Do current regulatory frameworks in the EU support innovation and security of supply in electricity and gas infrastructure?

Country Report - Belgium

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The electricity NRF in Belgium

The Belgian electricity transmission lines are operated by a single transmission system operator ("**TSO**"), Elia System Operator SA/NV ("**Elia**"). The primary duties of the CREG ("**NRA**") encompass advising the federal government on the organisation and operation of the electricity market, the proposition of a grid code and the establishment of a tariff methodology. The development of the transmission network is one of the TSO's main tasks. The CREG advises on the investment plan which then be approved by the Minister of Energy. The TSO is responsible for the actual implementation of the development plan. The electricity transmission methodology is a cost-plus model combined with some incentives and favourable provisions related to specific projects with a regulatory period of four years.

The TSO's tasks encompass the contribution to security of supply and playing a role in the capacity mechanism. The NRA and the Ministry of Energy also have specific duties regarding security of supply. Moreover, the CREG's tariff methodology has to incentivize the TSO to ensure the security of supply.

There is no specific duty aimed at encouraging innovation in Belgium. The statutory requirement that the CREG's tariff methodology must incentivise the TSO to ensure security of supply, however, whilst not referring to innovation *per se*, allows the tariff methodology to contain more favourable provisions in order to incentivize investments.

The regulatory practice in the electricity sector in Belgium

Only a bias in favour of CAPEX solutions in contrast to OPEX solutions has been identified as a barrier for investments in innovative or security of supply projects.

Whereas the Belgian NRF does not directly incentivise innovation, there are provisions, such as extra remuneration for risky projects (which has been so far only applied in case of the Modular Offshore Grid) and the possibility to partly recover costs accrued during the search for R&D subsidies. Also, the NRA is perceived as welcoming towards innovative solutions. Nevertheless, a lack of incentives for innovative projects (and R&D projects) has been mentioned. This lack of incentives will also not be directly tacked with the new regulatory framework to be introduced in 2020.

For security of supply, in contrast, the NRF is regarded to be adequate to support projects aimed at increasing security of supply.

Options for improvement

The NRF is well-designed and functional for security of supply and most innovative projects. Yet, stakeholders feel that specific incentives for innovative projects are lacking and that there is a bias in favour of CAPEX solutions. To tackle these issues, the following options could be considered:

(i) Favouring of OPEX-based solutions;
(ii) Statutory obligation to consider alternatives; and
(iii) Statutory reference to innovation.

Assessment of the NRF and the regulatory practice of the gas sector in Belgium

The gas NRF in Belgium

Fluxys Belgium SA/NV is the natural gas transmission system operator ("**TSO**"). The development of the transmission network is one of the TSO's main tasks. The primary duties of the CREG ("**NRA**") of the Belgian federal electricity and gas market include advising the federal government on the organisation and operation of the gas market, proposing a grid code and establishing a tariff methodology and approving the tariff proposals of the TSO. The development of the transmission network is one of the TSO's main tasks. The TSO develops a network plan, the CREG analyses this plan and its compatibility with the Community-wide network development plan. The CREG is responsible for establishing a tariff methodology, which

(*de facto*) applies to a regulatory period of four years (the current methodology applies to the regulatory period 2016-2019).

The TSO's tasks encompass the contribution to security of supply through an adequate transmission capacity (including cross-border capacity) and the reliability of the transmission network. The NRA and the Ministry of Energy also have specific duties regarding security of supply. Moreover, the CREG's tariff methodology has to incentivize the TSO to ensure the security of supply.

There is no specific duty for the TSO encouraging innovation. There is a statutory requirement that the CREG's tariff methodology must incentivize the TSO to implement the research and development necessary for its activities.

The regulatory practice in the gas sector in Belgium

The stakeholders do not see direct barriers in the NRF.

The stakeholders agree that improvements to the European regulatory framework are possible: the framework should account for the decarbonisation of gas, the use of bio-methane, the injection of hydrogen etc.

The share of innovative projects is perceived to not be very high. There are no explicit barriers, but there are also little incentives for innovative projects.

The regulation of security of supply projects is more straightforward than for innovative projects. The NRF is perceived as adequate to support security of supply projects.

Options for improvement

The NRF is well-designed and functional for security of supply and most innovative projects. Yet, stakeholders feel that specific incentives for innovative projects are lacking and that clear targets for decarbonisation and green gasses usage in the (European) regulation for gas should be introduced. Therefore, the following options for improvement could be considered:
(i) Statutory obligation to consider alternatives; and
(ii) Statutory reference to innovation.

1. INTRODUCTION

The present Country Report is a deliverable of the study "Do current regulatory frameworks in the EU support innovation and security of supply in electricity and gas infrastructure?".

The key objective of the study is to analyse how the existing national regulatory frameworks (NRFs) in the EU guide and incentivise the electricity and gas transmission project promoters to undertake investments. The focus of the study is both on investments in new innovative technologies and investments to increase security of supply. The main objective of the study is to map how the regulatory frameworks in the MSs support such investments and how do these frameworks ensure that the necessary investments are made.

This Country Report provides an overview of both the current legal frameworks and their implementation practice related to investments in gas and electricity transmission infrastructure. As part of this analysis, selected specific infrastructure projects in electricity and gas are discussed. Based on this research, options for improvement are formulated, both relating to the implementation practice and to legal changes.

The Country Report is based on previous study deliverables and analysis. It is divided into two main sections, Section 2 which relates to electricity, and Section 3 which relates to gas. Each of these sections examines the legal framework (Section 2.1 for electricity and Section 3.1 for gas), including specific rights and duties of relevant parties, such as TSOs and NRAs (hereafter also referred to as stakeholders), mechanisms for the financing of investment projects and the regulatory rules regarding innovation and security of supply in particular. Having studied the legal regulatory framework, Section 0 for electricity and Section 3.2 for gas examine the regulatory practice in Belgium, drawing specifically on stakeholder interviews, and paying particular attention to the regulatory practice related to innovation and security of supply. The functioning of the legal framework and the regulatory practice are illustrated by selected specific projects in Belgium. Lastly, options for improvement of the regulatory practice and the regulatory framework are discussed in Section 2.3 for electricity and Section 3.3 for gas.

These options for improvement are taken from a long list of best practises that the project team has compiled based on the analysis of regulatory frameworks in all Member States. We acknowledge that we have not carried out a full analysis of all the costs and benefits of the suggested options. Therefore, some of these options are conditional and there might be reasons that we did not take into consideration not to implement them.

The focus of this report is not primarily on R&D investments and projects, but rather on "innovative" transmission infrastructure related investments. In order to define what "innovative" is in the context of this report, we have introduced the notion of "typological investments" (see Annex I and II). The goal of selecting "typological investments", which, in our understanding, are categories of investments, was to make the discussion concrete and the investments comparable across countries. The term "typological investment" relates to technical solutions that TSOs can adopt to provide the transmission capacities needed to cover the transmission demand of grid users.

Thus, a typological investment is meant to be a type of solution that can be implemented, in principle, by any TSO in situations in which these solutions are appropriate to provide the desired benefit. Hence, typological investments are not specific to a concrete location or a particular TSO. Annex I provides a list of typological investments in the electricity sector, whereas Annex II provides the same for gas.

Ultimately, these technical solutions contribute to fulfilling the objective to improve or maintain the level of security of supply. It has to be noted that the degree of innovativeness of typological investments can be quite diverse, ranging from construction of conventional assets like AC overhead lines or pipelines with conventional materials and construction methods down to novel concepts of system automation and operation based on recent R&D achievements. Innovation aims at providing the desired level of transmission capacity – determined by the objectives of security of supply (see above) – in a way that is in some way superior to the conventional way, e.g.:

i. by immediately reducing overall cost as compared to a conventional solution;
ii. by prospectively reducing overall cost in the future, subject however to a "learning curve" as to the cost level of the innovative solution;

iii. by accelerating the process of transmission capacity expansion and thus reducing social welfare loss caused by temporarily insufficient transmission capacities; or
iv. by providing improvements with respect to other criteria that are often difficult to monetarise, like environmental or public acceptance aspects.

Innovative investments, especially those whose benefits fall into category ii., iii. and iv. named above, can face certain barriers and market failures. We have identified five categories of innovative projects, which might encounter potential regulatory barriers (see also Annex III for more explanation):

a. Capital intensive projects resulting in uncertain future OPEX gains (efficiency improvements / cost reductions) are not incentivised by the regulatory framework;
b. Projects with potential significant benefits, which would benefit primarily the wider society and where the concerned TSOs are not incentivised;
c. A roll out and investment in smart grids substituting planned physical investments may provide a reduction in the regulated asset base, but might not be realised due to an increase in tariffs or regulatory disincentives;
d. Projects with few or no commercial benefits to justify the investment, but with positive social impacts;
e. Projects, which result in a lower TSO TOTEX, but bring about a shift in the CAPEX/OPEX ratio, which is not incentivised by the regulatory framework.

