# MONITORING REPORT

## Belgian electricity market

## Implementation plan

July 2021

economie

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# 1. Introduction

As foreseen in article 20.3 of Regulation 2019/943 of 5 June 2019 on the internal market for electricity (hereafter: Regulation 2019/943), Member States with identified resource adequacy concerns shall develop and publish an implementation plan with a timeline for adopting measures to eliminate any identified regulatory distortions or market failures as a part of the State aid process. Belgium currently operates a strategic reserve (State aid measure SA.48648)[1] and intends to introduce a capacity mechanism of the type "reliability options", and is therefore involved in such a "State aid process".

On 9 July 2020, Belgium has submitted its final implementation plan.[2]

As foreseen in article 20.6 of Regulation 2019/943, Member State shall monitor the application of their implementation plans and shall publish the results of the monitoring in an annual report and shall submit that report to the Commission. This is the present document, the "Monitoring Report".

To elaborate this monitoring report, the DG Energy of the FPS Economy collaborated with CREG and ELIA who provided input in their respective field of expertise.

Chapter 2 discusses the changes in the policy environment that have taken place since the implementation plan and also provides some key figures about the Belgian electricity system. In chapter 3 an overview is provided of the most recent adequacy assessments of Belgium, whichdemonstrate that, despite numerous improvements to the market functioning, a constant effort to open up the markets to new technologies and a robust network which is highly interconnected with the neighboring countries, the adequacy concerns that will arise in the near future are confirmed. Chapter 4 provides an overview of measures on a single timeline and an explanation of the changes as from the last report. Chapter 5 concludes.

# 2. Context

## 2.1. Policy context

Since September 2020, Belgium has a new federal government and a new Minister of Energy: Tinne Van der Straeten.

The federal government confirmed, through the coalition agreement of the government[3] that the nuclear phase-out should be completed by 2025 and confirmed an acceleration in the development of offshore capacity, so that 4.4 GW should be installed by 2028. The federal government supports the further development of the capacity remuneration mechanism in accordance with the EU's Clean Energy Package.

Since the publication of the final version of the implementation plan, the European Commission has published an assessment[4] of the final national energy and climate plan (NECP) of Belgium[5]. Following the recommendations of the European Commission on the draft plan submitted at the end of 2018, the various public inquiries, the regional consultation and the opinions of stakeholders, Belgium submitted its first final NECP. Compared to the draft version, the latest version of the NECP foresees a higher electricity final consumption. This increase is mainly explained by two drivers:

- a slightly more ambitious electrification of the transport sector for the Brussels[6] and Flemish regions;

[1] This mechanism will come to an end after the winter 2021-2022.

[2] https://economie.fgov.be/sites/default/files/Files/Energy/Belgian-electricity-market-Final-implementation-plan-CRM-22062020.pdf

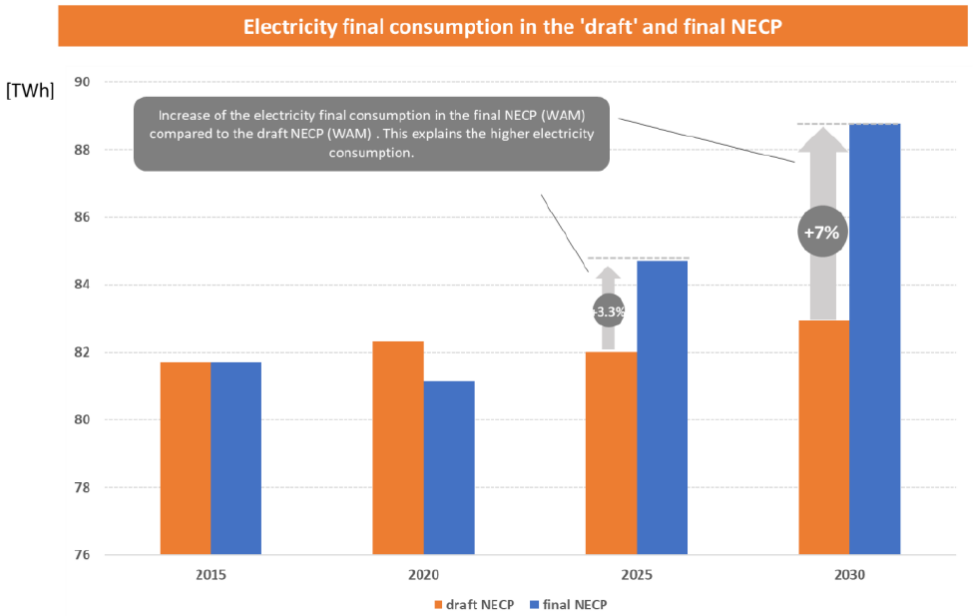
[3] https://www.belgium.be/sites/default/files/Accord_de_gouvernement_2020.pdf

[4] https://ec.europa.eu/energy/sites/default/files/documents/staff_working_document_assessment_necp_belgium_en.pdf

[5] https://www.nationalenergyclimateplan.be/en

[6] The city of Brussels plans to ban diesel cars from 2030 and petrol vehicles from 2035. The policy still has to be discussed with other regional governments, with the aim of getting it passed into law by the end of the year.

- and more consequently, an increase of electricity consumption from the industrial sector in the Flemish region.




Source: Elia, Adequacy and flexibility 2022-2032

## 2.2. Key facts about the Belgian electricity system

This section aims to provide a non-exhaustive overview of the recent trends in the electricity sector in Belgium.

### 2.2.1. Production

As shown in Table 1 the Belgian gross electricity production[7] in 2020 was 88.1 TWh.

Table 1: Belgian gross electricity production in 2020

| **Electricity** | | **TWh** |
|---|---|---|
| Nuclear | | 34,4 |
| Naturel gas | | 26,5 |
| Solid fossil fuels and manufactured gases | | 1,8 |
| Oil products | | 0,1 |
| Renewable Energy | | 23,4 |
| Other sources* | | 1,8 |
| **Total** | | **88,1** |

* Other sources include pumped hydro, heat recovery, non-renewable waste and other.

[7] The 2020 values should be considered an estimation at this stage.

