
  - In addition, the access holder often has no physical link with the asset. Cabling is done on site via RTU of the Grid User

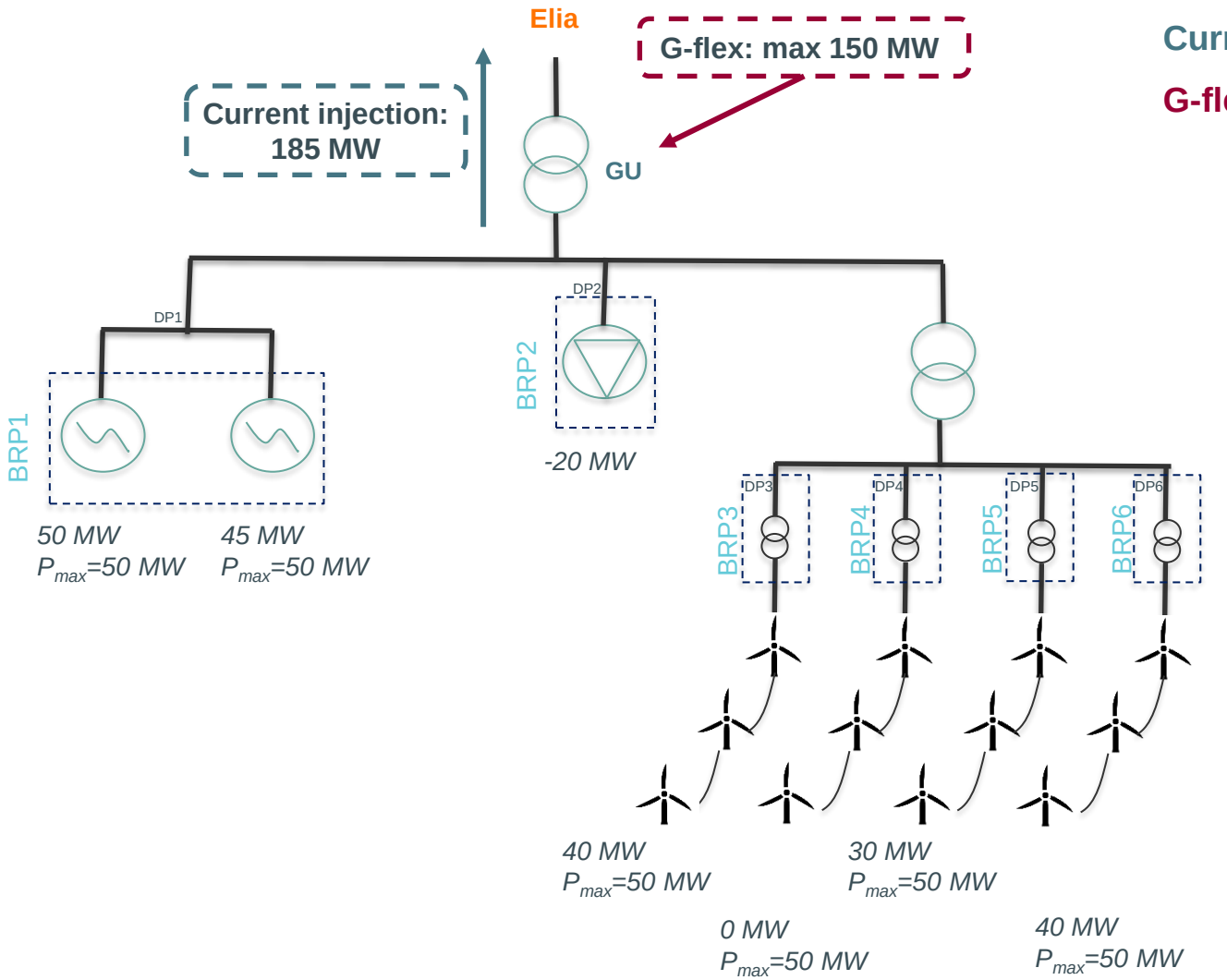
➔ Elia proposed to define the responsibility at the level of the connection point

➔ Cases where several connection points are connected on the same busbar will have to be looked at on a case-by-case basis



Mixed sites

How to determine the volume corresponding to the activations?



Current injection @ connection point: 185 MW

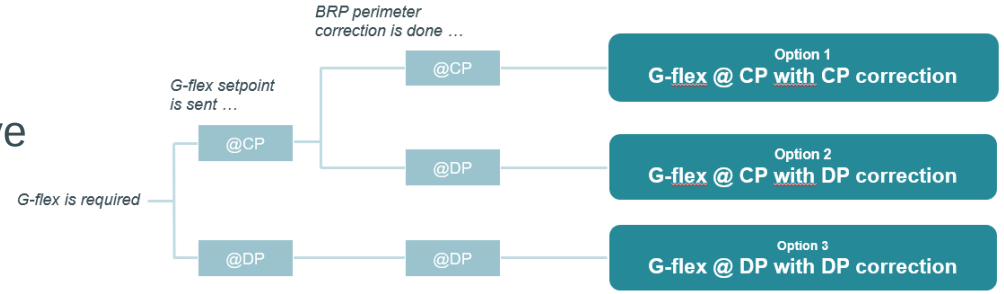
G-flex max injection @ connection point: 150 MW

- If the Grid User reduces production of the wind parks, the AAP method should be used
- If the Grid User reduces production generators, the historical baseline should be used
- If the Grid User increases the load, an appropriate method should be defined
- In any case, the perimeters of the right BRPs should be corrected

Mixed sites

How to determine the volume corresponding to the activations?