Our understanding of innovative investments and typological investments, and the categorisation of investment projects in relation to possible regulatory barriers are the basis for the research done in the context of the analysis of the implementation practice in this report.

2. ELECTRICITY

2.1. Legal analysis of the NRF in Belgium

2.1.1. Overview of the regulatory framework of Belgium– legal rules

The Belgian electricity transmission lines between 30 kV and 380 kV are operated by a single transmission system operator ("**TSO**"), Elia System Operator SA/NV. Belgian federal law allows the TSO to centralize the ownership of the transmission network in a separate subsidiary. This is the case in the field of electricity, where Elia System Operator is the TSO operating the grid and Elia Assets is the owner.

In general, the Federal State is competent for the transmission grid and tariffs, whereas the three Belgian regions (Flanders, Wallonia and Brussels) are competent for the distribution grid and tariffs. The Belgian definition of "transmission", however, does not fully match with the European concept of "transmission". As a consequence, Elia is subject to different legal regimes of transmission network operation (in the European sense of the concept), depending on whether it operates above or under a threshold of 70kV.

At the federal level, the electricity transmission grid encompasses the aerial lines and underground cables above 70kV - onshore or offshore - and their related transmission installations, including the connections to power plants and the interconnections with other (national or foreign) grids[1]. At the regional level, Elia is appointed by each of the three regions to operate the "regional transmission grids", i.e. the electricity facilities from 30 kV up to 70 kV with a transmission function[2].

The principal piece of federal primary legislation is the Federal Electricity Act of 29 April 1999[3]. Elia's tasks are defined in the Federal Electricity Act[4]. Three main categories of tasks can be distinguished:

- operating, maintaining and developing the transmission grid itself (including the offshore grid and interconnections), in order to ensure the security of supply through sufficient capacity;
- ensuring the stability of the grid by managing electricity flows, i.e. balancing demand and supply (including capacity allocation, generation nomination, imbalance management and intervention in the capacity mechanism described below as 'strategic reserve');
- different tasks as facilitator to realise the objective of creating an integrated market (including promoting opportunities for exchanges between Access Responsible Parties (ARPs), interconnection upgrades or objective border capacity allocation mechanisms).

The Federal Electricity Act also lays down the TSO's public service obligations, which include the duty to buy, at a regulated minimum price, the green certificates granted to offshore wind power generation.

Furthermore, the Federal Electricity Act provides the legal basis for the transmission grid tariffs[5].

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1 Art. 2, 7° of the Federal Federal Electricity Act.

2 Art. 4.1.2 of the Flemish Energy Act of 8 May 2009 ("*Decreet van 8 mei 2009 houdende algemene bepalingen betreffende het energiebeleid*"); Art. 3 of the Brussels Federal Electricity Act of 19 July 2001 ("*Ordonnance du 19 juillet 2001 relative à l'organisation du marché de l'électricité en Région de Bruxelles-Capitale*"); Art. 3 and 4 of the Walloon Federal Electricity Act ("*Décret du 12 avril 2001 relatif à l'organisation du marché régional de l'électricité*"). In Brussels and in the Walloon Region, the TSO is appointed by the Regional Government. In the Flemish Region, the TSO is appointed by the regional regulatory authority (VREG).

3 « *Loi du 29 avril 1999 relative à l'organisation du marché de l'électricité* », hereinafter the « Electricity Act ».

4 See art. 8 of the Federal Electricity Act for a general list of the TSO's tasks.

5 Art. 12 of the Federal Electricity Act.

The NRA of the Belgian federal electricity and gas market, the CREG[6], derives its primary duties, objectives and powers from the Federal Electricity Act[7]. Those tasks include:

- advising the federal government on the organisation and operation of the electricity market (e.g. about the degree of transparency and competition on the market, the electricity prices, the security of supply, flexibility of the demand side, cross-border matters etc.);
- proposing a grid code (see below);
- establishing a tariff methodology and approving the tariff proposals of the TSO (see below).

The technical rules regarding the operation of the electricity transmission grid are set out in a grid code (the so-called federal "**Technical Regulation**"). This code contains, amongst others, rules regarding connections and access to the grid, security of supply, evaluation of the available capacity and congestion management. The Technical Regulation is proposed by the CREG but takes the form of a Royal Decree approved by the federal government[8].

The connection to, the use of electricity transmission system and infrastructure and the ancillary services of the TSO are remunerated by the transmission grid tariffs. The CREG is responsible to establish a tariff methodology, which (*de facto*) applies to a regulatory period of four years[9]. The TSO has to file a tariff proposal for the upcoming regulatory period, which is based on the CREG's tariff methodology. The TSO's tariff proposal is subject to the CREG's approval. The electricity transmission methodology is a cost-plus model combined with some incentives. Tariff methodologies for the regulatory period 2016-2019 were approved in December 2014 followed by tariffs at the end of 2015[10]. The tariff methodology for the next regulatory period 2020-2023 was adopted on 28 June 2018[11].

At the latest on 1 March of each year, the TSO provides the CREG with its tariff report about the past year. The (positive or negative) difference between the total income of the TSO approved by the CREG and the realised income according to the TSO's bookkeeping, are subject to regulatory mechanisms (i.e., depending on their nature and the existence of incentives, passed through in future tariffs and/or put at cost or benefit of the TSO).

The main tasks of the operator of the regional transmission grids, as defined in the three **Regional Acts**[12], are similar to those set at federal level for federal transmission. Here also, the duties are set out in further detail in (regional transmission) grid codes[13]. The transmission grid tariffs are a purely federal competence, in which the regional regulators do not intervene.

2.1.2. Specific legal rights and duties

Role of the TSO

The development of the transmission network is one of the TSO's main tasks (as described in Section 2.1.1 above)[14].

In cooperation with the services of the federal Ministry of Energy and the Federal Planning Bureau, the TSO proposes a development plan for the transmission network. The CREG advises on the plan. The plan must subsequently be approved by the Minister of Energy. The development plan covers a period of ten years and must be adapted every four years. The plan contains a detailed estimate of the needs for transmission capacity and determines the

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6 Commission for Electricity and Gas Regulation.
7 Art. 23 of the Federal Electricity Act.
8 Royal Decree of 19 December 2002 / « *Arrêté royal du 19 décembre 2002 établissant un règlement technique pour la gestion du réseau de transport de l'électricité et l'accès à celui-ci* ».
9 Art. 12 of the Federal Electricity Act. The current tariff methodology applies to the regulatory period of 1 January 2016 until 31 December 2019 and can be found here: http://www.creg.be/fr/publications/autres-z141218-cdc-11097b.
10 See www.creg.be.
11 https://www.creg.be/fr/publications/communique-de-presse-pr180628.
12 Art. 4.1.6 of the Flemish Energy Act; art. 5 of the Brussels Electricity Act; art. 11 of the Walloon Electricity Act.
13 See in Flanders: Art. 4.2.1 of the Flemish Energy Act and grid code of 5 May 2015; in Brussels: art. 5 of the Brussels Electricity Act and grid code of 23 May 2014; in Wallonia: art. 11 of the Walloon Electricity Act and grid code of 3 March 2011.
14 See art. 8, 1° of the Federal Electricity Act.

investment program the TSO undertakes to implement[15]. The TSO is then responsible for the actual implementation of the development plan. Building of new infrastructure is made through public tenders appointing contractors.

The TSO is required to undertake investments

The TSO is required to undertake any investment project to deliver on its legal duty, as described in Section 2.1.1, and included in the development plan.

More specifically, the TSO is responsible for (co)developing interconnections, like the pending projects Alegro (BE-DE), Brabo (BE-NE) and NEMO (BE-UK) and, the development of onshore projects like the reinforcement of the onshore grid near seashore to dispatch the offshore production (project Stevin).

Regarding offshore activities: the TSO also has to finance, build and exploit the Modular Offshore Grid (MOG)[16], i.e. a common infrastructure linking different offshore wind farms and connecting them to the onshore grid. The TSO also pays one third of the costs of the individual connection of older wind farms to the onshore grid[17].

Role of NRA

Legally, the CREG only advises on the development plan, which is proposed by the TSO and approved by the Minister of Energy,[18] and has no direct approval competence on the investment projects undertaken by the TSO.

In practice, however, the informal role of the CREG is crucial, through its approval of the grid tariffs.

On 1 March and 15 September of each year, the TSO provides the CREG with a report about the evolution of the investments in its investment plan. The TSO has to explain the reasons for any deviations in timing or costs regarding the biggest projects[19]. The CREG has the right to request intermediary reports of specific projects whenever it deems it necessary.

Institutional or procedural constraints on the performance of these roles

The expropriation process, the process to acquire a declaration of public utility and the planning process can act as procedural constraints. These processes take time. Furthermore, the decision to expropriate and/or the declaration of public utility and the building or integrated permit can be challenged before the Council of State or the Council of Permit Disputes with procedures to suspend and/or annul these decisions. The height of the expropriation allowance can also be contested before a civil court. Such procedures take a lot of time (sometimes a few years) and can significantly slow down the development of new infrastructure.

