



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

Country Report - Lithuania



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EXECUTIVE SUMMARY

Assessment of the NRF and the regulatory practice of the electricity and gas sector in Lithuania

The Lithuanian NRF and regulatory practices for electricity and gas have many similarities, for this reason in this summary no distinction is made between electricity and gas.

The NRF in Lithuania

The Law on Energy of the Republic of Lithuania of 16 May 2002 is the principal piece of primary legislation governing the Legal Framework for the energy sector, including the gas and electricity sector, in Lithuania. It is supplemented by The Law on Electricity and the Law on Natural Gas.

The role as TSO is assigned to Litgrid for electricity and Amber Grid for natural gas.

There are no express duties encouraging innovation in general terms.

Efficiency of performance of the TSO and the resulting efficiency gains are key elements in the incentive mechanism in the NRF.

As well in Lithuania, since 2014, for the gas sector the methodology included the principle that all projects with strategic importance could be granted additional return on the investment based on NRA assessment. For electricity, projects characterised by higher risks can obtain additional return on investment by the calculation of individual weighted average cost of capital (WACC). In 2015, the NRA changed the electricity methodology and now it includes the principle that all projects with strategic importance could obtain an additional return on the investment based on NRA assessment.

Moreover, in natural gas sector the methodology implies the reduction of ROI in the case of decreasing quality indicators, which encourages natural gas companies to make investments which guarantee reliable and uninterrupted natural gas supply.

Similarly, there are limited powers to encourage innovation.

The regulatory practice in Lithuania

The interviewees remarked that, in general, there is no regulatory barrier hindering innovative investments from being financed. Innovative projects do not account for more than 20% of the gas infrastructure investment, and 5-10% of the electricity infrastructure investments. Efficiency of performance of the TSO and the resulting efficiency gains are key elements in the incentive mechanism in the NRF. Innovative projects are understood as being projects which allow the TSO to lower down OPEX in exchange of a higher level of regulated return.

As far as innovative investments are concerned, the TSO is constrained by finding solutions, which create efficiency gains. If the NRF is adequate in bolstering investments in modernization of the current gas grid based on operational cost reductions, the bureaucracy of the project overall approval process represents a pitfall which dilute the average approval time.

Most projects are undertaken to ensure security of supply, for both gas and electricity. While the share for gas (80%) is higher than that for electricity (46% of investments in TYNDP), there is a strong focus on security of supply in both energy segments.

In conclusion, the NRF works well in general, and stakeholders identified no direct barriers.

Options for improvement

Three of the most important projects the Lithuanian electricity TSO, Litgrid, has invested in are NordBalt, LitPol Link and Synchronisation project of the Baltic States' electricity network with the Continental European Network (its implementation time is expected by 2025, the approval of the project was taken September 2018).

The projects are of cross-border importance and are considered beneficial for the development of the European electricity grid, on one hand, and the integration of the European electricity

market with the Baltic electricity market, on the other. The approval process of LitPol Link project was quite lengthy due to discussions among relevant member states on beneficiary countries and cost allocation among them and needed ACER involvement as indicated by Infrastructure (TEN-E) regulation. On the other hand, the Synchronisation project approval process was very smooth and swift.

In gas sector the involvement of ACER was also needed in regards to the Lithuania-Latvia connection, and the Gas Interconnector Lithuania-Poland (GIPL) was approved and currently under development.

One possible solution to get over such impediment would be to include social CBA as requirement in national plans; not only would such approach ameliorate the final investment decision making process, but also it might constitute the basis for cost allocation decision between the involved countries' TSOs during consultation phases.

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 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 have been formulated, both relating to the implementation practice and to legal changes.

The Country Report is based on previous study deliverables and analyses. It is divided into two main sections, Section 2 which is related to electricity, and Section 3 which is related 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 2.2 for electricity and Section 3.2 for gas examine the regulatory practice in Lithuania, 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 Lithuania. 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 did not do a full analysis of all the costs and benefits of the suggested options. Therefore, some of these options are conditional and that 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 suffer from 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 Lithuania

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

The Law on Electricity¹ is the main legislation governing the Legal Framework for the electricity sector in Lithuania. According to the Law on Electricity, the electricity sector in Lithuania is comprised of electricity consumers, producers, independent and public suppliers, entities performing the function of guaranteed supply (supply of last resort) and operators of the transmission network, distribution networks and electricity exchange².