- If one signal is sent at the connection point and there are several BRPs behind, how to determine the volume corresponding to the Gflex setpoint?
    - Volume necessary for “cap consumption”, BRP perimeter correction and remuneration
- This question has been studied in the design note and 3 options have been proposed



- In discussion with stakeholders, it became clear that there was no “one size fits all” solution among those proposed, as Grid Users have different needs: some want to be able to determine themselves how to respect the Gflex signal, others need to simplest possible approach
- An additional option is being investigated

➔ Interactions with market parties, especially consumers, will be necessary to land on this topic

Mixed sites
Proposed approach for stakeholder interaction

- Elia proposes to have specific discussions with interested stakeholders
- The workshop of 11/12 will be used to share a status and define the next steps towards the finalization of the design

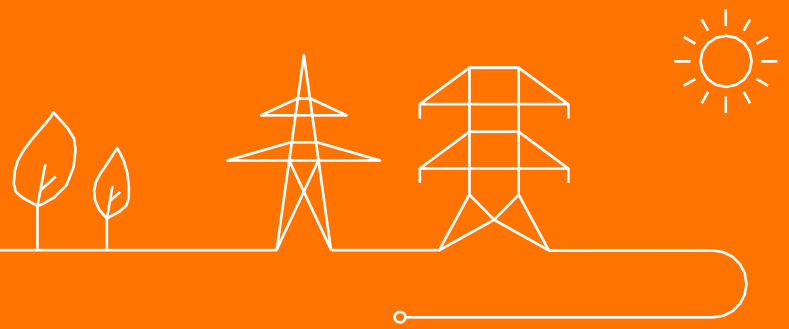
7. Specific needs of demand facilities

Specific cases of demand facilities

- The main objective of the coming amendment of the Code of Conduct is to define the notion of flexible access. From an operational point of view, in the short term, this will imply real-time flexibility activations, similar to the existing Gflex activations.
- Elia is aware that this doesn't cover all the needs, especially for demand facilities which often do not have the capability to react in real-time. While progress is being made on the mixed sites, Elia is committed to work on a robust solution under the form of the Target Model, which will be introduced in the next slides.
- Before the final implementation of the Target Model, Elia is committed to further investigate intermediate solutions where possible for capacities that cannot react in real-time. This will most likely require investigations on a case-by-case basis and a potential need for regulatory sandboxing.
- The concrete experience that will be created should also feed the design discussion related to the Target Model

Target Model

8. Optimised approach considering flexibility, from grid planning to operation



Why to put long-term solutions and the Target Model at the agenda of this workshop ?

- Section 9 of the Design Note is dedicated to the Target Model where Elia's long-term vision for optimization of long-term grid planning with the use of flexibility is introduced.
- During the previous workshop, we received comments from Market Parties stating that the long-term vision is not clear and that it is uncomfortable to support the "short-term framework" without knowing what the Target Model consists of
- During the public consultation, we received interesting feedback related to long-term evolutions that should be further investigated.
- The CREG asked us to bring this point for discussion in workshop and more particularly to explain the different challenges that must be addressed and prerequisites that are necessary to be able to develop such a Target Model

→ For those reasons, Elia considers that it is needed to discuss the status with the Market Parties

→ The possible evolutions developed in this section are **interdependent**, will require **significant design work**, **discussion** and alignment with the **market parties**, **further amendment** of **the regulated documents** and a significant **implementation**. Those evolutions are therefore not possible in the short-term but in a **longer timeframe.** A prioritization of the developments should allow developing the framework in successive phases.

Key principles supporting the proposed Target Model

1. Overall objective**: fit-for-purpose power grid** for Belgian society, striving for a **techno-economic optimum**

Trade-off between grid infrastructure and flexibility solutions

2. This requires a **trade-off between traditional infrastructure solutions** and **non-wire/flexibility solutions** as anchored in the **EMDR**

3. The **trade-off**, implemented through a **Cost-Benefit-Analysis (CBA** – or "**TOTEX Optimization")**, should ensure a level playing field and adequate investment security for Grid Users while mitigating market distortion

4. As is the case for grid infrastructure, also the **cost of flexibility solutions <u>following this trade-off</u> are to be socialized**

5. Regarding the **operational activation**, the TSO applies a **techno-economic principle** in the interest of society (activation at merit-order)

Activations of flexibility resulting from the trade-off are remunerated and should therefore be optimized…

6. This trade-off leads to **more frequent activations of flexibility**, and therefore **increased congestion costs** for the TSO,

7. The level of flexibility considered in long-term grid planning should **respect technical capacities.** The **approach** can be **customized** based on the **type of Grid Users**. However, **flexibility counted upon at the grid planning stage** should be **available at the operational stage**

8. **Bounds** should be set on the **use of flexibility** in long-term grid planning to ensure **harmonious development of the grid** and a **level playing field**

… While keeping the temporary period principle and the incentive to timely connect to an appropriate location

9. **Flexibility products** can be **differentiated and fine-tuned** to **specific Grid User types**

Different products are needed

10. To cope with the lead time to develop grid infrastructure, **temporary** connections with **flexible access** can be **offered voluntarily to Grid users to connect earlier** to the system. In this case the **Grid User bears the associated costs (non-socialized)**

11. In such situations, the **risk for the Grid User should be bound** to allow him to keep his risk under control and providing adequate investment security

Focus of 2024

12. Regional and federal **development plans** as well as **the definition of scenario** are keys, involvement of stakeholder is needed

LT strategy from a system perspective – Proposed evolution of the methodology for proposing grid development solutions

LT grid planning : Grid investments are to be initiated **unless** the **following criteria** are met

⇒ **Positive CBA for flexibility** compared to grid reinforcements (principle 2)