2.1.3. Mechanism for financing of investment projects

Investments of the TSO in the transmission network are a part of the TSO's total income, which is covered by the grid tariffs. When approving the tariff proposal of the TSO, the CREG analyses the efficiency of the TSO's investment projects[20]. The TSO has to demonstrate the efficiency of its investment projects to the CREG by a cost-benefit analysis[21].

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15 Art. 13 of the Federal Electricity Act.

16 The MOG is a connection of several wind farms to a high-voltage substation located on an offshore platform, which is, in turn, connected to the onshore grid, instead of the individual connection of each wind farm to the onshore grid. See art. 7, §2 of the Federal Electricity Act.

17 Art. 7, §2 of the Federal Electricity Act.

18 Art. 13, § 1 of the Federal Electricity Act. This is not only rubber stamping.

19 I.e. the projects with an investment cost (CAPEX) exceeding 5,000,000 EUR. See art. 42, §1 of the tariff methodology.

20 See Art. 29 of the tariff methodology (http://www.creg.be/sites/default/files/assets/Publications/Others/Z1109-7bFR.pdf).

21 See the Decision of 7 July 2016 from the CREG concerning the methodology and the criteria for the evaluation of investments in electricity and gas infrastructure and the associated bigger risks, p. 16, available at: http://www.creg.be/fr/publications/decision-a160707-cdc-1480.

The grid tariff methodology established by the CREG has to ensure a balanced development of the grid, according to the development plan[22]. In particular, the return of the TSO for investments in the regulated asset base, fixed by the NRA, has to be high enough to ensure the investments required for performing the TSO's tasks[23].

For new electricity transmission infrastructures of national or European interest (including interconnections and offshore infrastructures), the grid tariff methodology approved by the CREG can contain more favourable provisions related to costs and profit margin, in order to incentivize investments[24]. The CREG made use of this possibility for several projects[25].

Relevant categories of financing mechanisms of the TSO

There exists one general financing mechanism for the development of the transmission network in Belgium, i.e. a cost recovery via the grid tariffs.

Some tariffs are recurrent (e.g. the tariffs for developing and managing the grid infrastructure), others are non-recurrent (e.g. the tariff for a study about a new connection to the transmission grid).

There are specific incentives in the tariff methodology to stimulate, amongst others, cost-efficiency[26], market integration and security of supply (see Section 2.1.5) and innovation (see Section 2.1.4))[27].

For extensions of existing electricity transmission infrastructures or new infrastructures of national or European interest (including interconnections and offshore infrastructures), the grid tariff methodology approved by the CREG can contain more favourable provisions related to costs and profit margin, in order to incentivize investments[28].

An example is the specific tariff methodology for the Nemo offshore interconnector. In cooperation with the British NRA Ofgem, the CREG adopted a specific tariff methodology for the offshore interconnector "Nemo" between the UK and Belgium[29]. During the first 25 years after the commissioning of the interconnector, the cost recovery of the Belgian and the British TSOs with regard to the connection to and the use of this interconnector, must fluctuate between a "cap" and a "floor", i.e. the cost recovery cannot exceed the cap, nor can it be lower than the floor[30].

Other interconnections projects financed by the grid tariffs are Alegro (BE-DE) and Brabo (BE-NE). Domestic projects include Stevin (reinforcement of the onshore grid near seashore to dispatch the offshore production) and MOG (joint offshore infrastructure connecting offshore wind farms to the onshore grid. The MOG will also be subject to specific tariff provisions (that are currently under development). The full list of investment projects under special incentive tariff regime can be found in Annex 4 of the current tariff methodology.

2.1.4. Regulatory rules with respect to innovation

Specific duties of the TSO aimed at encouraging innovation

To our best knowledge, there is no specific duty aimed at encouraging innovation.

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22 Art. 12, §5, 4° of the Federal Electricity Act.
23 Art. 12, §5, 9°, of the Federal Electricity Act.
24 Art. 12, §5, 22°, of the Federal Electricity Act. See the list of projects and incentive in Annex 4 of the tariff methodology, as well as the decision of 26 November 2015, available at: http://www.creg.info/pdf/Divers/Z1109-9FR.pdf.
25 http://www.creg.info/pdf/Divers/Z1109-9FR.pdf.
26 Art. 20-22 of the tariff methodology for electricity of 18 December 2014.
27 Art. 24 of the tariff methodology for electricity of 18 December 2014.
28 Art. 12, para. 5, 22° of the Federal Electricity Act. The CREG made use of this possibility for new power transmission infrastructures of national or European interest, through a decision of 26 November 2015 (http://www.creg.info/pdf/Divers/Z1109-9FR.pdf).
29 Decision of the CREG of 21 December 2017, available at: http://www.creg.be/fr/publications/autres-z16541.
30 See Annex III to the tariff methodology for electricity of 18 December 2014. The details are explained in the Decision of the CREG of 21 December 2017.

Specific duties of the NRA aimed at encouraging innovation

The tariff methodology to be established by the CREG has to incentivize the TSO to implement the research and development necessary for its activities[31].

This methodology indeed provides financial incentives to stimulate research and development projects undertaken by the TSO[32]. The TSO can partially recover the costs incurred to obtain the necessary subsidies to finance such projects, from the users of the transmission grid, with a cap of (i) 50% of the total of the subsidies received in that year and (ii) a maximum of 1,000,000.00 EUR per year.

2.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

One of the main tasks of the TSO is to contribute to the security of supply through an adequate transmission capacity and the reliability of the transmission network[33].

Additionally, the TSO has a major role to play in the capacity remuneration mechanism called "strategic reserve"[34]. The TSO also has to carry out an analysis concerning the security of supply for the coming winter period, at the latest on 15 November of each year[35]. On the basis of this analysis, the services of the federal Ministry of Energy advises the Minister of Energy on the necessity to provide a strategic reserve for the coming winter period[36].

Specific duties of the NRA with respect to security of supply

The CREG has the duty to monitor the security of supply and to signal any problems and make recommendations to the federal government[37].

The services of the federal Ministry of Energy, in cooperation with the Federal Planning Bureau and in consultation with the CREG, draft a prospective study concerning the security of supply. This study covers ten years and is adapted four years after the publication of the previous study and, if necessary, updated every two years. The TSO and the National Bank of Belgium are also consulted. Every year, the services of the federal Ministry of Energy draft an additional report about the monitoring of the security of supply, in cooperation with the Federal Planning Bureau and in consultation with the CREG, with an overview of the results of the monitoring and the measures that have been taken or are being considered[38]. When analysing the investment plan proposed by the TSO, the CREG takes into account the results of this prospective study[39].

The tariff methodology to be established by the CREG has to incentivize the TSO to ensure the security of supply[40].

This methodology indeed provides financial incentives to stimulate market integration and the security of supply[41]. The TSO is stimulated to further market integration through three different incentives[42]:

(iii) part of the return of certain of its financial participations (dividends, realised added value);
(iv) an amount awarded for the measured increase of the available interconnection capacity in the Belgian control area;

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31 Art. 12, §5, 20° of the Federal Electricity Act.
32 Art. 26 of the tariff methodology for electricity of 18 December 2014.
33 Art. 8, 3° of the Federal Electricity Act.
34 This regime has been approved on state aid level by the European Commission on 7 February 2018 (case SA.48648). The regime is thoroughly described in the document C(2018) 589 final).
35 Art. 7*bis* of the Federal Electricity Act.
36 Art. 7*ter* of the Federal Electricity Act.
37 Art. 23, §2, 18° of the Federal Electricity Act.
38 Art. 3, §1 of the Federal Electricity Act. This supplementary report is also communicated to the European Commission.
39 Art. 23, §3, 5° of the Federal Electricity Act.
40 Art. 12, §5, 20° of the Federal Electricity Act.
41 Art. 23, § 1, 1° of the tariff methodology for electricity of 18 December 2014.
42 Art. 24 of the tariff methodology for electricity of 18 December 2014.

(v) an amount awarded for the measured increase of total welfare[43] in both Belgium (for 67 %) and the complete Central West European zone (for 33 %).

2.2. Regulatory practice

2.2.1. Overview over regulatory practice in Belgium

Main regulatory barriers

The opinions about the severity of regulatory barriers differ widely between the TSO and the NRA. Their opinion differ on whether there is a large financial risk for the TSO as soon as a project is approved. On the one hand, there is an extra remuneration for risky projects, such as for offshore wind. Also, CBA's are included in the investment plan. On the other hand, it is said that projects with a higher risk are sometimes not implemented, as the regulatory framework does not account for the extra risk that the TSO must cover in such a project.

Offshore projects are an example of such risky projects due to the unstable conditions and less experience in offshore projects than onshore projects: investments have slowed down in that area due to the extra risk. However, the regulatory framework allows for coverage of exceptional costs through a risk premium on the return on equity. This provision was used for the first time for an offshore project.