The following actors have duties, objectives and powers relevant to transmission network development in the electricity sector, which are established and derived from the Law on Electricity and the Law on Energy:³

- The National Regulatory Authority (the National Commission for Energy Control and Prices) the “Commission”;
- the Parliament of the Republic of Lithuania, the “Parliament” and the Government/Ministry of Energy of Lithuania, the “Ministry”.

Objectives most relevant in the Legal Framework include the following:

- The Ministry prepares the National energy independence strategy, the “Strategy”⁴ which sets the strategic direction of state policy in the energy sector. These include, but are not limited to: measures of energy independence and security; necessary investments in the energy sector and development of the structure of the energy sector⁵ The Strategy is then approved by the Parliament;
- The grid operator, taking into account the requirements for security and reliability of supply of electricity, quality, efficiency, consumption, management and environmental protection specified in the Strategy, improving the terms and conditions of access to the system shall plan the long-term development of the electricity system in coordination with the Ministry of Energy and distribution system operators and other stakeholders. Long-term electricity system development planning must be based on scientific, technological and economic assessment. Operators must work together to ensure optimal development of the transmission and distribution networks⁶;
- The Ministry also approves development plans of smart energy grids and smart energy accounting systems⁷;
- The Commission regulates activities and supervises businesses acting in the energy sector.⁸ This is achieved by various functions which are granted to the Commission, e.g. the Commission administers the licensing regime, sets the state regulated prices and upper limits, evaluates returns from investments, ensures effective separation between activities in energy sectors (in order to ensure independence of energy transmission from commercial interests of energy activities and avoid cross-subsidies). The Commission is also involved in the coordination procedure of investments planned by the energy companies (including transmission system operator, the “TSO”).

AB Litgrid⁹ carries out the role of TSO in Lithuania. Transmission of electricity is defined as transmission of electricity through electricity transmission networks including system services ensuring stability and reliability of electricity system but excluding electricity supply¹⁰. Such activity i.e. transmission of electricity, according to the Law on Electricity falls under licensing requirements.¹¹ The financing of projects are regulated by the price-cap economic framework.

¹ Law on Electricity, No. VIII-1881.

² Article 12 of the Law on Electricity, No. VIII-1881.

³ Law on Energy, N. IX-884.

⁴ Article 6(3) of the Law on Energy, N. IX-884.

⁵ Article 12(4) of the Law on Energy, N. IX-884, Article 9(3) of the Law on Electricity, No. VIII-1881.

⁶ Article 18 of the Law on Electricity, No. VIII-1881.

⁷ Article 7(4) of the Law on Electricity, No. VIII-1881.

⁸ Article 8(1) of the Law on Energy, N. IX-884.

⁹ Regarding appointment of electricity transmission system operator and issuance of transmission activity licence, No. O3-325.

¹⁰ Article 2(33) of the Law on Electricity, No. VIII-1881.

¹¹ Article 15(33) of the Law on Electricity, No. VIII-1881.

2.1.2. Specific legal rights and duties

Role of the TSO

AB Litgrid, in the role of TSO, is responsible for stability and reliability of electricity system operation, performance of balancing services in the territory of the Republic of Lithuania, provision of system services, exploitation, maintenance, management and development of interconnections with other countries' electricity systems¹².

The TSO also has a duty to act independently from electricity production, distribution and supply activities and from their commercial interests. This goal is achieved by implementing the principle of separating transmission activity from other types of activities in the electricity sector¹³. In the electricity sector, the ownership unbundling model was chosen for unbundling the state owned TSO Litgrid AB, making use of the possibility provided for in Article 9(6) of the Directive 2009/72/EC to implement the ownership unbundling model by means of separate public bodies within the State¹⁴. The Commission on the other hand supervises and controls whether the TSO meets the requirements of independence and separation of activities¹⁵.

According to the national legislation, the TSO has the following duties:

- exploit, maintain, manage and develop transmission networks and interconnection lines;
- TSO must consider requirements related to security and reliability of electricity system operation, environmental requirements, development plans and requirements of smart energy grids and smart energy accounting systems and economic conditions¹⁶;
- has an obligation to fulfil services that are in the public interest (i.e. services of general economic interest (SGEI)) (the "PSO" or the "PSO services") in accordance with the procedure and conditions established by the Government or an institution authorized by it¹⁷ (for more details regarding the PSO's please see Section 2.1.3 below).

Undertaking of investments

In compliance with Article 33(1) of the Law on Electricity, the TSO shall submit to the Commission a ten-year plan for the development of the transmission network based on existing and planned energy supply and demand in the electricity system no later than until 1 July of each year. Each year the TSO must provide to the Commission a 10-year development plan of transmission networks (i.e. it has to update it each year for the upcoming 10 year period).