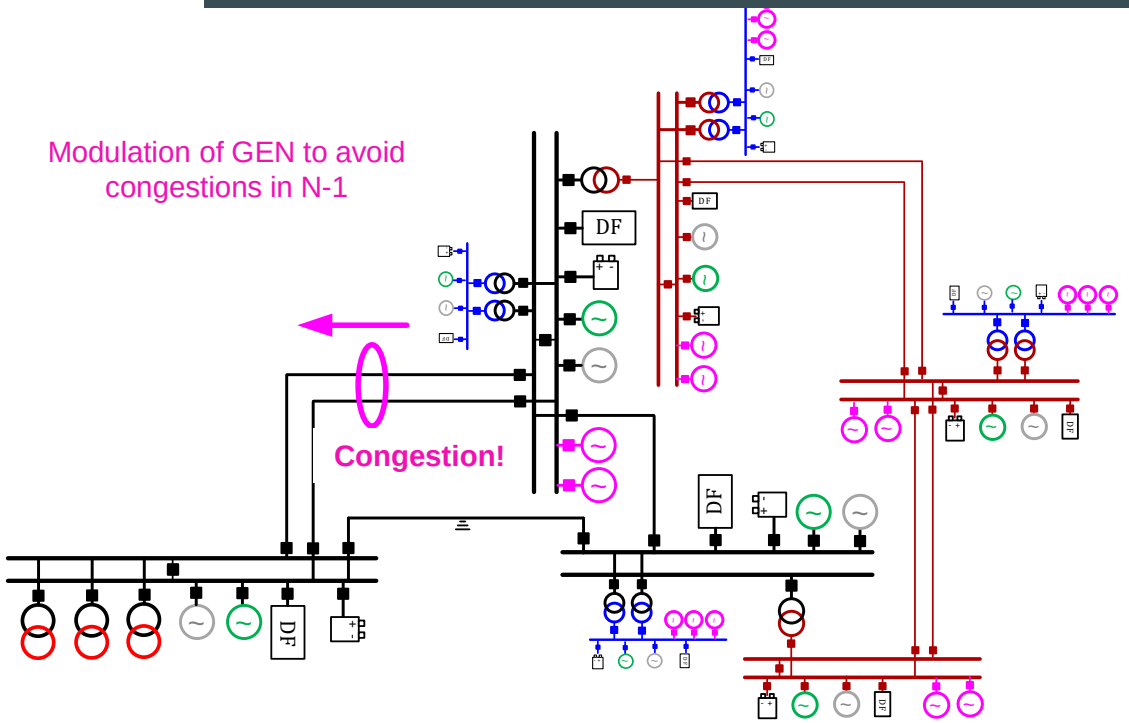
And

⇒ Flexibility usage remains within **predefined bound** (principle 8)

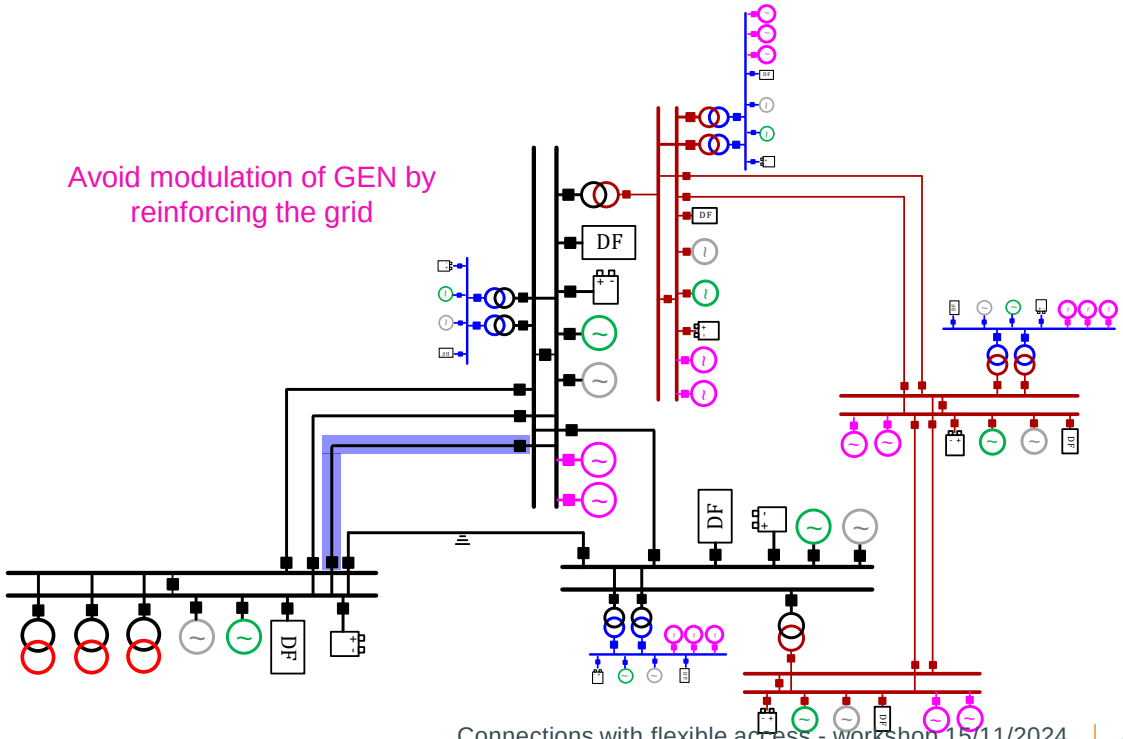
And

⇒ The considered **flexibility respects technical capacities** and is **available for operations** (principle 7)

Modulation of GEN to avoid congestions in N-1



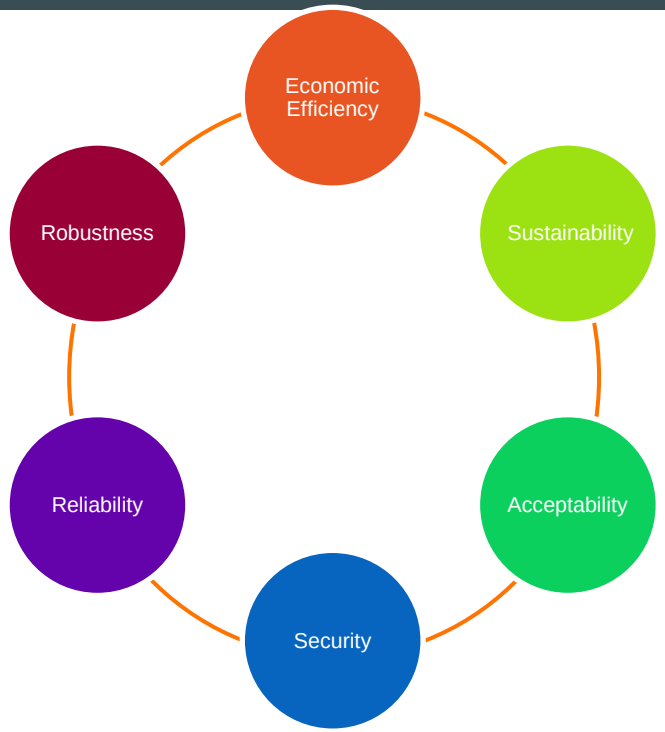
Avoid modulation of GEN by reinforcing the grid



Grid reinforcement or flexibility solution ?