2.2.2. Regulatory practice related to innovation

Innovative projects

According to the stakeholders, innovation is employed whenever it benefits the society. It is, however, hard to provide a share or number regarding how many projects can be considered innovative.

Examples of innovative projects comprise HNS technologies, HDVC subsea lines[44] (NEMO project), the corridor project (LIGHT project) and the Modular offshore grid. Moreover most of the typological investment examples in Annex I have already been implemented, including replacing conventional lines with high temperature lines and dynamic line rating to monitor the temperature of the line. System automation or auxiliary service provisions have not been implemented yet, but there is interest in these topics as well. Innovative PCI projects, which have been implemented, are Alegro and Brabo. The first is financed by subsidies from the Belgian government for innovation, the second has innovative phase shifters and line reinforcement.

Given the regulatory changes planned for 2020, possible future R&D projects could encompass energy storage, market flexibility, demand response and the usage of block chain for digital communication.

Adequacy of the NRF relating to its support for innovative investments

The stakeholders' opinions differ regarding the adequacy of the NRF in supporting innovative investments. Some stakeholders find the regulatory framework to be supportive of innovative investments. The innovative projects are approved in the ten-year investment plan. The NRA does not approve the plan, it only checks whether a project is cost efficient. The NRA believes that cost-efficiency encourages innovation. There is also a specific incentive to innovation: the costs of applying for a subsidy are covered if the project receives the subsidy. Moreover, there is an extra remuneration for risky projects, which, so far, has only been used for the modular offshore wind project in Belgium.

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[43] The increase in total welfare is measured as the sum of the consumer surplus, the producer surplus and the return on the sale of interconnection capacity.

[44] Regarding the subsea lines, there is some disagreement between stakeholders as to whether they are indeed innovative. Whereas some stakeholders consider subsea innovative, other remark that subsea cables are business as usual in countries like Greece. Yet, in Belgium, subsea cables have never been implemented before, so they could be considered somewhat innovative for Belgium.

Some stakeholders do not believe that the current framework provides enough incentives to invest in or investigate innovative solutions. Nevertheless, despite the perceived lack of incentives for innovation, the NRA is seen to be welcoming towards innovative projects if they provide social benefits.

In Belgium, talks for the next regulatory framework (2020 onwards) have been finished recently, it is currently in the process of public consultation[45]. The proposed regulatory framework (which is not yet published) does include an incentive for R&D projects but not necessarily incentives for the realisation of innovative projects.

The above-mentioned R&D subsidy incentive will be replaced by two incentives:

- Incentive for capital subsidies for innovative investments;
- The TSO can partially recover the costs incurred to obtain the necessary subsidies to finance such projects, from the users of the transmission grid, with a cap;
- R&D projects which are not part of specific subsidies. In the year before the new regulatory period starts, an R&D plan for 4 years is developed and sent for approval to the NRA. It should entail a description of the considered R&D projects with the expected results, planning and budget estimates. The plan can be adjusted yearly. Each year of the regulatory period, the TSOs obtain a percentage of the (costs, which have been made to realise the R&D plan. This is meant as an incentive to indeed do the R&D activities foreseen.

The hope is that the incentives will counterweigh the current efficiency incentive regarding OPEX costs by creating an incentive to spend money that the TSO would otherwise be tempted to save. Under this new framework, pilot projects as well as large projects would be possible.

2.2.3. Regulatory practice related to security of supply

Security of supply projects

In principle every project seems to have an impact on security of supply.

In Belgium, continuity of supply (reliability and resilience) is the responsibility of the TSO, whereas security of supply is the responsibility of the Ministry.

Typical security of supply projects include the interconnection with Luxemburg, France and the Netherlands, the NEMO project with UK and an interconnection project with Germany.

Adequacy of the NRF relating to its support for security of supply investments

The stakeholders think that the regulatory framework is adequate to support the reliability/continuity of supply.

2.2.4. Illustrative specific projects

The projects below are considered successful innovation projects; however they can also be considered security of supply projects. The projects illustrate how the current regulatory framework incentivises investments in innovation and security of supply.

Interconnection between Belgium and Germany (Alegro)

Description and aim

Alegro is the first interconnection between Belgium and Germany. Elia and the German Transmission System Operator Amprion (Germany) have decided to lay a direct link between their transmission systems. The particularity of this project is that it will use direct-current technology and its whole route will be laid underground. Moreover, Alegro has been accepted as a PCI.

The aims of the projects are to boost the import and export capacity between the two countries, to reduce the risk of any imbalance between the available generation capacity and consumer

[45] https://www.creg.be/nl/openbare-raadplegingen/tariefmethodologie-2020-2023-elia-system-operator.

demand thereby enhancing security of supply. Additional objectives are the enablement of renewable energy and opening up the electricity market to more competition.
The construction period started in 2018 and the works are expected to take around two years to complete, from constructing the converter stations to laying cables along the entire route. The commercial operation of the interconnection is anticipated to start in 2020.

Approval process

The approval process was as expected. project was approved as part of the Federal Development Plan. Construction is ongoing.

As for any project, cost scrutiny by the regulator take place during execution of the project and ex-post with a decision every year from the regulator on costs to be covered by the tariffs.

Financial mechanisms

The European Commission is supporting the project with funds from the TEN-E programme.

High-voltage shore connection and security of supply for the port of Antwerp and Belgium as a whole (Brabo)

Description and aim

The Brabo project will shore up the high-voltage grid and will consolidate security of supply for both the port of Antwerp and Belgium as a whole. Phases II and III of the project. It has been given PCI status.

The project consists of three phases:

- Brabo I: the connection Doel-Zandvliet and substation Zandvliet
  The upgrade of the second high-voltage line between Doel and Zandvliet is complete and the line was commissioned on October 25. The additional phase-shifting transformers at Zandvliet were commissioned in November 2015 and June 2016;
- Brabo II: the Zandvliet-Lillo-Liefkenshoek connection
  The existing 150-kV HV line is being upgraded to a 380 kV connection on the right bank of the River Scheldt in the Antwerp district of Berendrecht-Zandvliet-Lillo and the municipality of Stabroek. This connection will cross the River Scheldt to Beveren on the left bank, where it will be connected to the existing 380 kV connection (Doel-Mercator);
- Brabo III: the Liefkenshoek – Mercator connection
  From Liefkenshoek, the existing 150 kV connection will be modernised and upgraded to 380 kV. This line runs over a distance of 19 km from Liefkenshoek (municipality of Beveren), via the Kallo high-voltage substation (municipality of Beveren) to the Mercator high-voltage substation (municipality of Kruibeke).

The Brabo project is seen as important for the further economic growth of the port of Antwerp and as necessary for a secure and sustainable supply of electricity across the country and for Western Europe as a whole. Locally, it will increase supply capacity to cope with growing electricity consumption in the port of Antwerp, increasing security of supply and making the connection of new generation to the grid possible. At a national and international level, it will upgrade the north-south axis of the international European interconnection grid. This will improve international trade opportunities and reduce reliance on Belgian generating facilities.

Approval process

The project was approved as part of the Federal Development Plan. Construction is ongoing.

Financial mechanisms

As for any project, cost scrutiny by the regulator take place during execution of the project and ex-post with a decision every year from the regulator on costs to be covered by the tariffs.

Modular offshore grid (MOG)

Description and aim

The Modular Offshore Grid (MOG) is the first grid project of Elia at sea and the first of its kind in Belgium. The MOG will group and connect the offshore produced energy of four new wind farms (Rentel, Seastar, Mermaid and Northwester 2), so that it can be injected in the Belgian onshore

grid via fewer sea cables. It consists of an Offshore Switchyard Platform (OSY), the transmissions systems on the Rentel platform and three submarine connecting the platforms with the Stevin 380kV-substation in Zeebrugge.

The MOG is supposed to be fully operational mid-2020.

Approval process

The approval process was very long due to a lack of legal basis in Belgian law.

Financial mechanisms

The project has benefitted from an extra remuneration for risky projects, which, so far, has only been used for this project.

Possible improvement to the (approval) process for such projects

The creation of a suitable legal and regulatory framework for such kinds of projects would improve the approval process.

Improving the link between UK and European electricity generation (NEMO)

Description and aim

Nemo Link® is the name of a project to lay high voltage electricity cables under the sea, improving the link between UK and European electricity generation with consumers in the UK and across the continent. It is a joint project between National Grid Interconnector Holdings Limited, a subsidiary company of the UK's National Grid Plc, and the Belgian Elia group. The aim of the project is to give both countries improved reliability and access to electricity and sustainable generation. The projects has been given PCI status.

Nemo Link® will consist of subsea and underground cables connected to a converter station and an electricity substation in each country, which will allow electricity to flow in either direction between the two countries. The site for the converter station and electricity substation in the UK is an 8 hectare site, formerly occupied by the Richborough Power Station, which now forms part of the Richborough Energy Park proposals. A similar converter station and substation will be built in the industry zone Herdersbrug in Bruges, Belgium.