The grid development plan shall contain efficient measures for ensuring the adequacy of system capacities and security of supply.

Prior to providing the grid development plan to the Commission, (upon the decision of the TSO) consultations shall be held with the competent state authorities and interested grid users.

Role of NRA regarding investment projects undertaken by the TSO

The Commission is obliged to hold transparent and open consultations on the grid development plan submitted by the TSO with all interested grid users. To do so, the Commission publish the results of the consultations on its website, in particular the potential need for investments in the grid development. The Commission carries out monitoring of the grid development plan and makes its assessment.¹⁸

If the TSO fails to submit a development plan according to the terms set by law or if it submits a development plan but fails to comply with the requirements and remove the inconsistencies within the Commission's specified time limit, the TSO shall be considered to have breached the conditions of the regulated electricity transmission operation. However, coordination of the plan does not mean that the specific amount of investments had been approved and, thus, each investment has to be approved separately by the Commission and accordingly, only then the

¹² Article 23(1) of the Law on Electricity, No. VIII-1881.

¹³ Article 24 of the Law on Electricity, No. VIII-1881.

¹⁴ Litgrid AB received its final certification decision by the Commission in August 2013.

¹⁵ Article 26(1) of the Law on Electricity, No. VIII-1881.

¹⁶ Article 31(1) of the Law on Electricity, No. VIII-1881.

¹⁷ Article 31(14) of the Law on Electricity, No. VIII-1881.

¹⁸ Article 33 of the Law on Electricity, No. VIII-1881.

TSO is able to perform investments to the transmission network (otherwise such costs will not be included in regulated tariffs).

2.1.3. Mechanism for financing of investment projects

There are several types of project financing mechanisms in Lithuania, which depends on the project, and the nature of financing.

The First financing mechanism includes investments made from the TSOs' funds (funds owned by TSO or borrowed funds). In such cases, investments made by the TSO are covered by the TSO charging its electricity transmission tariff.

The services provided by the TSO are remunerated by customers of the TSO's services according to the fees provided in the contracts. The TSO does not have entire freedom in establishing prices for its services as the price of such services are subject to price caps *ex ante* established by the Commission for 5 year regulatory periods, and under specific circumstances (high inflation, etc.) may be adjusted not more than twice a year. The specific tariffs for transmission are set and changed by the service supplier (not higher than price cap). The Commission also performs *ex post* control monitoring that prices actually charged by the TSO would be in compliance with price caps established by the Commission.

The "Price-cap" economic framework

Price caps are established following the methodology *ex ante* approved by Commission. Such price caps (i) entitle the TSO to compensation of all costs incurred by the TSO in providing the respective service (if such costs are considered as reasonable and justified by Commission); as well as (ii) reasonable profit. In particular, Article 19(2) of the Law on Energy states that when setting the state regulated prices, provisions have to be made for necessary costs for extraction of energy resources, energy production, purchasing, transmission, distribution and supply as well as for the development of the energy sector and energy efficiency, implementation of public service obligations and reasonable return of investment and / or property have to be taken into account.

Lithuanian legislation suggests that the value of reasonable profit, which could be earned by the TSO primarily depends on the value of *regulated asset base* (RAB) (i.e. reasonable profit is calculated as percentage value from the value of RAB), which is verified and approved by the Commission.

Thus, in the course of regular investments into infrastructure, investments by the TSO are recovered according to the system described above (i.e. collected through payments for TSO services). The Methodology for Setting the Power Transmission, Distribution and Public Supply Services and Public Price Cap, the "**Methodology**" ¹⁹ provides principles for TSO pricing in detail.

Subsidies from EU

The Second financing mechanism (or mechanisms) might include subsidies received from the European Union, "**EU**", the PSO services funds or other donations. The PSO regulation mechanism is now explained in more detail:

The funding of electricity projects from PSO funds is conceptually based on EU legislation. In particular, Article 3(2) of the Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC ('the Directive 2009/72/EC') provides that:

"Having full regard to the relevant provisions of the Treaty, in particular Article 86 thereof, Member States may impose on undertakings operating in the electricity sector, in the general economic interest, public service obligations which may relate to security, including security of supply, regularity, quality and price of supplies and environmental protection, including energy efficiency, energy from renewable sources and climate protection. Such obligations shall be clearly defined, transparent, non-discriminatory, verifiable and shall guarantee equality of access for electricity undertakings of the Community to national consumers. In relation to

¹⁹ The Methodology for Setting Price Caps of Electricity Transmission, Distribution and Public Supply Services, No. O3-3.

security of supply, energy efficiency/demand-side management and for the fulfilment of environmental goals and goals for energy from renewable sources, as referred to in this paragraph, Member States may introduce the implementation of long-term planning, taking into account the possibility of third parties seeking access to the system."