LT strategy from a system perspective – Proposed evolution of the methodology for proposing grid development solutions

Current methodology for proposing grid development solutions (see FDP)



As mentioned in the FDP, for the horizontal grid, a regulated CBA methodology is used to compute the indicator “Economic Efficiency”.

However, no structural cost associated to using Grid Users' flexibility can be considered after grid reinforcement except on cross-border investments.

Proposed evolutions

It is proposed to allow some Grid Users' flexibility to be considered after grid reinforcement as long as this flexibility is limited to some bounds

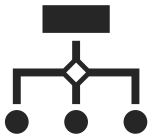
For illustration purposes, it means that a new optimal grid structure having a lower investment cost than the initial one will be retained if

Expected activated GU flexibility	**x**	**Flexibility Cost**	**≤**	**Delta total investment cost with or without GU’s flexibility**
Need to calculate the operational activated flexibility volume per unit. & to include compensation actions		Based on the actualized value of expected activation cost of the needed units.		Actualized investment costs to reinforce the grid

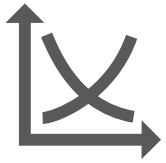
- Limited expected activated GU flexibility
  - Different bounds could be considered for the **different types of Grid User** (RES, storage, conventional production, load…)
  - Different bounds could be set at **aggregated (national) level and per Grid User** – link to be made with the EU regulations (e.g. 5% threshold for RES)
- The considered flexibility respects technical capacities

Optimized long-term grid planning with flexibility : important added societal value

In the future, in addition to grid reinforcement (“CAPEX solutions”), the Target Model expects to rely on remunerated Grid User Flexibility (“OPEX solutions”) for solving congestions. Through a trade-off between infrastructure and flexibility both the total costs for and the risks borne by society can be further optimized. This approach has the following benefits :

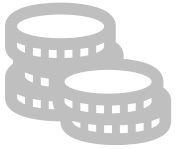


Long-term **grid planning** is **anticipated** based on **future scenario** (including capacity potentials), which entails a **trade-off** between the **risk of insufficient hosting capacity** versus the **risk sub-optimal grid infrastructure**. **Flexibility** supports the **mitigation of these risks.**



Grid **development plans** are **periodically reviewed** by considering the “up-to-date” existing and reserved capacities and updated future scenarios (including updated potentials). A **new trade-off** can then be performed to **optimize the total cost for society by “cutting the tail” of the investments.**

Attract as **much flexibility as possible** by proposing a **consistent set of congestion products** (e.g. with different activation times, for all technologies, combining existing and future solutions...) with an adequate remuneration model.



Activations of flexibility **with a merit-order approach** to enable optimizing the operational costs

Enablers

9. Optimization of flexibility activations in operations

Optimization of flexibility activations

- In the context of flexibility solutions developed to optimize grid investments, **flexibility activations** will be **remunerated and socialized** (as it is the case for the grid reinforcements).
- To keep those costs under control the operational costs must be optimized by minimizing the volumes to be activated and by activating at the most optimal way. The activations will therefore be selected based on a **techno-economic merit-order.**

This raises the following questions that need to be examined and analyzed:

a. The possibility (when suitable and possible) to activate closer to the Real Time (while acknowledging that all technologies are not able to do so)

b. The development of a Remedial Action Optimizer (RAO) in order to be able to activate in an optimal way, including closer to RT

c. The further development of information exchange (Outage Planning and Scheduling process) to improve detections of congestion risk before the RT timeframe at all voltage levels

d. An optimal usage of *all* available flexibility through a (technico-)economic merit order combined to a mechanism which preserves the incentive for appropriate location in case of temporary period with a flexible access

e. Reassessing the remuneration model from the perspective of an increased rate of activation

See Section 10 *consistent set of products*

iCAROS project

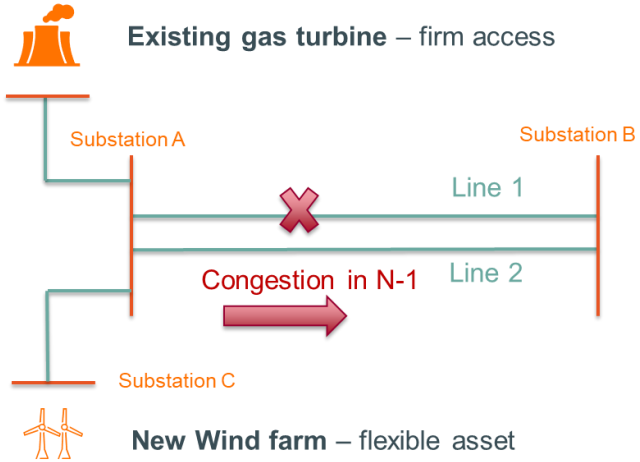
See next slide

See section 11

Optimization of flexibility activations – merit order activation

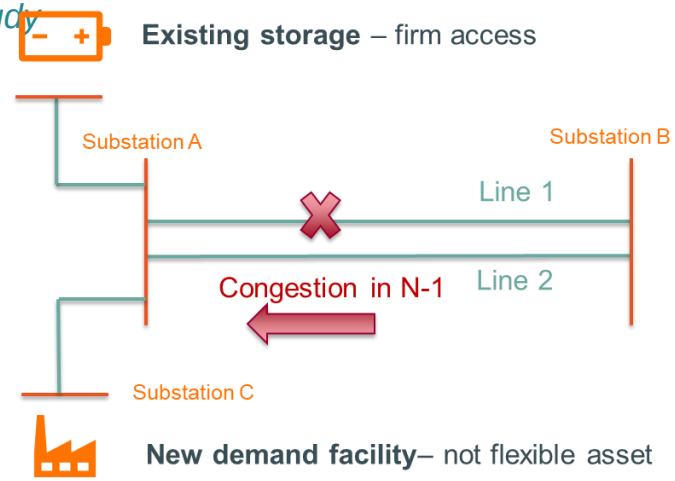
- Note that point d) could address comments/issues raised by market parties during the previous workshops* and could (once steps a). to c). are developed) also be extended for the temporary period:

a. *Why not activating based on economic efficiency ?* *(cf. comment in design note)*