Approval process

The approval process was as expected.

Financial mechanisms

This project can potentially receive financial support from the CEF.

However, generally speaking, given eligibility criteria, it is not easy for a regulated company such as Elia to get funding for works. Applications usually concern financing for studies.

2.3. Options for improvement

2.3.1. Options to improve regulatory practice

The above discussion shows that the NRF is well designed and functional for security of supply and most innovative projects, if they provide a benefit for society. Yet, after consulting stakeholders and analysing the NRF, it is deemed that specific incentives for innovative projects are lacking and that there is a bias in favour of CAPEX solutions.

(i) Favouring of OPEX-based solutions

Belgium does not have a TOTEX regulation and the stakeholders were concerned about a bias in favour of CAPEX solutions. Without changing to a TOTEX regulation, specific incentives for OPEX-based solutions, which have been identified as advantageous or necessary, could be introduced. In the new 2020 regulatory framework, there are plans to introduce provisions remunerating certain R&D related operational expenditure. Another possibility would be the introduction of a specific budget, e.g. for IT-technology.

(ii) Statutory obligation to consider alternatives

A more general approach would be the introduction of an obligation to consider OPEX-related innovative options in the network development plan. The TSO would then have to provide OPEX-based options as alternatives to (CAPEX) projects outlined in the network development plan. This approach necessitates that a framework is developed determining when OPEX-based solutions should be favoured over CAPEX-based solutions.

(iii) Statutory reference to innovation

There is no long-term perspective on innovative investment. The measures so far, such as the monetary rewards given for MOG project, and the partial recovery of costs accrued in the successful search for R&D project subsidies, are not perceived to be sufficient. A long-term strategic perspective can only be developed if the regulatory framework contains an explicit reference to innovation. This long-term strategic perspective could shaped by governmental policies, statutory duties or could be included in the NDP.

2.3.2. National law mechanism(s) for implementing options

We consider that, with the exception of the following, the above-mentioned changes could be implemented using legal powers already available to the NRA or others under the existing NRF.

As regards option (ii) (statutory obligation to consider alternatives), we understand that the legal mechanism for implementing this option would involve the modification of the Federal Electricity Act[46] through the "Belgian Legislative Process".

Note: the Belgian Legislative Process has the following meaning for the purpose of this paper:

"The process whereby a bill amending the Federal Act is introduced and voted in the Chamber of Representatives (i.e. the Lower House of the Federal Parliament) only. The Senate (i.e. the Upper House) has no role with regard to this type of legislation. Such a bill can be drafted by either the Federal Government (on the initiative of the Federal Minister of Energy in case of energy matters), or by one or more Members of the Chamber of Representatives.

In case of a bill proposed by the Government, the administration and cabinet of the Minister of Energy prepare a draft bill, which is subsequently discussed and approved by the Council of Ministers. After approval, the draft bill is sent to the Council of State, section Legislation, for advice. This advice can lead to modifications and possibly a new advice of the Council of State on the amended draft bill, the bill is introduced in the Chamber of Representatives.

In case of a bill proposed by one or more Members of the Chamber of Representatives, the draft bill is not automatically sent to the Council of State for advice (only at the initiative of the President of the Chamber of Representatives, when one third of the Members or the majority of a language group requests this).

A parliamentary committee specialised in the subject discusses the bill. Amendments to the text can be made by the members of the committee and/or the Government. After the discussion and vote in the parliamentary committee, the bill is sent to the plenary session of the Chamber of Representatives. In plenary session, the text can be amended again and voted upon. Once the bill is passed in the Chamber of Representatives, it is signed by the King and the Minister of Energy (who is the responsible minister in this case) and sent to the Belgian State Gazette for publication."

Turning to option (iii) (statutory reference to innovation), we expect that this could be implemented by including such a reference in the Federal Electricity Act through the Belgian Legislative Process.

2.3.3. Impact assessment

We have not encountered any specific examples of projects that have been cancelled due to the regulatory framework. For this reason, we do not expect that any of the suggested changes will result in considerable changes to investment levels. Yet, if a long-term strategic perspective on innovation could be attained, the share of innovative projects could increase.

[46] For instance art. 13 of the Federal Electricity Act.

3. GAS

3.1. Legal analysis of the NRF in Belgium

3.1.1. Overview of the regulatory framework of Belgium– legal rules

The principal piece of primary legislation is the Federal Gas Act of 12 April 1965[47]. The Federal Gas Act creates a legal monopoly for the operation of the natural gas transmission grid[48]. It provides that the TSO has to be certified before its designation[49], but that the existing TSO at the time of the implementation of the Third Energy Package is deemed to be certified. Fluxys Belgium SA/NV[50] was already appointed by the Federal Minister for Energy as natural gas transmission system operator[51], but was certified by the CREG in 2012 anyway[52].

The Federal Gas Act defines the main tasks of the TSO[53], as a direct implementation of art. 13 of Directive 2009/73/EC, including:

- operating, maintaining and developing the transmission grid in a safe, reliable and efficient way at an acceptable cost;
- organising a secondary market capacity on which flexibility can be freely negotiated by the grid users or by the TSO[54];
- balancing the gas system and being in charge of the construction of sufficient cross-border capacities taking into account the security of supply in natural gas[55]; and
- in the case of access refusal due to a lack of capacity or lack of connections, carrying out the required grid improvements (when economically justified or when the client agrees to finance them)[56].

Furthermore, the Federal Gas Act provides the legal basis for the grid tariffs[57].

The NRA of the Belgian federal electricity and gas market, the CREG[58], derives its primary duties, objectives and powers from the Federal Gas Act (as well as from the Federal Electricity Act)[59]. These tasks include:

- advising the federal government on the organisation and operation of the gas market (e.g. about the degree of transparency and competition on the market, the gas prices, cross-border matters etc.);
- proposing a grid code (see below);
- establishing a tariff methodology and approving the tariff proposals of the TSO (see below).

The technical rules regarding the operation of the natural gas transmission grid are set out in a grid code (known as the **"Code of conduct"**). This code contains, amongst others, rules regarding connections and access to the grid, security of supply, evaluation of the available capacity and congestion management. The Code of conduct is proposed by the CREG but takes the form of a Royal Decree approved by the federal government[60].

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47 « *Loi du 12 avril 1965 relative au transport de produits gazeux et autres par canalisations* ».

48 Art. 8, §1 of Federal Gas Act. The natural gas transmission grid covers the transmission installations needed for natural gas supply at high pressure, as well as for some other kinds of gas, including biogas. The natural gas storage or LNG facilities are not included in the transmission grid but are also operated under a legal monopoly by the SSO and the LNG-SO.

49 Art. 8, §4*bis* of the Federal Gas Act.

50 Hereinafter « Fluxys ».

51 Hereinafter "TSO".

52 Art. 8 of the Federal Gas Act and decision of the CREG of 27 September 2012.

53 Art. 15/1 of the Federal Gas Act.

54 Art. 15/1, §1, 9°*bis* of the Federal Gas Act; Fluxys participates to the PRISMA platform, the European joint capacity booking platform of major European TSOs (https://platform.prisma-capacity.eu/#/start).

55 Art. 15/1, §3, 1° and 4° of the Federal Gas Act.

56 Art. 15/1, §3, 6° of the Federal Gas Act.

57 Art. 15/5*bis* of the Federal Gas Act.

58 Commission for Electricity and Gas Regulation.

59 Art. 15/14 of the Federal Gas Act.

60 See art. 15/5*undecies* of the Federal Gas Act, implemented by the Royal Decree of 23 December 2010 (« *Arrêté royal du 23 décembre 2010 relatif au code de bonne conduite en matière d'accès aux réseaux de transport de gaz naturel, à l'installation de stockage de gaz naturel et à l'installation de GNL et portant modification de l'arrêté royal du 12 juin 2001 relatif aux conditions générales de fourniture de gaz naturel et aux conditions d'octroi des autorisations de fourniture de gaz naturel* »).

The connection to, the use of the natural gas transmission system and infrastructure and the services of the TSO are remunerated by the grid tariffs. The CREG is responsible for establishing a tariff methodology, which (*de facto*) applies to a regulatory period of four years[61]. The TSO has to file a tariff proposal for the upcoming regulatory period, which is based on the CREG's tariff methodology. The TSO's tariff proposal is subject to the CREG's approval. Tariff methodologies for the regulatory period 2016-2019 were approved in December 2014 followed by tariffs at the end of 2015[62]. The tariff methodology for the next regulatory period 2020-2023 was adopted on 28 June 2018[63].

At the latest on 1 March of each year, the TSO provides the CREG with its tariff report about the past year. The (positive or negative) difference between the total income of the TSO approved by the CREG and the realised income according to the TSO's bookkeeping, are subject to regulatory mechanisms (i.e., depending on their nature and the existence of incentives, passed through in future tariffs and/or put at cost or benefit of the TSO).