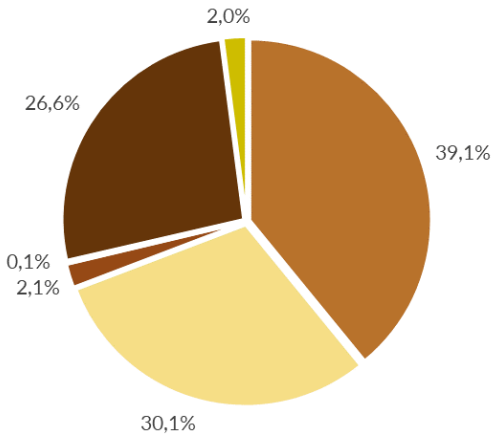



Figure 1: Proportion of each source for the gross electricity production in 2020

**Evolution in TWh**

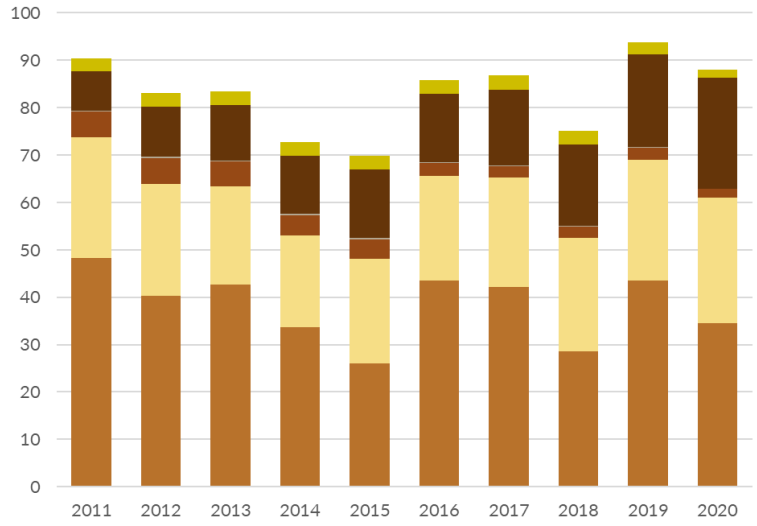



Figure 2: Evolution of gross electricity production (TWh) in the last decade in Belgium

In 2020, gross electricity production was 6.0% below its 2019 level, mainly due to a decrease in production from nuclear facilities (-20.9% or -9.1 TWh). However, 2020 remains the third highest year of the last decade in terms of gross electricity production. In the last decade, the most remarkable increase can be seen in renewable energies, where production has risen by 180.7% or 15.1 TWh compared to 2011. Figure 2 also shows that the use of oil products and solid fossil fuels has decreased significantly (-66.3% and -69.6% respectively over the past decade), mainly to the benefit of renewables. The last power plant using solid fossil fuels closed in 2016. The electricity still generated from this fuel group today comes from manufactured gases in the steel industry and small multi-fuel cogeneration plants.

## 2.2.2. Consumption

In 2020[8], net electricity imports were negative for the second consecutive year after many years of positive net imports. This indicates a surplus of electricity production compared to domestic demand. Net imports into Belgium were positive with France, the Netherlands and Germany (0.8, 4.0 and 0.2

[8] The 2020 values should be considered an estimation at this stage.

TWh respectively); they were negative with Luxembourg and the UK (-0.3 and -5.0 TWh respectively). This resulted in a net export of 0.3 TWh in 2020. The high exports to the UK were mainly driven by higher prices on the British Isle at peak times than on the continent.

At the end of 2020, the ALEGrO interconnection between Belgium and Germany was completed, enabling the exchange of electricity between the two countries. Since November 2020, this interconnection is available for commercial activities. With ALEGrO (1,000 MW) added, the maximum commercial import capacity amounted to 6,500 MW in 2020.

### 2.2.3. Belgian grid

Belgium has one of the highest interconnection capacities shared with neighbours (when comparing the share of market maximum capacities to the peak consumption of each country). Data from the latest Mid-term adequacy forecast (MAF2020[9]) for 2025, summing up the NTC (Net Transfer Capacities) assumed for Belgium for each of its borders leads to a share on the peak consumption of more than 60%.

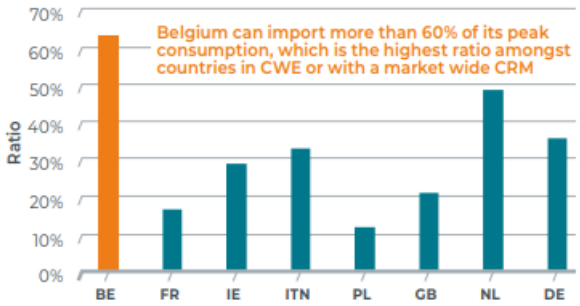



Figure 3: Ratio between the imports capabilities and the average peak demand[10]

# 3. Resource adequacy

Different studies, made by several entities (independent public entities, universities, consultants, TSO)[11], have demonstrated major challenges related to adequacy for Belgium as from 2025, despite the ambitious intentions to further develop renewable energies, demand response, storage and interconnections. Those issues arise from an unprecedented supply shock linked to the Belgian nuclear phase-out, which accounts nowadays for more than half of the thermal generation capacity. Moreover, the studies that also performed an economic assessment reveal that economic conditions on the electricity market will not ensure a sufficient level of investment to compensate this phase-out.

Since the publication of the Implementation Plan, the Belgian TSO, in collaboration with the Federal Public Service Economy ("FPS Economy") and the Federal Planning Bureau ("FPB"), and in concertation with the National Regulatory Authority (CREG), has published a new adequacy and flexibility outlook for the period 2022-2032.

As stipulated by the Electricity Act, Elia is responsible for publishing a biennial study on Belgium's adequacy and flexibility needs over the forthcoming decade. These studies analyze both short-term and long-term policy options regarding the future energy mix for Belgium. The study has been published the 25th June 2021.

Whilst undertaking the current study, Elia used updated data and applied new European methodologies for performing adequacy assessments.[12] The study has identified three key messages:

[9] https://www.entsoe.eu/outlooks/midterm/

[10] Source: Elia, Ad&Flex 2022-2032.

[11] For more details, please refer to the Implementation Plan.

[12] The ERAA methodology was only approved by ACER in October 2020 and shall be fully implemented at the European level by the end of 2023 at the earliest.

1. it reconfirms the urgent need for new domestic capacity to anticipate the capacity needs created by the planned nuclear exit. To cope with Belgium's nuclear phase-out by 2025, 2 GW of additional capacity (assuming 100% availability) is predicted to be required in the EU-BASE scenario;[13]
2. although there is an enduring need for capacity, the current markets will not provide sufficient stimulus for the needed investments. The need for a supporting mechanism, such as the Capacity Remuneration Mechanism (CRM) currently being implemented in Belgium, is therefore clear. Compared to other measures, the CRM will have the best positive effects on socioeconomic welfare. In addition, it will have multiple valuable knock-on effects on the investment climate and will support a more stable energy market;
3. whilst the urgent issues outlined above must be addressed in the run-up to 2025, Belgium also needs to prepare for its transformation into a carbon-neutral society by 2050. This requires action to be taken now in relation to market design, RES development and international cooperation.

It is important to note that these conclusions are the result of a study that already integrates the ongoing and planned market developments and the most recent projected policy targets as described or referred to in the implementation plan.

# 4. Implementation plan - Monitoring 2021

This section provides an update of the overview of measures provided in the final implementation plan.