- In this example the gas turbine could be activated first if more efficient
- In order to preserve the right incentives for the new grid user (wind turbine) to ask for a connection at the most optimal place, the inherent costs (activation and BRP perimeter correction) should be borne by the wind farm with a flexible access
- Note: If the wind farm was more efficient, it would be activated first

b. *Some grid users cannot become flexible (e.g. demand) → such an option could allow them to connect earlier than a given grid investment and letting Elia count on the flexibility of a neighboring connection to solve the congestions identified during the study*



- In this example the battery could be activated first and instead of the demand facility (which is not flexible)
- In order to preserve the right incentives for the new grid user (demand facility) to ask for a connection at the most optimal place, the inherent costs (activation and BRP perimeter correction) should be borne by the demand facility

! Complexity of such a scheme: the exact modalities of such a cost allocation

One of the complexities of applying the optimization of activations during the temporary period is to define the costs to be allocated to the Grid User requesting a new *flexible* access. Consistent rules for both the volume and the price will need to be examined

10. Definition of a consistent set of Congestion Management products

Congestion Management Products – Drivers and Long-term Vision

Considering that:

1. Market parties mentioned that not **all units are technically able to be activated in real-time (RT)** so that it could represent a barrier to get a flexible access
   - Flexible access with other activation modalities should be possible as it may become very close to redispatching iCAROS framework
2. Market parties mentioned that the **coexistence of redispatching (RD) activations** within iCAROS framework and **Gflex activations** within flexible access framework creates **unclarities and differences of treatment** between connections with firm or flexible access
   - What would then be the difference in terms of RD activations between a GU with firm access and a GU with flexible access after temporary period?
3. In parallel, Elia sees also an **increasing need for a broader use of RT redispatching** activations as it allows to :
   - reduce the volumes to be activated for operational security issues
   - reduce the frequency of RD activations due to the possibility to request curative RAs

Elia proposes to analyze the possibility to develop a set of RD products to cover operational needs related to congestion management whose technical modalities are independent from the provision of a flexible access
This would allow decoupling the financial and technical modalities of a flexible access

Congestion Management Products – Principles

Technically/operationally

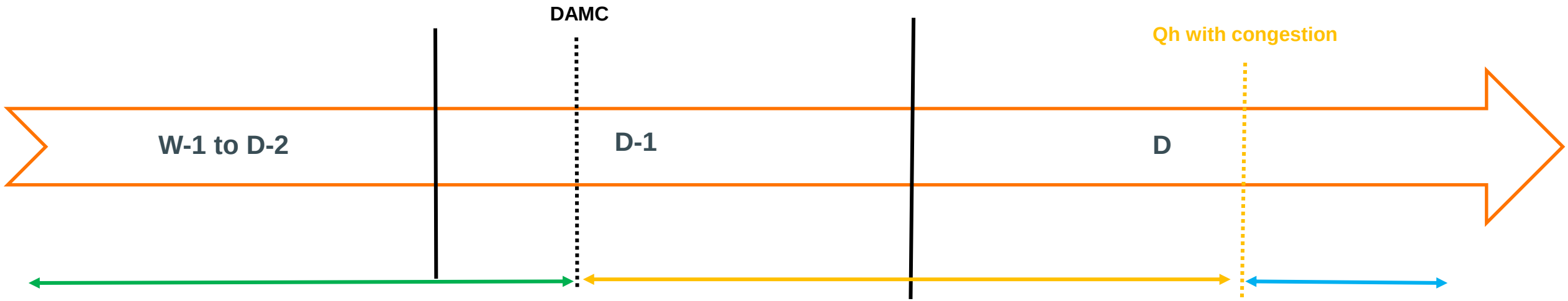
- The set of products should:
  - Cover **system's needs** related to congestion management **at different timeframe** (from week-ahead to real-time)
  - Address the reality and the needs of all **types of technical facilities** (production, storage and demand) according to their technical characteristics such as the activation time
- Within the set of products, Elia would use **a technical-economical merit order** to select the means that are necessary to solve congestion issues on the grid
  - Considering the technical characteristics of the products
  - Considering the type of remedial action: curative or preventive
  - Considering the amount of needed redispatching volumes and the degree of certainty of the forecasted congestion issues
  - Independently on the attribution of a flexible access to some grid users
- Considering the above elements, the **granting of a flexible access is decoupled from the technical capacities** of the technical facilities of grid users

Financially

- All remedial actions requested to solve congestion issues would be **remunerated**
- Within the temporary period, a **grid user with flexible access** would still support the costs related to the congestion management
  - Independently on the type of congestion management product(s) it provides (if any - see example presented on previous slide)
  - Considering contractual guarantees in the framework of flexible access

Congestion management products

Elia proposes to analyze the following **products for congestion management**



Before DAMC product
- Product with conditions on the schedule **before day-ahead market coupling (DAMC)**
- Similarities with existing **Must-run and May-not-run** products

Preventive redispatching (RD) product
- Product with request for deviations from the schedule **as from day-ahead 15:00 to real-time** according to technical characteristics provided in the explicit RD bids
- Similarities with existing **redispatching** product

Curative and preventive RD product
- Product with a request to reach a setpoint in real-time within a short reaction time
- Based on existing **Gflex** modalities

Added-value of real-time flexibility product in the context of the long-term grid planning

- If an activation of **flexibility** can **only** be **requested in advance** (e.g in ID but several hours before RT or even in D-1), the flexibility needs would increase as:
    - Curative remedial actions could not be requested leading to the need to rely on preventive remedial actions, that are requested independently of the occurrence of an outage (N-1)
    - Activation requests should be based on **forecasts** so that the activated **flexibility volumes** would be **higher**

➔ In such cases, the Cost-Benefit-Analysis in long-term grid planning would **likely lead** to the **triggering of an investment**

- For Grid Users with real-time flexibility capabilities (Generation, Storage, Flexible load, …), the **volume** of **flexibility associated to curative actions** (only **feasible with a real-time product**) after an unplanned outage will always be **small**