3.1.2. Specific legal rights and duties

Role of TSO

The development of the transmission network is one of the TSO's main tasks (as described in Section 3.1.1, above)[64]. The TSO is charge of the construction of sufficient cross-border capacities taking into account the security of supply in natural gas[65].

In case of access refusal due to a lack of capacity or lack of connections, the TSO has to carry out the required grid improvements (when economically justified or when the client agrees to finance them)[66].

Each year, the TSO must send an investment plan for the transmission network to the CREG and the services of the federal Ministry of Energy[67]. The CREG analyses this plan and its compatibility with the Community-wide network development plan[68]. The investment plan covers a period of ten years. The TSO is then responsible for the actual implementation of the investment plan. Building of new infrastructure is made through public tenders appointing contractors.

Undertaking of investments

The TSO is required to undertake any investment project to deliver on its legal duty as described above in (i) and included in the investment plan.

Role of NRA

Legally, the CREG only analyses the investment plan, which is proposed by the TSO, and has no direct approval competence on the investment projects undertaken by the TSO. In practice, however, the informal role of the CREG is crucial, through its approval of the grid tariffs.

On 1 March and 15 September of each year, the TSO provides the CREG with a report about the evolution of the investments in its investment plan. The TSO has to explain the reasons for any deviations in timing or costs regarding the biggest projects[69]. The CREG has the right to request intermediary reports of specific projects whenever it deems it necessary.

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61 Art. 15/5bis of the Federal Gas Act. The current tariff methodology applies to the regulatory period of 1 January 2016 until 31 December 2019 and can be found here: http://www.creg.be/fr/publications/autres-z141218-cdc-11107.

62 See www.creg.be.

63 https://www.creg.be/fr/publications/communique-de-presse-pr180628.

64 See art. 15/1, §1, 1° of the Federal Gas Act.

65 Art. 15/1, §3, 1° and 4° of the Federal Gas Act.

66 Art. 15/1, §3, 6° of the Federal Gas Act.

67 Art. 15/1, §5 of the Federal Gas Act.

68 Mentioned in art. 8, § 3, b) of Regulation (EC) No 715/2009 of 13 July 2009.

69 I.e. the projects with an investment cost (CAPEX) exceeding 5,000,000 EUR. See art. 36 of the tariff methodology.

Institutional or procedural constraints on the performance of these roles

The expropriation process, the process to acquire a declaration of public utility, a transport permit and the planning process can act as procedural constraints. These processes take time. Furthermore, the decision to expropriate and/or the declaration of public utility, the transport permit and the building or integrated permit can be challenged before the Council of State or the Council of Permit Disputes with procedures to suspend and/or annul these decisions. The height of the expropriation allowance can also be contested before a civil court. Such procedures take a lot of time (sometimes a few years) and can significantly slow down the development of new infrastructure.

3.1.3. Mechanism for financing of investment projects

Investments of the TSO in the transmission network are a part of the TSO's total income, which is covered by the grid tariffs. When approving the tariff proposal of the TSO, the CREG analyses the efficiency of the TSO's investment projects[70]. The TSO has to demonstrate the efficiency of its investment projects to the CREG by a cost-benefit analysis[71].

The connection to and the use of an interconnector and the ancillary services of the operator of the interconnector, are as of 1 October 2018 also the object of a tariff methodology established by the CREG[72]. To this end, the CREG consults the operators of the interconnector and the NRA('s) of the other Member State(s) concerned[73].

For new gas transmission infrastructures of national or European interest (including interconnections and offshore infrastructures), the grid tariff methodology approved by the CREG can contain more favourable provisions related to costs and profit margin, in order to incentivize investments[74].

Relevant categories of financing mechanisms of the TSO

There exists one general financing mechanism for the development of the transmission network in Belgium, i.e. a cost recovery via the grid tariffs (see subsection above).

An example of a specific tariff methodology for the connection to and the use of an interconnector and the ancillary services of the operator of the interconnector[75], is the tariff methodology for the interconnector UK (Zeebrugge – Bacton)[76]. This tariff methodology entered into force on 1 January 2018.

3.1.4. Regulatory rules with respect to innovation

Specific duties of the NRA aimed at encouraging innovation

A special provision in the Federal Gas Act implements art. 36 of Directive 2009/73/EC for new major natural gas infrastructures, defined as interconnections, LNG-installations, gas storage infrastructure, as well as the modification of existing infrastructures with major capacity increase or which enable the development of new sources of gas supply[77]. For such infrastructures, derogations from access rules or grid tariffs can be obtained by a Royal Decree, upon advice of the CREG. This possibility is subject to the conditions mentioned in the aforementioned article 36, including the fact that the infrastructure must be owned by an entity separated from its operator. Taking into account the Belgian legal monopoly of the TSO (and the LNG-SO and SSO), this derogation possibility for new infrastructure is rather theoretical.

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70 See Art. 23 of the tariff methodology (http://www.creg.be/sites/default/files/assets/Publications/Others/Z1110-7FR.pdf).

71 See the Decision of 7 July 2016 from the CREG concerning the methodology and the criteria for the evaluation of investments in electricity and gas infrastructure and the associated bigger risks, p. 17, available at: http://www.creg.be/fr/publications/decision-a160707-cdc-1480.

72 Art. 15/5*bis*, §15, first paragraph of the Federal Gas Act.

73 Art. 15/5*bis*, §15, second paragraph of the Federal Gas Act.

74 Art. 15/5*bis*, § 5, 21° of the Federal Gas Act.

75 Art. 15/5*bis*, §15, first paragraph of the Federal Gas Act.

76 Decision of the CREG of 21 December 2017, available at: http://www.creg.be/fr/publications/autres-z16541.

77 Art. 15/5*duodecies* of the Federal Gas Act.

The tariff methodology to be established by the CREG has to incentivize the TSO to implement the research and development necessary for its activities[78].

Specific duties of the TSO at encouraging innovation

To our best knowledge, there is no specific duty aimed at encouraging innovation.

3.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

One of the main tasks of the TSO is to contribute to the security of supply through an adequate transmission capacity (including cross-border capacity) and the reliability of the transmission network[79].

The TSO must have one or more regionally integrated networks, as mentioned in art. 12, §3 of Regulation (EC) No 715/2009 of 13 July 2009[80].

Specific duties of the NRA aiming at safeguarding security of supply

The services of the federal Ministry of Energy, in cooperation with the Federal Planning Bureau and in consultation with the CREG, draft a prospective study concerning the security of the natural gas supply. This study covers ten years and is adapted four years after the publication of the previous study and, if necessary, updated every two years. The TSO, the Storage System Operator (SSO), system operator of LNG infrastructure (LNG-SO) and the National Bank of Belgium are also consulted. Every year, the services of the federal Ministry of Energy draft a supplementary report about the monitoring of the security of supply, in cooperation with the Federal Planning Bureau and in consultation with the CREG, with an overview of the results of the monitoring and the measures that have been taken or are being considered[81]. When analysing the investment plan proposed by the TSO, the CREG takes into account the results of this prospective study[82].

The tariff methodology to be established by the CREG has to incentivize the TSO to ensure the security of supply.

3.2. Regulatory practice

3.2.1. Overview over regulatory practice in Belgium

Main regulatory barriers

The stakeholders do not see direct barriers in the NRF. Once a project is accepted, there is no financial risk for the TSO anymore, according to stakeholders. There are no penalties in case of delays in the planning and execution of projects.

The NRA works with a 'mechanism of open season' for large investments. It verifies if there is market demand for new capacity and whether the addition is useful. A cost-benefit analysis is made. If it is negative, the NRA and the TSO discuss to work out a compromise.

The stakeholders agree that improvements to the European regulatory framework are possible: the framework should account for the decarbonisation of gas, the use of bio-methane, the injection of hydrogen etc.

Regarding the barriers in Annex III, it was acknowledged that there is an incentive to reduce OPEX, especially in investing in innovation reducing OPEX. Yet, it is unclear whether that really has a negative effect on innovation.

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78 Art. 15/5bis, § 5, 19° of the Federal Gas Act.
79 Art. 15/1, §3, 4° of the Federal Gas Act.
80 Art. 15/1, §3, 5° of the Federal Gas Act.
81 Art. 15/13 of the Federal Gas Act. This supplementary report is also communicated to the European Commission.
82 Art. 15/14, §2, 14° of the Federal Gas Act.

Other barriers mentioned were:

- The non-existence of a certificate of origin or a system to certify green or renewable gas;
- No policy action aiming at establishing more favourable connection charges or feed-in-tariffs for renewable gas or hydrogen or a more favourable tax regime.

A barrier related to security of supply is overregulation and the administrative burden from the EU regulation. The NRA has to make multiple plans on both national and regional level. According to some stakeholders, this is unnecessary because in Belgium the markets are functioning properly.