Table 2 provides a summary of the different measures that will be discussed in Section 4.1. The status of each of these measures, in comparison to their status in the final implementation plan, is given.

| Measures | Status |
|---|---|
| **Wholesale markets** | |
| Price limits | No change |
| Offers in the wholesale market | No change |
| Generation reserves by TSOs | Update |
| CWE flow-based market coupling | Update |
| CORE region | Update |
| Integration of HVDC interconnectors | Update |
| **Balancing markets and ancillary services** | |
| Improved balancing publications | Update |
| Revision of the alpha component | Update |
| Further implementation of frequency-related ancillary service Product Roadmaps | Update |
| Participation in EU Balancing Projects | Update |
| Regional imbalance settlement harmonization | Update |
| Internet of Energy | Update |
| **Flexibility** | |
| Transfer of Energy | Update |
| EMD | New |
| Smart Meters | Update |
| **Regulated prices** | Update |
| **Interconnections and internal grid capacity** | Update |
| **Scarcity pricing** | Update |
| **Self generation, energy storage and energy efficiency** | Update |
| **Reliability standard** | New |

Table 2: Summary of the different measures

[13] Several sensitivities have been studied and also show a need for new capacity from 2025.

Table 3 provides the overview of the measures on a single timeline.

| TOPIC | CHANGE | STATUS | YEAR 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Price cap** | NO | Dynamic price caps, consistent between different time frames | | | | | | | | | | | | |
| **Introduction of a shortage pricing function** | NO | Offline model for calculation of scarcity price-adders | Online publication of simulated scarcity price-adders | | | | | | | | | | | |
| **Increase of interconnection and internal grid capacity** | YES | Interconnections strengthened thanks to go live of Nemo link and Allegro. Further investigation to increase interconnection and internal grid capacity | Extra interconnectors are live (BE-GB & BE-DE) and reinforcement of existing interconnection capacity (BE-NL & BE-FR). | | | | | | | | | | | |
| | | | Reinforcement of existing internal 380kV grid | | | | | | | Boucle du Hainaut & Ventilus | | | | |
| **Self-generation, energy storage, demand side measures and energy efficiency** | YES | Implementation of Transfer of energy for DA/ID markets to enter into force as of July 2021. | Implementation alternative mechanism for the pass-through contracts for mFRR.<br>Implementation opt-out and alternative mechanism for pass-through contracts for aFRR + reassessment of the transfer of energy model<br><br>Opening of transfer of energy (and opt-out alternative model) to the strategic reserve market completed<br><br>Study relative to the transfer of energy in the DA/ID markets completed | | Implementation of the transfer of energy (as well as the alternative models) for the DA and ID markets. | | | | | | | | | |
| | | Policy measures Self generation, energy storage and energy efficiency | Constant monitoring | | | | | | | | | | | |
| **Balancing markets developments** | YES | Single-pricing balancing mechanism | Improved balancing publications & revision of alpha completed | | | | | | | | | | | |
| | | FCR open to all technologies, all players, all voltage levels | | Daily procurement & regional procurement – completed and operational since July 2020 | | | | | | | | | | |
| | | aFRR only open to CIPU units | | aFRR open to all technologies & all players<br>& daily tender since September 2020 | PICASSO foreseen for 2022 | | | | | | | | | |
| | | | | | Marginal pricing activated energy (if sufficient liquidity) will be implemented for each optimization cycle when connecting to PICASSO | | | | | | | | | |
| | | mFRR open to all technologies, all players, all voltage levels | | Daily sizing and tender<br>& marginal pricing activated energy (February) | MARI foreseen for 2022 | | | | | | | | | |
| | | | Regional imbalance settlement harmonization ongoing. Cross border marginal pricing to be adopted when accession to MARI and PICASSO are fulfilled. | | | | | | | | | | | |
| | | | Internet of Energy : first test phase completed by October 8th, 2020. Some new use cases were selected for a sandboxing phase and some pilot projects are preparing to enter a demonstration phase. | | | | | | | | | | | |
| **Smart-meters** | | | | | | | | | | | | | | |
| **- flemish region** | YES | In 2020 the Flemish Government decided to speed up the roll-out of smart meters | | | | | | 80% | | | | | 100% | |
| **- wallon region** | NO | Roll-out is pursued as specified in the Implementation plan | | | | | | | | | | | | |
| **- brussel capital region** | NO | As January 2021, 21,361 meters have been installed on the Sibelga network | | | | | | | | | | | | |
| **Removal of regulated prices** | NO | No regulated prices except for social tariff (households) | | | | | | | | | | | | |
| **Reliability standard** | YES | New Reliability standard calculated by applying ACER's methodologies (Regulation (EU) 2019/943)) | | | Enter into force on 15th September | | | | | | | | | |

Table 3: Overview of the measures on a single timeline

## 4.1. Wholesale markets

### 4.1.1. Price limits

No further changes were foreseen, the current dynamic approach to price limits as foreseen by ACER already mitigates to a large extent any concern regarding price limits.

### 4.1.2. Offers in the wholesale market

No development was foreseen.

### 4.1.3. Generation reserves released by TSOs

Currently no strategic reserves are foreseen for the upcoming winter and the period for which the strategic reserve mechanism has been approved by DG COMP from a state aid perspective expires after the upcoming winter, rendering this change de facto obsolete.

### 4.1.4. CWE flow-based market coupling improvement

The CWE flow-based day-ahead market coupling has been gradually improved since its introduction in 2015. Particularly, in April 2018, the "minRAM 20%" rule has been implemented. This rule guarantees that, for all the elements considered in the capacity calculation, at least 20% is made available for cross-border exchanges within the CWE region.

Since April 2020, more capacity is made available thanks to the implementation of the rules of the new Electricity Regulation (the "70% rule", adapted at national level based on the approved derogation). By 2025, a minimum of 70% capacity should be available for cross-border exchanges.

This 70% rule continues to be applied. Two reports are available on the compliance with this rule:

- A report by ACER of 2 June 2021[14], indicating inter alia that:
    a) As for the first semester of 2020, derogations and/or actions plans were adopted by most Member States;
    b) For AC (Alternating current) in the SWE region, the minimum 70% target was reached between 30 to 60% of the time, depending on the border, when calculating the MACZT was possible;
    c) The margin for improvement is the largest
        1. in the CWE region, where significant efforts to meet the minimum 70% target are needed for all countries and especially in Germany, followed by the Netherlands, Belgium and France. However, the low MACZT in some of these countries, e.g. Belgium and the Netherlands, may be, to a certain extent, the result of loop flows originating in other countries of the region;
        2. in a number of countries and borders without coordinated capacity calculation, where the levels of relative MACZT are the lowest in the EU; this includes Austria on non-CWE borders, Bulgaria, Croatia, Germany on the borders with Czech Republic and Poland, and Hungary.
- A report by the national regulator CREG of 15 April 2021[15], indicating inter alia that:
    a) The analyses performed show that Elia, between 1 April and 31 December has respected the legal requirements related to the minimum margins, during

[14] https://extranet.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publications%20Annexes/ACER%20Report%20on%20the%20result%20of%20monitoring%20the%20MACZT%20S2%202020/ACER%20MACZT%20Report%20S2%202020_Version%201.0.pdf

[15] https://www.creg.be/sites/default/files/assets/Publications/Studies/F2183EN.pdf

81,3% of the considered period and on 99,2% of the observed network elements;

b) the observed loop flows from neighbouring bidding zones have a significant impact on the ability of Elia to respect the 70% threshold at all times.