➔ In such cases, the Cost-Benefit-Analysis in long-term grid planning would **likely not lead** to the triggering of an **investment**

A **remunerated product allowing real-time curative remedial actions to solve congestions** would therefore deliver a **significant added value** to reduce the flexibility needs in the context of long-term grid planning

Congestion management products – Elements to analyze

In the framework of this analysis, Elia will elaborate further the following elements:

Defining the **scope of application** of these different products in the framework of congestion management processes

- E.g. Real-time activations have advantages but are not always feasible in case of high anticipated redispatching volumes

Defining the **applicability of these products** for the different types of technical facilities*

- Mandatory or voluntary provision
- Distinction based on the technology/size of facilities/…

Clarifying the **roles and responsibilities** (of grid user, scheduling agent, ...) related to the provision of these products

Clarifying **product modalities**

- Level at which the products should be delivered (delivery point/access point)
- Activation and Settlement modalities

*Considering that the phase 2 of iCAROS foresees an **extension of RD obligations to more production and storage facilities** for which modalities will have to be defined

11. Remuneration model

Remuneration model – Reminder iCAROS context (1/2)

Considering that:

- Congestion management is **very dependent on the localization of the redispatching means** and the number of technical units that can have a significant impact on a given congested grid element is limited in Belgium
- **Recurrent and "easy to predict" congestions may occur in N-X situations** (during maintenance work, during temporary phases of infrastructure projects, etc.), making it possible for the generators to anticipate the redispatching activations

Elia

- Identified that the **risk of strategic bidding** (such as inc-dec gaming – cfr next slides) would be real if market-based redispatching was implemented to solve congestions in the Belgian grid
- Requested the possibility to introduce cost-based redispatching as foreseen in Article 13.3 (c) of the Clean Energy Package

3. Non-market-based redispatching of generation, energy storage and demand response may only be used where:

(a) no market-based alternative is available;

(b) all available market-based resources have been used;

(c) the number of available power generating, energy storage or demand response facilities is too low to ensure effective competition in the area where suitable facilities for the provision of the service are located; or

(d) the current grid situation leads to congestion in such a regular and predictable way that market-based redispatching would lead to regular strategic bidding which would increase the level of internal congestion and the Member State concerned either has adopted an action plan to address this congestion or ensures that minimum available capacity for cross-zonal trade is in accordance with Article 16(8).

- This **exemption** to use market-based redispatching is **approved by the CREG and VREG**
- As stated in CREG and VREG decisions, this **exemption should be re-evaluated on a regular basis** considering possible evolution of the context related to congestion management
- Note: next modification of the Rules for Coordination and Congestion Management is foreseen in 2025

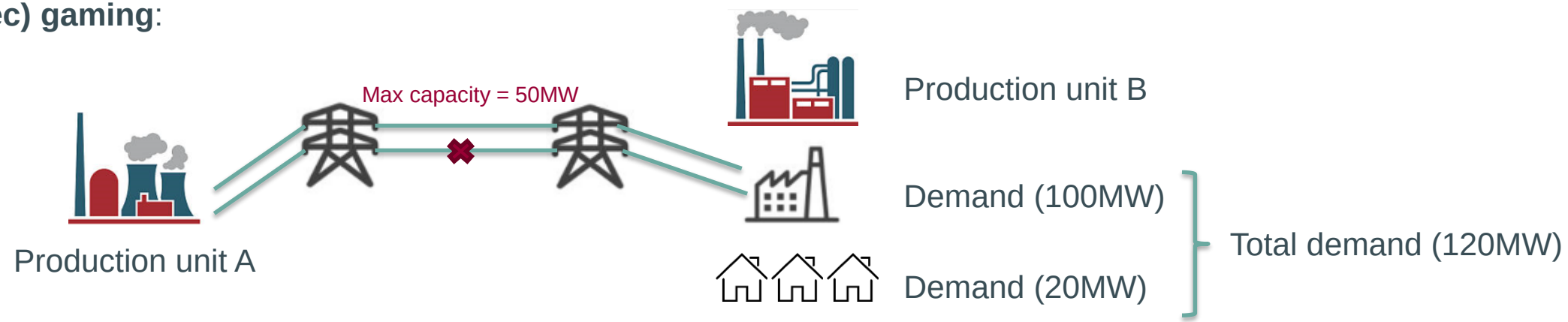
Remuneration model – Reminder iCAROS context (2/2)

- Elia also reminds that the **cost-based remuneration for redispatching** has been introduced in combination with the **freedom of dispatch**
  - Freedom of dispatch allows market parties to take market opportunities until RD GCT* even if this aggravates an identified congestion risk
- Market-based remuneration is **not compatible with the current design**, in particular with :
  - **Freedom of dispatch** as it substantially increases the risk of gaming
  - **Transparency about congestion risk** (via publication of the CRI levels) as it increases the predictability of the congestions

* Redispatching Gate Closure Time which is 45 min before the start of a given quarter-hour

Remuneration model – Risk of strategic bidding related to Market-based RD (1/2)

Several studies* demonstrated that the introduction of redispatching locational market may lead to **increase-decrease (inc-dec) gaming**:



	Marginal price	Available power
Unit A	40 €/MWh	100 MW
Unit B	35 €/MWh	150 MW

Without gaming

	Day-ahead market bid price
Unit A	40 €/MWh
Unit B	35 €/MWh

- Unit B satisfies the load: DA clearing price = 35€/MWh
- No redispatching needed

With inc-dec gaming*

	Day-ahead market bid price	RD energy bid price
Unit A	20 €/MWh	10 €/MWh (down)
Unit B	60 €/MWh	80 €/MWh (up)

- Unit A (100 MW) and B (20 MW) are selected in DA market: DA clearing price = 60 €/MWh
- Redispatching of unit A (50 MW downward) and B (50 MW upward) with associated costs

- Unit A anticipates that it will be redispatched down and underbids to make sure it is selected in the wholesale market (dec-gaming)
- Unit B anticipates that it will be redispatched up and overbids, hence increasing the spot price or pricing itself out of the wholesale market (inc-gaming)