Moreover, the stakeholders express their concern with the recent push on EU level for short-term capacity booking. They foresee it to become an issue in the future, as infrastructure might be in place, which will not be fully booked anymore in the future ("risk of stranded assets"). It might turn into a problem for the European system.

3.2.2. Regulatory practice related to innovation

Innovative projects

The share of really innovative projects is currently not yet very high, according to stakeholders.

Projects related to injecting green gas into the grid and LNG projects, such as CNG, the use of fuel gas for shipping and trucking, are regarded to be innovative. In addition to the typological innovative investments, there is interest to engage in projects in the area of:

(vi) system coupling/power-to-gas;

(vii) new applications for gas and gas usage, i.e. small scale LNG, CNG;

(viii) renewable gas, regarding both production and integration of other types of gas than natural gas into the transmission system. A potential project is to research, from a pure technical point of view, under which conditions hydrogen could be injected and transmitted to a network. This research could inform specific technological / material choices in the future.

Possible other project examples encompass projects affecting mobility, satellite options where LNG or CNG consumers are not directly connected to the network. So innovative projects do not only relate to infrastructure, but to coupling of energy systems, new gases and new utilizations or markets for gas.

Example projects encompass:

- Investment in the development of a new type of heating installation (very high efficiency gas heat pumps), promoted by the Fluxys group (not a TSO regulated activity) to stimulate efficient use of gas (Fluxys TSO currently has no incentive to participate in such a project);
- Promotion of the installation of a LNG truck filling station (also not promoted by the TSO itself, but by Fluxys group);
- Investment and development of services for small scale LNG to stimulate the use of LNG (by the LNG operator as a regulated investment covered by the normal regulation).[83]

Regarding LNG, it can be noted that there is a special provision in the national gas law (article 15/5bis, § 5, 21°, of gas law) regarding "new major natural gas infrastructures, defined as interconnections, LNG installations, gas storage infrastructure as well as the modification of existing infrastructure with major capacity increase or which enable the development of new sources of gas supply, for which some derogation from access rules or grid tariffs can be obtained by a Royal Decree". This has been used to enable the offering of long term (20y) stable tariffs to the LNG terminal users at the LNG terminal in Zeebrugge (which is fully regulated).

[83] The Fluxys group is interested in developing assets for filling stations for ships elsewhere (not linked to the LNG re-gas terminal), which could be a non-regulated activity. Fluxys would focus on assets and would not be involved in buying and selling LNG.

Despite the current lack of innovation incentives, there are positive developments for the next regulatory period, starting in 2020: the regulator issued a new tariff methodology that foresees new incentives for the TSO. Indeed, the new regime would not only include an incentive on cost efficiency, but also some other type of incentives, some of them stimulating innovation. For example, there would be financial incentives for the TSO to:

- connect to its network bio-methane production units, Power to gas installations and CNG satellite compression stations;
- reduce its methane emissions; and
- increase efficiency of its gas heaters installations.

Adequacy of the NRF relating to its support for innovative investments

There are no explicit barriers, but there are also little incentives for innovative projects. In general, costs for investments need to be reasonable, proportionate and efficient within the regulatory framework. Through cost efficiency incentives, the TSO has hence an incentive to invest in technologies, which are cost-efficient, which optimize operations.

Moreover, there are no clear targets for decarbonisation and green gasses usage in the European regulation for gas, so the regulatory frameworks in the EU and in Belgium do not support the injection of green gases. This could be changed by improving and harmonizing European level regulation, which would help to solve the chicken-and-egg problem of these new technologies by allowing the TSOs to become involved.

The current regulation is, however, favourable regarding LNG.

The new regulatory regime (from 2020 onwards) is thought to provide more incentives for innovation than the current regime.

3.2.3. Regulatory practice related to security of supply

Security of supply projects

The Ministry is responsible for security of supply. The ministry has created an emergency plan and an action plan for security of supply. If there is a request for investments by the ministry, the TSO is obligated to make the investments and the regulator will accept the investments in the investment plan. These investments are made in close cooperation with all stakeholders in a coordinated manner. In Belgium, they are at 100% security of supply and the pipelines have the possibility of reverse flow.

Many projects undertaken have an added value on the level of security of supply (i.e. mainly concerning flexibility).

Security of supply projects encompass L gas-H gas conversion and projects related to the improvement of redundancies.

Adequacy of the NRF relating to its support for security of supply investments

The regulation of security of supply projects is more straightforward than in case of innovative projects. The TSO is supposed to ensure the resilience of the system, ensure its flexibility, market functioning, and ensure the security of gas supply. The NRF is perceived as adequate to support security of supply projects. Projects relating to security of supply are more usual business. Security of supply projects are usually accepted by the NRA as long as they stay reasonable regarding the project costs. Therefore, no amendment is needed regarding security of supply issues.

3.2.4. Illustrative specific projects

The projects describe in this section are considered innovation and security of supply projects. The first two are considered to be innovative projects, whereas the third project is closer related to security of supply. The projects illustrate how the current NRF incentivises security of supply and innovation investments.

Investment and development of services for a small scale LNG ship station for loading / re-loading to stimulate the use of LNG[84]

Description and aim

In 2017, Fluxys commissioned a second jetty at the Zeebrugge LNG terminal. The development of this project allows for the accommodation of small LNG bunkering vessels, which are in turn able to resupply larger vessels or small bunker terminals. The second jetty further develops the terminal's flexibility in responding to fluctuations in demand or consecutive berthings. The European Union co-financed the project's preparatory studies as well as construction with TEN-E and TEN-T subsidies respectively.

L gas to H gas conversion[85]

Description and aim

In order to cope with the expected decrease in supply of low-calorific gas (L-gas) from the Netherlands, Fluxys has developed a phased project to convert the network from L- gas to high-calorific gas (H-gas). The three stages of this project will take place in 2017-2019, 2020-2024, and 2025-2029, to fully convert the network before 2030, which is when supply of gas from the Netherlands will be phased out completely. The cost of the investment required for the conversion of Fluxys' network is valued at €50 million.

Fluxys will move to file this L/H conversion project as a PCI with the European Union, as it will concern the supply of newly converted H-gas to a broader area in the north-western European market.

Regional supply projects[86]

Description and aim

As part of its 2010-2019 indicative investment program, Fluxys has undertaken several projects to enhance the supply of natural gas along local and regional axes.

In the period of 2010-2013, Fluxys has invested in the Dilsen-Boslaan, Olen-Ham, and Tongeren-Genk pipelines for a more secure supply across existing lines in the Campine region of the province of Limburg, as well as to establish new connections to the grid.

In the same period, Fluxys has also invested in the Lommel-Ham-Tessenderlo, and Tessenderlo-Diest pipelines to connect a new combined cycle gas turbine to the grid, besides expanding supply capacity in the province of Limburg.

In 2010, worked on the Warisoulx-Vedrin-Namur pipeline to enhance capacity in the Meuse valley. Furthermore, in the period of 2010-2011 Fluxys developed the Péronnes-Leernes-Dampremy pipline in the Louviere and Cherleroi area in order to connect a power station located in Marcinelle to the grid.

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84 For more information see: https://www.fluxys.com/belgium/en/Services/LNGTerminalling/LNG_smallscale/LNG_smallscale: https://www.fluxys.com/group/en/AboutFluxys/~/media/Fluxys/AboutFluxys/FinancialInfo/Fluxys_annual_financial_report_2017.ashx: https://www.fluxys.com/belgium/en/Sustainable%20development/Research%20and%20development/Research%20and%20development: https://www.fluxys.com/belgium/en/Fluxys%20nearby/CurrentLargeProjects/Second%20jetty-Zeebrugge/Second%20jetty-Zeebrugge.

85 For more information see: https://www.fluxys.com/belgium/en/About%20Fluxys/Investment/~/media/Files/About%20Fluxys%20Belgium/Investment%20Programme/TYNDP_2016_Fluxys_BE%20LNG_EXTERNAL_DOCUMENT__final_EN.ashx: https://www.fluxys.com/belgium/en/About%20Fluxys/Investment/InvestmentProgramme/LH_conversion: https://www.fluxys.com/group/en/AboutFluxys/~/media/Fluxys/AboutFluxys/FinancialInfo/Fluxys_annual_financial_report_2017.ashx.

86 For more information see: https://www.fluxys.com/belgium/en/about%20fluxys/publications/~/media/files/publications/brochures/fluxys_tys_uk_web%20pdf.ashx.

Finally, in order to guarantee the supply of H-gas to the Antwerp region and to enhance the supply capacity of the storage facility in Loenhout, Fluxys invested in the Wilsele-Loenhout pipeline in the period of 2012-2013.

3.3. Options for improvement

3.3.1. Options to change improve practice

The above discussion shows that the NRF is well-designed and functional for security of supply and most innovative projects, if they provide a benefit for society. Yet, after consulting stakeholders it is deemed that specific incentives for innovative projects are lacking and that clear targets for decarbonisation and green gasses usage in the (European) regulation for gas should be introduced. Moreover, there is at least a theoretical risk of CAPEX-bias.