Notwithstanding the principal obligation to reserve a minimum of 70% for cross-border exchanges, the reality sometimes differs, as can be seen from these reports.

### 4.1.5. CORE region

ACER took a decision at the beginning of 2019 with respect to the day-ahead and intraday capacity calculation methodologies. These methodologies are due to be implemented by 1st December 2020 and 1st December 2021 respectively, but due to competing developments on EU level, new go-live dates for 1st February 2022 and 1st February 2023 have been agreed. They include small but significant differences with respect to the current approach in CWE, in particular by providing a solution to the issue of undue discrimination caused by the loop flows taking away a significant part of the thermal capacity[16] of the lines before offering it to cross-border exchanges. The development and implementation of the coordinated redispatching and countertrading methodologies (including cost sharing) have been decided by ACER and are planned to be implemented in April 2024. They are expected to bring additional improvements with respect to the capacity offered to the market.

### 4.1.6. Integration of HVDC interconnectors

The following actions have taken place:

- Following Brexit, the UK market is no longer part of the IEM. This affects cross-border trade and the functioning of the interconnectors, including Nemo link. Explicit trading arrangements for all timeframes are in place in order to allow market exchanges that remain as efficient as possible. In line with the Trade and Cooperation Agreement reached between the EU and the UK, a cost-benefit analysis regarding a new implicit arrangement (multi-regional loose volume coupling) has been delivered. A decision to proceed with the implementation is awaited.
- Alegro HVDC interconnector between Belgium and Germany has been implemented following the evolved flow-based approach, maximizing the efficiency of the market coupling. Alegro will be integrated in the existing CWE processes through the implementation of the so-called Evolved Flow-Based approach. The intention is to make an ID product available on Alegro shortly after the go-live of DA allocation on the interconnector. This means that Alegro will open up access to the liquid DA and ID market in Germany via implicit coupling.

## 4.2. Balancing markets and ancillary services

### 4.2.1. Improved balancing publications

The changes foreseen towards improved balancing publications have been implemented as planned, including the development of an IT tool allowing Elia to communicate the relevant information to (registered) BRPs within 15 minutes after the respective quarter-hour. This development helps BRPs to determine their imbalance.

[16] Internal losses in the connection release heat, which increases the temperature of the line or cable. The higher the current in the line, the higher the losses and consequently more heat is generated. In the case of overhead lines, this causes the line to expand and increases the sag of the line, decreasing the distance between the line and ground. As this distance is legally specified, there is a maximum admissible sag of the line and consequently a maximum temperature. As the loading is thus determined by the temperature, this is referred to as thermal capacity.

### 4.2.2. Revision of the alpha component

As for the balancing publications, the improvements foreseen regarding the alpha component have been implemented beginning of 2020 to continue the evolution towards a fully single-pricing balancing mechanism. This includes:

- A refined way to calculate the alpha component in order to provide stronger incentives for BRPs during high and structural imbalances.
- A symmetrical application of the alpha component to BRPs in order to both reward BRPs helping the system and punish BRPs acting against it.

### 4.2.3. Further implementation of frequency-related ancillary service Product Roadmaps

Various actions related to the evolution of the different balancing products were implemented step by step, after a close interaction with the market :

- **FCR:** FCR is open to all technologies and all players. Tendering is taking place on a daily basis and at regional level since July 2020.
- **aFRR:** Since September 2020, aFRR is open to all technologies and all players. Tendering takes place on a daily basis as well.
- **mFRR:** mFRR is open to all technologies and all players. Sizing & tendering are taking place on a daily basis. Marginal pricing for activated balancing energy is enabled since February 2020.

### 4.2.4. Participation in EU Balancing Projects

FCR is already tendered and procured at regional level since July 2020. With respect to the other products:

- **aFRR:** accession to PICASSO is foreseen for 2022. Marginal pricing of activated energy will be implemented for each optimization cycle when connecting to PICASSO.
- **mFRR:** accession to MARI is foreseen for 2022.

### 4.2.5. Regional imbalance settlement harmonization

The regional imbalance settlement harmonization is ongoing. The current system is already compliant with most requirements. Cross-border marginal prices will be adopted as a reference when the accession to PICASSO and MARI is completed.

### 4.2.6. Internet of Energy

In February 2019, Belgium's energy system operators teamed up with 60 companies, public bodies and academic institutions to launch a collaborative innovation initiative called IO.Energy[17]. The first test phase, which comprised eight pilot projects, was completed on 2020, 9th of October.

Some pilot projects are now preparing to enter a demonstration phase and could ultimately result in new products or services centered around the end consumer with the potential to make the energy landscape evolve.[18]

A second round of ideation started in February 2021, resulting in 5 use cases being selected to enter the sandboxing phase. First results will be available by end December 2021.

[17] https://www.ioenergy.eu/

[18] For more details: https://www.ioenergy.eu/use-cases/.

## 4.3. Flexibility

### 4.3.1. Transfer of Energy

Transfer of energy in DA and Intraday markets has been implemented and has entered into force on July 1st 2021.

The assessment of the need for transfer of energy in the aFRR market segment will take place some time after the go live of the ToE in DA/ID. In the meantime, other promising design schemes are being investigated by the TSO. Those are centered around the consumer and aim at reducing entry barriers and fostering the development of DSR (especially at low voltage and among others for the aFRR market segment). Those schemes will be tested in some of the pilots in the framework of IO. Energy (see previous point).

### 4.3.2. EMD

The transposition of directive (EU) 2019/944 of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (hereafter "Directive 2019/944") is under process.

**Federal**

On the federal level, the legislation is being altered to create the legal basis in relation to Regulation 2019/943 and Directive 2019/944. In particular, the federal bill provides for the extension of the rights and obligations of end users connected to the transmission grid (> 70 kV) and the definition of new roles for these actors on the electricity markets, in order to increase their active contribution to the balancing and flexibility of the electrical system, to reinforce their autonomy and to foster the development and integration of decentralised RES and storage capacity in the system, in accordance with Directives 2019/944 and 2018/2001. It also provides for the extension of the TSOs roles and responsibilities in this regard, and for the reinforcement of the regional and international cooperation with other TSOs.

On the grid level, the federal grid development plan 2020 – 2030 describes multiple projects to enhance the integration of large scale offshore wind production in combination with an increase in interconnection capacity. The expansion of the transmission grid is described in other sections of this document, the main driver is to tackle large fluxes within the transmission grid originating from large renewable energy production in Belgium and Europe.