* E.g. *Lion Hirth; Ingmar Schlecht; Christoph Maurer ; Bernd Tersteegen (2019) : Cost- or market-based? Future redispatch procurement in Germany, conclusions from the project "Beschaffung von redispatch"*
Lion Hirth, Ingmar Schlecht (2018) : Market-Based Redispatch in Zonal Electricity Markets
Justin Dijk, Bert Willems (2011) : The effect of counter-trading on competition in electricity markets

Remuneration model – Risk of strategic bidding related to Market-based RD (2/2)

Consequences of strategic bidding

- Higher energy costs and congestion management costs that are borne by the system operator and are eventually at the expense of the consumers
- Polluted and hard to predict spot market price
- Aggravation of the congestion
- Perverse investment incentive

	Without inc-dec gaming	With inc-dec gaming (per qh)
DA clearing price	35 €/MWh	60 €/MWh
Energy costs	• Unit A: 0 € • Unit B: 120/4 x 35 = 1050 €	• Unit A: 100/4 x 60 = 1500 € • Unit B: 20/4 x 60 = 300 €

	Without inc-dec gaming	With inc-dec gaming (per qh)
RD volume & cost unit A - downward	0 €	• 50 MW • - 50 MW/4 x 10 €/MWh = -125 €
RD volume & cost unit B - upward	0 €	• 50 MW • 50 MW/4 x 80€/MWh = 1000€

	Without inc-dec gaming	With inc-dec gaming (per qh)
Margin unit A*	0 €	1500 – 50/4 x 40 – 125 = 875€
Margin unit B	1050 – 120/4 x 35 = 0 €	300 – 70/4 x 35 + 1000 = 688 €

Investments in export-constrained regions might be stimulated

- A necessary condition for this inc-dec gaming to occur is the **predictive nature of the congestions**
- Market-based aggravates inc-dec gaming**
- Inc-dec gaming risk is increased in **absence of a sufficient liquidity in the market**

**Margin = energy revenues – marginal costs of produced energy + RD remuneration*
*** Even though in theory a risk is not completely absent with cost-based as soon as the congestions can be predicted*

Remuneration Model – Long-term Evolving Context

TOTEX optimization

Flexibility from grid users will be considered in a global optimization together with CAPEX investments

➔ Impact: No acceptability of market parties to consider a cost-based flexibility in this optimization

Optimization of activations

All redispatching activations requests are remunerated and a global merit-order of relevant means to solve a congestion is defined, even in the presence of units with flexible access (within temporary period)

➔ Impact: No acceptability of market parties with firm access to be activated more frequently at cost in place of grid users with flexible access

ROSC (Regional Operational Security Coordination)

Regional optimization to solve the congestions on 220/380kV grid elements using congestion management means from all the involved TSOs

➔ Impact: potential increase of the frequency of redispatching activations due to discrepancies in the remunération model

This context leads to a **paradox**:

Increase of **frequency of congestions** with more **opportunity losses** for market parties

><

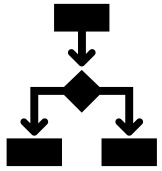
Increase of **previsibility of congestions** aggravating the **risk of market distortion** in case of market-based redispatching

Remuneration Model – Long-term Evolving Context

- Elia is open and identifies the need to consider reevaluating the **remuneration for congestion management**
- This reevaluation is in **line with the decisions** of the CREG and VREG
- This is an **extensive and challenging exercise** for which all the aforementioned issues need to be considered
- Reevaluation of the remuneration needs to be part of a **consistent design**, where other aspects may also need to evolve

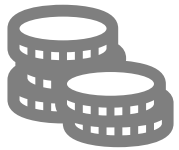
12. Methodological development required in long-term grid planning

The following methodological development are required in the context of long-term grid planning



Develop a process to correctly **evaluate the potential for flexibility** – in line with the technical capability

Develop a methodology to calculate the **flexibility volumes to be activated** in order to solve the identified congestions - in line with the available flexibility and with the available products.



Develop a methodology to assess the **costs** of the **activated volumes** and the cost to **correct the BRP perimeter** – in line with the remuneration schemes of the products - and compare these costs with the grid reinforcement costs

Develop the adequate **bounds** and criteria on the **maximal usage of flexibility** in long-term grid planning to ensure a **harmonious development of the grid**

13. Roadmap – main principles

Approach towards the target model

- Elia has an ambitious Target Model, on which we are willing to engage
- In the previous sections, we have put some lights on the width of the preliminary prerequisites, on their complexity as well as their many interdependencies
- Elia intents to move forward rapidly but progressively with a pragmatic approach:
  - ✓ without waiting that every detail from the Target Model is defined in detail before going on with implementation
  - ✓ by proposing a phased approach and intermediate go-lives
- As the evolutions are complex and impact many processes, a balance has to be found between too many *"smaller"* go-lives and waiting too long between consecutive and bigger go-lives.
  - ✓ example the iCAROS phased evolutions aiming med at avoiding a complex "big bang"
- The next slides are showing our current thinking about the approach
- Elia has the intention to propose a more refined approach during the workshop in December. Therefore, feedback from stakeholders is welcome

Overall objectives can be regrouped into two

Short Term Target : ***Industrialized connection with flexible access for customers awaiting grid reinforcement***

ongoing

- ✓ Focus on temporary period until reinforcement
- ✓ Incentive for customers to connect at the right place & at the right time (costs should mostly stay at the grid users)
- ✓ …But providing guarantees to help grid users closing their financing
- ✓ For all technologies and in standardized way across Belgium
- ✓ With increased transparency (e.g. grid study methodology), a better reservation capacity process

Longer Term Target : ***Have a robust design implemented using flexibility of Grid Users in an optimal way from grid planning (trade off between flexibility solutions & infrastructure development) to operations (optimal merit order) and proposing a consistent set of products***

- ✓ Allows to avoid over-building the grid and to cope with the increasing connection request
- ✓ Cutting the tail of the grid-investment needs (and their uncertainties) thanks to flexibility
- ✓ Attractive societal optimum of operationally tapping into cheapest flexibility available at all times
- ✓ Requires:
  - ✓ An optimal set of products allowing all available flexibility to be available (also on voluntary basis)
  - ✓ An optimal usage of this flexibility allowing to reduce costs for society
  - ✓ A fair remuneration while ensuring no (INC-DEC) gaming nor any manipulation
- ✓ …

Roadmap for realizing the ST Target Picture

ongoing

Phase 1: Fundations

- **Industrialize the historical GFlex product** to ensure a balanced approach between risks for grid users and socialization.
- **Enhance EOS/EDS processes and study methodologies**.
- **Increase transparency**, for ex. on grid studies.
- **Key limitation**: The product is real-time and therefore not suitable for all technologies, especially demand.