(i) Statutory obligation to consider alternatives

A more general approach would be the introduction of an obligation to consider OPEX-related innovative options in the investment plan. The TSO would then have to provide OPEX-based options as alternatives to (CAPEX) projects outlined in the investment plan. This approach necessitates that a framework is developed determining when OPEX-based solutions should be favoured over CAPEX-based solutions.

(ii) Statutory reference to innovation

There is no long-term perspective on innovative investment. The measures so far, such as the monetary rewards given for MOG project, and the partial recovery of costs accrued in the successful search for R&D project subsidies, are not perceived to be sufficient. A long-term strategic perspective can only be developed if the regulatory framework contains an explicit reference to innovation. This long-term strategic perspective could be shaped by governmental policies, statutory duties or could be included in the NDP.

Some respondents have highlighted potential hurdles created by EU unbundling regime. Whether or not such hurdles are actually caused by the unbundling regime or not requires a careful analysis that falls outside the scope of this project. In the final report we point out that for some areas, a clarification of the boundaries of the activities that TSOs are allowed to undertake would be helpful. In other cases, the recently adopted Clean Energy Package (including e.g. the market test) provides a procedure to overcome such hurdles.

3.3.2. National law mechanism(s) for implementing options

We consider that the above mentioned need to be implemented by amending the NRF in the following ways:

As regards option (i) (statutory obligation to consider alternatives), we understand that the legal mechanism for implementing this option would involve the modification of the Federal Gas Act[87] through the Belgian Legislative Process.

Turning to option (ii) (statutory reference to innovation), we expect that this could be implemented by including such a reference in the Federal Gas Act through the Belgian Legislative Process.

3.3.3. Impact assessment

We have not encountered any specific examples of projects that have been cancelled due to the regulatory framework. For this reason, we do not expect that any of the suggested changes will result in considerable changes to investment levels. Yet, if a long-term strategic perspective on innovation could be attained, the share of innovative projects could increase.

[87] For instance art. 15/1, §5 of the Federal Gas Act.

ANNEX I: TYPOLOGICAL INVESTMENTS – ELECTRICITY

Generally, the term typological investment relates to technical solutions that TSOs can adopt to provide the transmission capacities needed to cover the transmission demand of grid users. Thus, a typological investment is meant to be a type of solution that can be implemented, in principle, by any TSO in situations in which these solutions are appropriate to provide the desired benefit. Hence, typological investments are not specific to a concrete location or a particular TSO. In the following, we have listed a selection of typological investments for the electricity transmission sector, that are differentiated in 7 categories that can be considered innovative as compared to conventional solutions. For each of these categories we have provided a number of examples of solutions, based on our existing knowledge, a literature review and interviews. The list might not be completely comprehensive, but should give an idea of our understanding of the different types of typological investments, we are interested in.

Category	Examples of solutions
New transmission lines based on innovative technology or change of technology of existing lines	• New HVDC lines (→allow to control the power flow; less expansive for long distance transport; undergrounding less complex); • Replacement of HVAC by HVDC lines (→less complex and less expensive; more compact design); • Underground cables or GIL (→ more expensive than OHL but can help improving public acceptance and accelerate the authorisation process); • Design of overhead line poles (→can help improving public acceptance and accelerate the authorisation process); • Replacement of conventional overhead line conductors by high-temperature conductors (→more expensive than conventional ones but can allow to provide additional capacity at a lower cost level and more quickly than by building completely new lines).
Introduction of dynamic capacity rating with the aim of utilising existing transmission lines or transformers at higher levels	Spectrum of technological options ranging from a differentiation of rating levels according to fixed time intervals (e.g. seasonal or time-of-day) down to online monitoring of equipment temperature and adaptation of capacity rating in real-time operation.
Installation of power flow control components in order to better adapt power flow patterns to capacities and topology of the existing grid.	• Phase-shifting transformers; • Semiconductor-based FACTS elements (including HVDC converters).
Investment into components contributing to ancillary services provision (reactive power / voltage control, short-circuit power, momentary power reserves and black-start capability)	• Purely phase-shifting generators (→offer operational flexibility and can serve to improve cost efficiency); • FACTS elements (→ see above).
New or extended power system control and automation technology with the aim to lower the risk of disturbances threatening security of supply	• Improvements in observability and controllability based on conventional sensor and actor devices; • Wide-area measurement systems (aiming at synchronously measuring power phasor angles at the grid nodes to improve observability); • Real-time dynamic security assessment tools (aiming at observing stability phenomena beyond static voltage/current measurements).

Category	Examples of solutions
Partial automation of system operation processes aiming at better utilisation of existing grid capacities	Automatic switching of network devices (in connection with adaptive protection schemes) or of generation-side or demand-side flexibilities in case of grid component outages in order to reduce the demand for (n-1) capacity reserves.
Improvement of approaches to curative congestion management providing the possibility to operate systems closer to their technical limits and/or to improve security of supply	• Generation-side flexibilities (especially renewables); • Demand-side flexibilities (DSM/DR); • Storage components; and • Technologies coupling the electricity sector with other sectors (gas, heat, traffic).

ANNEX II: TYPOLOGICAL INVESTMENTS – GAS

Typological investments are meant to be those type of investments whose aim is to promote innovation in the gas transmission systems while ensuring or enhancing the level of security of supply of a region. Hence, by definition, they can be implemented independent of a specific TSO and location.

In the following table, we offer a resume of the typological investments for the gas transmission system we have deemed as innovative compared to "conventional" solutions.

The investments are broken down into four categories each accompanied by examples that emphasise their importance and impact on the gas system.

Category	Examples of solutions
Increased need for flexibility for market development and security of supply.	• (Power-to-gas) Usage of excess pipeline capacity as "energy" storage of excess wind or solar energy by utilizing electrolysis (an efficient utilization of the excess of electricity produced by non-programmable sources of energy); • Increase withdrawal and injection capacity in storages by incentivising investments supporting flexibility (support of gas market liquidity and security of supply level); • Allowance of higher pressure in selected pipeline/routes (increase of flexibility of the supply side).
Incentivise and facilitate upgrade of biogas to the transmission system.	• Investments in upgrade of biogas to transmission system (support of gas market liquidity and security of supply).
Digitalisation of operations, through e.g. drone inspections and artificial intelligence (AI), resulting in a safer and cost-efficient operation.	• Drone inspections and AI in combination with modern SCADA systems can serve as input to reliability based operation and maintenance (lower maintenance cost and reduction of unforeseen/unplanned shutdowns).
In order to support security of supply and add liquidity to the gas market, there is a need to build interconnectors in Europe.	• More reverse flow systems could be considered to increase flexibility in the supply routes (reduction of dependency and power of trading of the large gas suppliers); • Enhancement of available gas supply in situation of supply crisis; • possibility of arbitrage a price convergence between markets to support the development of the internal market.

ANNEX III: POTENTIAL REGULATORY BARRIERS FOR PROJECTS

Regardless of the character of a project (e.g. projects enhancing security of supply or applying innovative technologies, which this questionnaire is focussing on) there might be potential regulatory barriers for implementing projects in general but maybe also barriers for special kind of projects. To give you an impression what kind of barriers we have in mind, we have listed some examples of such barriers in the following. It should be noted that there might be different or even more or less barriers in the regulatory framework of your country.

Type	Description / Explanation
Higher TSO CAPEX but lower expected OPEX within the TSO	the investment upfront is more costly, but has a potential of lowering the operational costs in the future. However, because of its innovative and more risky character the lower OPEX is not guaranteed. If not allowed to put the costs in case of a failure in the tariffs, TSO would not invest in innovative solution.
Higher TSO CAPEX, but benefits go to the wider society, instead of the TSO	This is a situation where higher investment, including in new technologies, is needed on the part of a TSO but benefits in terms of RES integration, RES curtailment or CO2 avoidance benefit other players in the society, while the TSO is only faced with the cost increase. Projects in regulatory frameworks, which do not distribute adequately the benefits to the TSO that bears the costs and takes the risk, are less likely to happen. This could also apply to cross-border investments involving several TSOs.
Investments in smart grid elements /technology aimed at replacing planned grid investments	Investments in smart grids and other smart elements that actually reduce the need of physical construction of lines for example due to a better interactive/intelligent grid management of balancing tools (battery storage) may provide a reduction in the regulated asset base, however with a slight increase of tariffs, might not be realised.
Investments in security of supply – projects without commercial benefits	Projects that ensure security of supply will in some cases never bring enough commercial benefits such as a pipeline would be going to be used only in case of emergency. If the security of supply (e.g. diversification of the sources for gas) is not put into tariffs, a TSO is most likely not willing to invest.
Lower TSO TOTEX but shift in the CAPEX/OPEX ratio	In some member states CAPEX and OPEX are treated differently in the regulatory regimes. Depending on the incentives set by doing so, technical solutions/projects with higher CAPEX might be preferred by the TSOs even if they result in higher total costs.

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