With regard to pumped hydro, the owner has decided to expand the existing largest pumped hydro storage plant Coo by 2024. This will increase the energy storage with 425MWh and the power output with 84MW.

**Flemish region**

The 4th Energy Package, adopted on July 14, 2019, is being transposed in Flemish legislation. The final transposition is planned in the summer of 2021. Especially the transposition of the Directive 2019/944 will bring new rights and obligations for consumers, will introduce new market roles such as the flexibility service provider and energy communities. DSO's will be able to use flexibility as an alternative to network investments to tackle local congestions and use flexibility for voltage regulation.

**Walloon region**

An upcoming Decree will ensure the transposition of both RED II and MD[19] directives and bring novelties in the Walloon legislation, among which the creation of new legal notions and their resulting rights and obligations, notably:

- **Aggregation:** consists of combining multiple consumption or production loads of electricity for sale, purchase or auction on the different markets and can be performed by different actors, including suppliers, flexibility service providers or intermediaries;

[19] MD = Market Design

- **Collective Self-consumption**: self-consumption of renewable energy exercised collectively by a group of active customers located or established in the same building;
- **Peer-to-Peer Exchanges:** the sale of electricity produced from renewable energy sources between active customers or energy communities on the basis of a contract containing pre-established conditions governing the automatic execution and settlement of the transaction either directly between the active customers or energy communities or through an intermediary;
- **Energy Communities (Citizen and Renewable):** legal persons in which ones may openly and voluntarily participate, destined to deliver economic, social and/or environmental benefits to its members and/or region and allowed to produce electricity, to supply electricity, to self-consume electricity produced within it, to practice aggregation and participate in flexible supply services, to store energy, to provide recharging services for electric vehicles, to provide energy efficiency or other energy services and to sell self-produced and not self-consumed electricity, where appropriate through a power purchase agreement, and, in the case of electricity from renewable energy sources, also through peer-to-peer trading.

**Brussels**

The 4th European package, in particular Directive 2019/944, is in the process of being transposed: the changes will enter into force by the end of 2021.

The main aspects of this transposition in the Brussels legislative project are:

- the creation of energy communities as a new market player and of an operating framework regarding this new actor;
- a regulatory framework for emerging activities on the regional energy market: electric vehicle charging, sharing of self-produced electricity, flexibility, aggregation and electricity storage;
- granting new rights and obligations to final consumers and active consumers in particular, and
- complementary aspects to the deployment of smart meters on the regional territory and to the DSO's facilitating role for the development of above-mentioned new players and emerging activities.

### 4.3.3. Smart Meters

The deployment of smart meters in line with articles 19 to 22 of Directive 2019/944, which is a competence of the Regions in Belgium, is explained in this section.

Each of the regional governments has specific targets for the installation of smart meters. In the Walloon Region and Brussels-Capital Region, complete or near-complete coverage is not expected until after 2030.

**Flemish region**

In 2020 the Flemish Government decided to speed up the roll-out of smart meters, aiming to replace 80% of all energy meters in Flemish households by the end of 2024. Moreover, in the amended energy decree of 17 July 2020, the Flemish government set the ambition that all traditional meters in Flanders should be replaced by digital energy meters by 1 July 2029.

Fluvius works actively to promote 'smart' applications for end-users. Today, every Flemish household with smart meters can consult their personal energy usage or feed-in via a new free online consumer portal. The data can be consulted in great detail: per 15 minutes for electricity and per hour for natural gas. In 2021, these data will also be made available to commercial companies for tailor made energy advice. The Flemish smart meters also offer two data ports (P1 and S1) for commercially available smart energy applications.

**Walloon region**

Roll-out is pursued as specified in the Implementation plan.

At the beginning of 2019, the two main DSOs, ORES and RESA, announced their intention to embark on a common trajectory with the choice of the same meter technology and communicating channel.

**Brussel Capital region**

The Ordinance of 19 July 2001 on the organisation of the electricity market was amended in 2018. On this occasion, modalities for the progressive deployment of smart meters by priority user segments were introduced.

It should be noted that another modification is under way: it broadens the framework for the deployment of smart meters and transposes the 4th European package (introduction of the right to dynamic pricing, new "active customer" status which allows direct participation in electricity markets, creation of energy communities, etc.).

As January 2021, 21,361 meters have been installed on the Sibelga network.

The smart meters currently placed are for the following cases:[20]

- new connections and major renovations;
- new prosumers;
- customers with an electric vehicle charging point;
- customers participating in an energy community;
- customers who apply for a smart meter.

## 4.4. Regulated prices

Belgium has no exemptions from network or energy-related costs for specific classes of consumers which might affect demand response incentives.

The social tariff system contributes to the European objectives aiming at i) guaranteeing the right of access to energy for all; ii) protecting vulnerable consumers and (iii) fighting against energy poverty, which lies in the level of energy prices (in addition to the two other key factors; i.e. income level and energy efficiency of housing and equipment), and this without preventing electricity and gas bills of social tariffs beneficiaries from following downwards as well as upwards price market developments.

Social tariffs have the following economic properties:

- Identical through the whole Belgian territory, social tariffs are aligned with the cheapest commercial tariff offered in the cheapest distribution area; a link with the supply market conditions is therefore structurally guaranteed (supply market-based);consequently, they are not set below the costs of supply;
- they are transparent (published by the CREG) and subject to continuous monitoring by the CREG;
- they do not disturb competition and do not create market distortion;
- they do not restrict the freedom of the beneficiaries to change suppliers if they wish;
- they provide a rough indication of the competitive potential in the supply market.

Reforms have also been made on January 28th 2021 to the system to take particularly into account market developments and supplier concerns. As such, suppliers are allowed to receive the social tariff plus the reimbursement of the cost resulting from the application of social tariffs, which, from now on, better reflects market practices as market quotes in the hedging activities of suppliers. This adaptation makes it possible to significantly contain the hedging costs for suppliers.

## 4.5. Interconnections and internal grid capacity

On the internal grid side (reinforcements), there are no changes as communicated in the Federal Development plan. Elia is still actively developing the proposed projects: HTLS reinforcement of the 380 kV backbone and new corridors Ventilus and Boucle Du Hainaut.

On the interconnection side, Elia is also actively working on projects as put forward in the Federal Development plan. Some major changes are the following:

- Reinforcement Zandvliet-Rilland: One year delay on the HTLS reinforcement on the Dutch side, due to impact of the regulation 2019/943. Belgian side (4th PST) will proceed in 2022 as planned.