Phase 2: very next evolutions

- **Address most urgent expectations** from Phase 1
- Elia's current perspective:
  - Including clear interaction between GFlex product and **impact on participation in balancing** markets (BSP) and **CRM**.
  - Extend the real-time product to industrial sites with local production units or storage devices **("mixed sites")**

Phase 3: Expansion

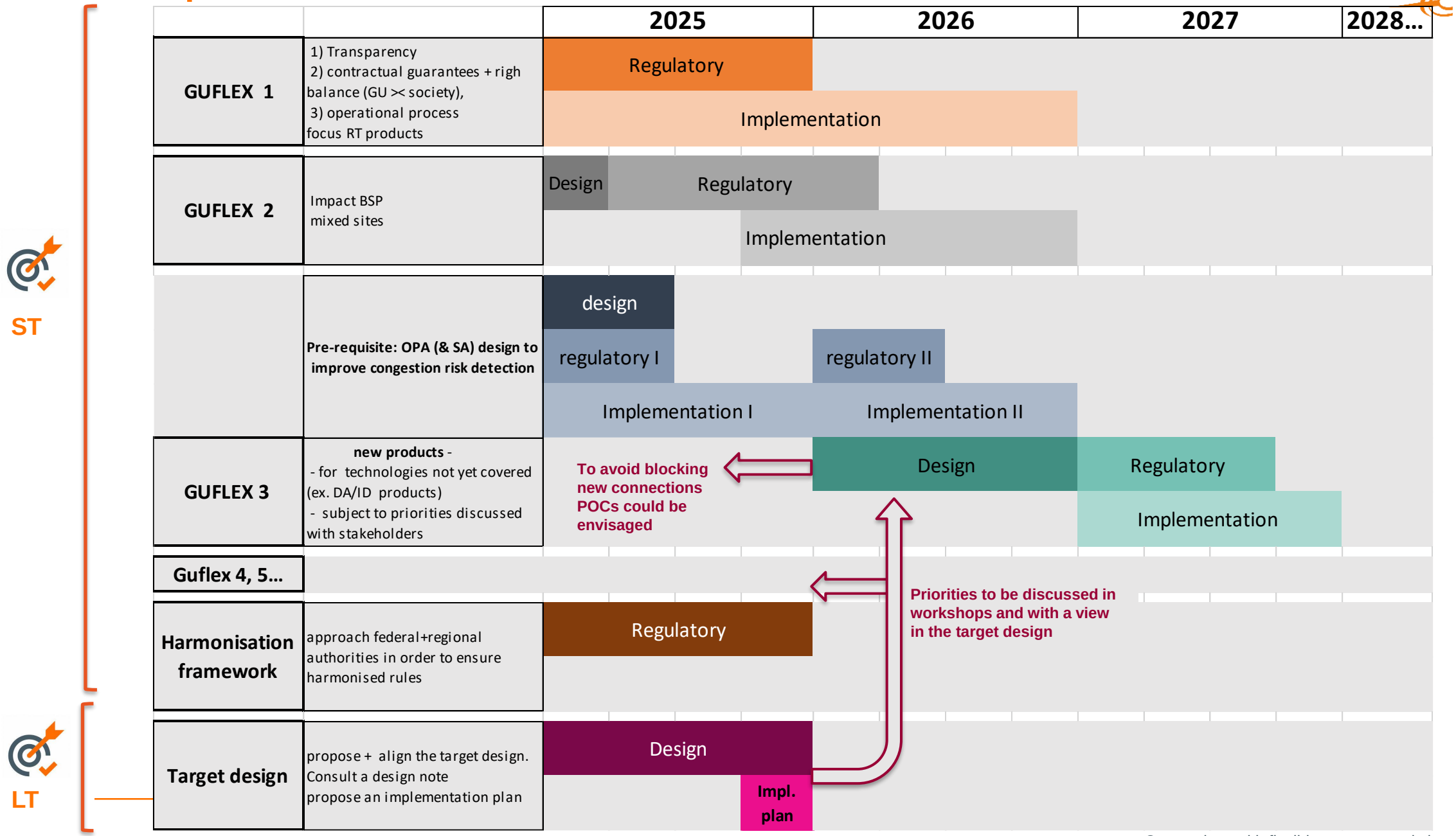
- Extend flexible connection products to **by adapting to capabilities of all technologies**.
- Identify and prioritize **new products** through co-creation with customers.
  - In order not to block connection requests, Elia is committed to further investigate intermediate solutions where possible for capacities that cannot react in real-time. This will most likely require investigations on a case-by-case basis and a potential need for regulatory sandboxing.
- **Advance the implementation of an improved outage planning agent process**, providing operational and customer benefits compared to the existing process.

Each phase will be constituted of a design stage (D), a regulatory stage (R), also including the contractual work, and an implementation stage (I).

In // of these three phases: **harmonization** across the federal and the 3 regional **legal and regulatory frameworks is essential**

Anticipating LT target: In-depth design discussions and informal public consultation in 2025 to develop a phased roadmap.

Roadmap towards ST and LT



14. Conclusions and next steps

Next steps

- Last workshop of 2024 is planned on the **11/12/2024**

Feedback on the content of the present workshop

- Grid User are invited to mention if they identify additional design elements that needs to be put in the roadmap
- Grid User are invited to highlight their priorities regarding the mentioned design elements to further investigate

→ Feedback expected by **22/11/2024**

Note on EOS/EDS technical report

- The note will be shared by the 22/11/2024
- Grid Users are invited to provide their feedback

→ Feedback expected by **29/11/2024**

Thank you.