[20] https://www.brugel.brussels/publication/document/notype/2021/fr/Presentation-plan-investissement-Electricit%C3%A9-2022-2026.pdf

- Nautilus: Rescoped from a HVDC point-to-point interconnector to a hybrid system, combining the function of connection of an offshore windfarm with an interconnector.
- Alegro: taken into service at the end of 2020.
- Germany - Belgium II: Latest studies, taking into account the CEP regulation, have led to an updated commissioning date of ~2035. Further studies required after CRM auctioning is known.
- NEW: Belgium – Denmark: Elia actively investigates a new hybrid system (wind + interconnection) between Belgium and Denmark. A memorandum of understanding (MoU) has been signed on February 2021. The objective of this MoU is to initiate cooperation on the planning of a possible interconnection with an energy hub in the Danish economic zone in the North Sea with mutual benefit of the two countries. This could improve security of supply; increase overall socio-economic welfare, bring diversification of energy sources, contribute to national targets and ambitions for renewable energy and facilitate energy system integration of wind power across sectors.

## 4.6. Scarcity pricing

Scarcity pricing is an administrative intervention in the energy market, ensuring that energy prices spike during scarcity events and reflect the value of energy without relying on supra-competitive bids of generators. Scarcity pricing is the principle of pricing electricity at a value above the marginal cost of the marginal unit during conditions of high system stress, according to the incremental value that flexible capacity offers to the system in terms of keeping the loss of load probability in check.

In the final implementation plan submitted in 2020, no decision had been made regarding the implementation of a scarcity pricing in Belgium. Previous studies had demonstrated that there was a need for further research. It was foreseen that both CREG and ELIA continue to work actively on the topic.

In 2019, CREG published a note on the implementation of a scarcity pricing mechanism in Belgium[21]. Since October 2019, Elia publishes - for informational purposed- calculated scarcity price adders on D+1 basis on its website[22]. This simulation is based on a scarcity pricing model as conceptualized in the note by CREG and UCL CORE on the general design of a mechanism for the remuneration of reserves in scarcity situations.

In December 2020, Elia published its findings regarding the design of a scarcity pricing mechanism for implementation in Belgium[23]. The initial preliminary report was publicly consulted upon. A first and prominent objective of this incentive was to assess a study by UCL CORE titled 'Study on the general design of a mechanism for the remuneration of reserves in scarcity situations'[24]. In its report, Elia considers the CORE study as valuable in identifying potential building blocks when purely developing a scarcity pricing mechanism. However, Elia's analysis also concludes that the design presented in the CORE study, and particularly the application of scarcity price adders on BSPs (both in energy and capacity prices) bounces with legal obstacles, is hardly compatible with the prevailing market design and would have discriminatory effects and potentially distort the good (European) market functioning. While the CORE study's design has several difficulties that cannot be overcome in the short to medium term, it nevertheless provides ingredients for alternatives that could be feasible. Based on the proposals raised in the CORE study and Elia's analysis, Elia derived an alternative scarcity pricing proposal that is deemed feasible.

This alternative proposal consists of the introduction of a scarcity component – further referred to as omega (Ω) component – in the imbalance price calculation[25]. Beyond the fact that the omega component represents a feasible scarcity pricing implementation measure, it remains to be assessed whether this proposed – and in general any – scarcity pricing mechanism for Belgium, is desirable. Based on the feedback received from stakeholders during the public consultation, it appears that there is no appetite for the implementation of a scarcity pricing mechanism in general. Market parties refer to the fact that

[21] https://www.creg.be/fr/publications/note-z1986

[22] https://www.elia.be/en/electricity-market-and-system/studies/scarcity-pricing-simulation

[23] https://www.elia.be/en/public-consultation/20200930-public-consultation-on-elia-is-findings-regarding-the-design

[24]

[25] Importantly, the conceived scarcity component applies only on BRPs and is designed to apply in addition to the alpha component currently in place, since both components serve a different purpose.

scarcity pricing provides no (guaranteed) solution for adequacy, point out that there is no extra need for investment incentives for flexible capacity[26], express their believe that the real-time value of energy naturally takes into account the risk of scarcity already and argue that a scarcity pricing mechanism introduces risks and complexities.

A very major point of uncertainty in the introduction of scarcity pricing is its application on BSP's, which the EU and Belgian legislation does not seem to allow blankly as it may concern a form of price regulation or state aid. Also in a context of cross border exchange of balancing services in projects like MARI and PICASSO the application of a shortage pricing is not foreseen. Moreover, the application on national and foreign BSP's in a first assessment seems to be negative. These questions are being analyzed further in cooperation with the regulator. If applied only on BRP's in imbalance pricing, the shortage pricing is a mere cash neutral (zero-sum) instrument incentivizing the availability of the existing operational reserve margin, rather than creating additional revenue streams. On the contrary, market parties confirm that in the framework of investment decisions it will be considered as a higher operational risk and cost (mainly for maintenance).

# 4.7. Self generation, energy storage and energy efficiency

## 4.7.1. Self generation

CEER has defined self-generation as the use of power generated on-site by an energy consumer in order to reduce, at least in part, the purchase of electricity from the grid. Be it with rooftop photovoltaic, small wind turbine or other small scale electricity generation, Belgium has seen a progression in consumers' empowerment for self-generation in each of the regions.

**Flemish region:**

At the end of 2019, the installed PV capacity was approximately 3.2 GWe. The solar map shows that there is sufficient potential available on roofs to achieve significant growth. Further annual growth of 300 MWe is estimated over the period 2021-2025, with 318 MWe per year from 2025 onwards, with the aim being for solar PV capacity to reach 6.7 GWe in Flanders by 2030. This target is easily within the potential identified using the solar map, and also within the system integration and balancing capacity. A Solar Plan 2025 with projections to 2030 has been produced in order to increase solar power. Under the Flemish government agreement, the existing investment aid system is to be expanded through budgets set annually for small and medium-sized wind farms and medium-sized PV projects from 2021 so that the most cost-effective projects are carried out. The aid system is to be funded by the Energy Fund.

On 4 December 2020 the Flemish Government approved a new *Solar Plan 2025* and on 11 December 2020 a new *Wind Plan 2025*. These plans include additional measures:

<u>Solar Plan:</u>

- the existing investment aid system for small and medium-sized wind turbines is expanded for small and medium-sized PV projects from 2021 so that the most cost-effective projects are carried out (call procedure). The aid system is to be funded by the Energy Fund (18,9 million €/year in 2021);
- investment support for small PV until 10 kW (budget 32 million €/year in 2021);
- stimulation of self-consumption of PV electricity;
- facilitate the integration of PV in the energy market and net exploitation;
- monitoring remuneration self-generated renewable electricity feed into the grid;
- obligation feasibility study for PV for large roofs as condition for the premium for the removal of asbestos;
- facilitator PV for small and medium sized enterprises.

<u>Wind plan:</u>

- phasing out the support of wind in 2025 (mature technology) and monitoring the profitability of wind energy projects;
- empowering local governments ;
- pilot project of tendering wind energy on government land;

[26] This is also confirmed by the last Adequacy and Flexibility Study - 2022-2032.

- facilitate Repowering ;
- developing a Spatial Policy Plan with aspects of renewable energy, Local Spatial Energy Strategies, planning framework for wind turbines,…;
- evaluation of the permit framework for wind turbines;
- public acceptance by local support of new projects (Local Energy and Climact pact, focus on local stakeholders, communication).

The Flemish Government encourages the production of electricity from renewable energy sources through the system of green energy certificates (GEC). In 2020, important additional measures were taken: limit the internal rate of return used in banding factor calculations, gradual phase-out of renewable electricity support through the certificate system until 2023, to be completed by 2025.

### Walloon region

The development of green electricity production is stimulated by European directives which require member states to take the laws, regulations and administrative provisions necessary to comply with them. But member states can also show more ambitious.

The objectives set by the Walloon government were confirmed as part of the drafting of the Energy Plan 2030 for Wallonia, which was integrated into the National Energy-Climate Plan (PNEC) in order to lead to a Belgian plan sent to the European Commission at the end of 2019. This plan was established following the guidelines given by the "Clean Energy Package" drawn up by the European Commission with a view to achieving the objectives set for 2030.

The policies and measures envisaged by the Walloon Plan lead to a total part of 23.5% of renewable energy sources. The final energy consumption of Wallonia in 2030, thanks to an increase in renewable production and a reduction of gross final energy consumption, and led to a 37% share of renewable electricity in final electricity consumption in 2030.

The Walloon objectives and the terms of renewable electricity are implemented by the decree of the Walloon government of 30 November 2006 relating to the organization of the regional electricity market as amended by the decree of April 11, 2019 that establishes specific objectives by sector and an overall objective of production of 10,081 GWh of electricity from renewable sources by 2030.

In March 2019, the Energy Administration carried out a study on the determination of the PV potential in Wallonia and its various applications (BIPV, ground-mounted PV, AgriPV, Floating PV, PV&infrastructure, VIPV, ...). At the end of June 2019, the Walloon Government abolished the Qualiwatt premium for installations below 10kWp. Small photovoltaic systems have become sufficiently profitable to no longer be supported by public funds.

The prosumer tariff (competence of CWaPE) came into force on 1 October 2020. It is not a tax, but a tariff for the use of electricity transmission and distribution networks. With this new tariff, prosumers will also participate in the grid charges when they consume electricity at a different time from when their installation produces it. The system of compensation for energy supply remains in place. The prosumer can choose between two tariffs: the capacity/fixed rate tariff and the proportional/actual tariff.

### Brussels-Capital Region

The operation of the green certificates market was analysed in 2019 in the light of a profitability problem: the system yield was not the same (small facility = profitable, large-scale facility = highly profitable). This analysis led to a change in 2020 in the decree by the Government of the BCR, introducing a finer categorization of facilities.

The Brussels Government committed itself in the NECP to refine the support for Building Integrated Photovoltaics via the mechanism of green certificates. This modification would enter into force on January 2022. The NECP also plans to adapt the mechanism of green certificates to better support the installation of PV panels in public spaces (outside buildings, such as bus shelters or fixed urban furniture).

## 4.7.2. Energy storage

### Increase in storage capacity

The storage of electricity in batteries (or indirectly via heat pumps in boilers, for example) has already been technically developed and can be used to absorb short-term fluctuations. Energy storage in the form of hydrogen or other synthetic fuels offers an alternative for long-term storage.

As previously mentioned, with regard to pumped hydro, the owner has decided to expand the existing largest pumped hydro storage plant Coo by 2024. This will increase the energy storage with 425MWh and the power output with 84MW.

### Flemish region

### Encouraging energy storage through an incentive

Flemish authorities are encouraging the Flemish market for energy storage and management systems by supporting investments in electricity storage through a purchase incentive. Such energy storage systems will help to ensure system stability during peaks in demand and generation. They form a temporary alternative to additional investments in the system.

### Establishing a regulatory framework for energy storage

A regulatory framework for energy storage will be developed in order to increase storage capacity. The new style of electricity market requires energy services such as storage to be market-based and competitive. For that reason, Flemish authorities will not allow system operators to own, develop, manage or operate energy storage installations. In addition, the Flemish authorities will study the role of energy storage within districts, and any obstacles to this, and will adopt support measures or initiatives if need be. This framework will be closely linked with the regulatory frameworks for flexibility, which are yet to be developed, and with the local energy communities that are currently being developed as a result of the transposition of the European Directive on electricity and renewable energy, within which energy storage (at district level) may role an important role.

### Demonstration projects for energy storage and power-to-x

Electricity can be stored in the short term in batteries; however, for longer-term energy storage, hydrogen or other synthetic fuels offer an alternative. Developing such storage on a larger scale takes time and the infrastructure and investments needed are significant, meaning that lead times of three to seven years are not unusual. In order to have reliable storage technology available from 2023, experience needs to be gained quickly in this respect. The Flemish authorities are therefore going to launch new pilot and demonstration projects for energy storage and power-to-x, and will develop synergies between the various systems (gas and electricity), energy sectors and other sectors (sectoral coupling or integration). The aim will be to learn everything needed in order to develop a power-to-x policy and integrate it within the Flemish context. Energy storage capacity in Flanders will also be increased.

## 4.7.3. Energy efficiency

### Flemish region

The Flemish Energy and Climate plan (VEKP) was approved in December 2019. The plan puts forward the key energy and climate ambitions of the Flemish government for the period 2021-2030:

- Energy efficiency: 84,062 TWh of cumulative energy savings between 2021-2030 as contribution to the national energy savings obligation (article 7 of the Energy Efficiency Directive) and an estimated final energy use target of **275.240 GWh** (article 3 of the EED).

### Walloon region

The energy efficiency strategy of Wallonia is aligned on the Energy Efficiency pillar of the European Energy-Climate frame and is contributing to the Belgian commitment in this respect. Wallonia

contributes to the national Energy Efficiency Plan according to Energy Efficiency Directive 201/27/EU, and reports annually, including progress towards energy sales reduction (art.7) obligation.

The ESD 2006/32 Directive requested an annual reduction of final energy consumption by 1%. The EE 2012/27 directive introduced an additional final energy target corresponding to a 0.8% yearly reduction of the energy sales from 2014 onwards to 2020.

For 2030, the Walloon specific targets and milestones are -23% of final Walloon energy consumption vs 2005 & -36% of Walloon primary energy consumption vs 2005.

For 2050, the energy consumption must be reduced by 50% compared to 2005. Every sector has to cooperate:

a) for Industry, aside the improvement of intrinsic energy efficiency, decarbonation of industrial processes, sector coupling and circular economy will be developed.
b) for buildings, the targets are
    - for residential: the PEB A label (Espec ≤ 85kWh / m²year) on average for the entire housing stock;
    - for the tertiary sector: an energy-neutral (zero energy) tertiary building stock for heating, domestic hot water, cooling and lighting.
c) for transport, three axes will guide the efforts:
    - rationalise and reduce mobility and transport needs by a better layout of the territory and by encouraging local production of goods, circular economy, and shortening supply chains
    - shift towards means of mobility consuming less energy and emitting less CO2 like public transport, car sharing, electric bikes and encourage modal shift for freight
    - improve the transport modes for the energy efficiency point of view and by using zero CO2 emission fuels like renewable electricity, green hydrogen, biofuels, e-fuels and even ammonia for maritime transport.
d) for agriculture and forestry: the carbon sink of forestry will be enhanced, and smart farming will be developed.
e) regarding energy efficiency:
    - Overarching EE target: -23% of final Walloon energy consumption vs 2005 & -36% of Walloon primary energy consumption vs 2005
    - buildings: The reinforcement of the EPBD regulation, and the Long Term Renovation Strategy of Buildings - Energy Performance Contracting - public building exemplarity– energetic independence for new buildings (QZEN)– behavioural changes;
    - transport : Regional Mobility Strategy for passengers and fret, implementing the Fast vision (Avoid – shift – improve)[27][28];
    - industry: European ETS scheme - Financial support to companies in their decarbonation transition - new generation of Voluntary Agreements - mandatory measures like the audit obligation

The Walloon Energy and Climate plan as approved by the Government and included in the Belgian National Energy and Climate plan of December 2019 resumes the regional engagement in the Belgian Contribution to the Energy Union Frame 2030.

## 4.8. Reliability standard

Under the current Electricity Act, a two-part loss of load expectation (LOLE) criterion was described as the reliability standard, i.e. the level of security of supply that needs to be achieved for Belgium:

- LOLE: A statistical calculation used as a basis for determining the anticipated number of hours during which, taking into account interconnectors, the generation resources available to the Belgian electricity grid will be unable to cover the load for a statistically normal year. (art.2, 52° Electricity Act)

[27] http://mobilite.wallonie.be/files/eDocsMobilite/politiques%20de%20mobilit%c3%a9/SRM_PERSONNES_2019.pdf

[28] http://mobilite.wallonie.be/files/politiques-mobilite/SRM-marchandises-2020.pdf

- LOLE95: A statistical calculation used as a basis for determining the anticipated number of hours during which, taking into account interconnectors, the generation resources available to the Belgian electricity grid will be unable to cover the load for a statistically abnormal year. (art.2, 53° Electricity)

This double criterion will not be used anymore and will be replaced by a new reliability standard as required in the European and national legal framework.

According to the Article 25 of the Regulation 2019/943, when applying capacity mechanisms Member States shall have a reliability standard in place. A reliability standard shall indicate the necessary level of security of supply of the Member State in a transparent manner. The reliability standard shall be set by the Member State or by a competent authority designated by the Member State, following a proposal by the regulatory authority. The reliability standard shall be based on the methodology set out in Article 23(6). The reliability standard shall be calculated using at least the value of lost load and the cost of new entry over a given timeframe and shall be expressed as 'expected energy not served' and 'loss of load expectation'.

According to the new Article 7undecies §7 of the Belgian Electricity Act, the DG Energy of the FPS Economy, in collaboration with the Federal Planning Bureau and the Commission, is designated as the competent authority to draw up the single estimate of the value of lost load, referred to in Article 11 of Regulation 2019/943, and, for the first time, within six months of the publication of ACER's methodologies, referred to in Article 23, paragraph 6. Each single estimate, drawn up by the DG Energy of the FPS Economy, is deliberated in the Council of Ministers and approved by a royal decree. The DG Energy of the FPS Economy is designated as the competent authority to determine the cost of a new entrant, referred to in Article 23, paragraph 6, of Regulation 2019/943. The cost of a new entrant is deliberated in the Council of Ministers and approved by a royal decree. The Commission is the competent authority to establish a proposal for the reliability standard based on the method referred to in Article 23(6) of Regulation 2019/943. Both Elia and DG Energy of the FPS Economy have to submit an advice on this proposal. The reliability standard is deliberated in the Council of Ministers and approved by a royal decree.

The DG Energy of the FPS Economy estimates the Belgian VoLL at 17,340 €/MWh, which is the upper limit of the calculated interval [13,350;17,340] €/MWh.

The costs of new entry per reference technologies as calculated by the DG Energy of the FPS Economy are shown in the table below:

| Reference technology | $CONE_{fixed,RT}$ - [€/kW/y] | $CONE_{var,RT}$ - [€/MWh] |
|---|---|---|
| Demand Response | 45 | 736,73 |
| Open cycle gas turbine | 67 | 80 |
| Internal combustion | 79 | 180,4 |
| Combine cycle gas turbine | 97 | 49,8 |
| CHP | 152 | 53,1 |
| Battery storage | 223 | #N/A |
| Photovoltaics (PV) | 2206 | 0,0 |
| Wind offshore | 2404 | 0,0 |
| Wind onshore | 2721 | 0,0 |

By applying the VoLL and CONE values as calculated by the competent authorities, the reliability standard suggested by CREG is equal to:

$$2h43\ \text{min} = \frac{45.000\ €/MW/y}{17.340€/MWh\ - 736.73€/MWh}$$

Both Elia and the DG Energy of the FPS Economy agree on this value. Nevertheless, in their advice, they recommend to the Minister to round this value to a LOLE of 3h. First, a LOLE of 3h will ensure consistency with previous and next national and European adequacy studies. Second, in the absence of harmonized standards at the European level, it was customary for reliability standards to be expressed in rounded hours in each country. It is reasonable to expect that the application of ACER methodologies will lead to the same phenomenon in the future. Finally, given the non-marginal capacity shortfall that Belgium will face, it is reasonable to assume that the solution to this shortfall will involve an energy mix and not a single reference technology. Opting for a LOLE of 3h is equivalent to considering a LOLE between the $LOLE_{DSR}$ (2h43min) and the $LOLE_{OCGT}$ (3h53min without taking into account the negative dC/dQ factor).

On 11th June 2021, the Council of Ministers has principally adopted a reliability standard of 3h. The Council of State is currently assessing the legal text. The new reliability standard should enter into force on 15th September 2021.

# 5. Conclusion

The explained measures to eliminate any identified regulatory distortions or market failures and to alleviate resource adequacy concerns in Belgium are ongoing.

As shown in Elia's latest Adequacy and Flexibility study, to cope with the nuclear phase-out by 2025, 2 GW of additional capacity (assuming 100% availability) is predicted to be required in the EU-BASE scenario[29] and the need for a supporting mechanism, such as the Capacity Remuneration Mechanism (CRM) is therefore clear.

In accordance with Article 21 of Regulation 2019/943, to eliminate residual resource adequacy concerns Belgium intends to introduce a capacity mechanism. The development of this mechanism and its legal framework are currently under process in State Aid case SA. 54915.

[29] Several sensitivities have been studied and show a need for new capacity from 2025.