As can be seen, the Directive presupposes that having established PSOs on specific undertakings Members States may face a need to compensate undertakings for performance of PSO tasks by payment of financial or other compensation, provision of exclusive rights, etc. In this regard, the Directive requires only that such compensation would be provided in *non-discriminatory and transparent way* (see Article 3(6) of Directive 2009/72).

The PSO concept established in Directives 2003/54 and 2009/72 has been transposed into national legislation of Lithuania. In particular, the Law on Energy is the primary piece of legislation establishing general principles regulating all energy sectors in Lithuania. Article 2(38) of the Law on Energy introduces a PSO concept common for all energy sectors defining PSO services as *"services corresponding to public interests provided by energy companies in cases provided by laws under obligation of the Government of the Republic of Lithuania, by which it is aimed to implement the strategic goals of the state energy, the economy and (or) environmental protection in the energy sector and to protect legitimate public interests"*.

The principles established in the Law on Energy are specified for the electricity sector in the Law on Electricity, which establishes the framework for the organisation of the Lithuanian electricity sector governance, regulation, supervision, control and operations. The Law on Electricity is the main legal act transposing the Directive 2009/72/EC (and former Directive 2003/54) into national laws of Lithuania.

The Law on Electricity *inter alia* elaborates on the application of PSO concept in the electricity sector. In particular, Articles 6(1) and 74(1) of the Law on Electricity establish that the Government may impose an obligation to provide PSO services on any company operating in the energy sector, following the list of PSO services. Article 2(53) of the Law on Electricity provides that:

"Public interests in the electricity sector" means an act or omission in the electricity sector, directly or indirectly related to the State energy and (or) public security, the security and reliability of the electricity system performance, the reduction of the negative impact of the electricity sector on the environment, the diversification of energy resources and other objectives for the development of the sustainable energy sector provided for in this Law.

To sum up, the Law on Energy and the Law on Electricity generally provide that: (i) PSO concept imposes an obligation to perform certain actions on undertakings operating in energy sector; (ii) such obligatory actions should be related to the public interest; and (iii) such PSO should be entrusted by Government into special list of PSOs.

Such PSO entrustment model by its very nature guarantees that compensation for performance of PSO is provided in a *non-discriminatory and transparent way* as required by Article 3(6) of Directive 2009/72, as having included the project into the list of PSOs investments means that *each* PSO project is verified by the Commission and compensation for performance of PSO is approved following the specific methodology. The Commission approves a price calculation methodology of PSO services in the electricity sector and sets prices of services implementing public interest, which is paid by all electricity consumers in Lithuania and such funds are administered by PSO funds administrator.

Nevertheless, compensation of investments into infrastructure developed on the basis of PSO is subject to a slightly different scheme than described in first case above, which generally follow the same logic, i.e. all costs covered from PSO funding are reviewed by the Commission in order to verify that such costs are reasonable and justified and only then included into amounts, which shall be compensated.

In particular, the above law obliges the TSO to implement strategic projects for Lithuania nominated by the Government, which *inter alia* may include construction of new

interconnections as well optimization, development and / or reconstruction of the electricity network to ensure the production of electricity using renewable energy resources²⁰. Decisions as to performance of such projects are adopted at the political level of Lithuanian authorities – if they consider that, a specific project is needed by Lithuanian society, they include such strategic project into the list of strategic projects approved by the Government. This, in turn, leads to the obligation on the TSO to perform the specific PSO and the obligation of the State to compensate the TSO for such performance through specific PSO funds. These PSO funds are collected from the final consumers of electricity separately from the fees, which the TSO charges its customers for provision of TSO services.

It should be noted that subsidies or other funds (e.g. payments for PSO services or EU funds) cannot be included in the electricity transmission tariff (i.e. the regulation prevents double compensation). Item 7.2.4. of the Methodology excludes the following from the TSO's regulated asset base: "*<...> asset (or its part), that was acquired using European Union structural funds, received subsidies, grants or funds equated with them <...>*".

2.1.4. Regulatory rules with respect to innovation

Specific duties of the TSO aimed at encouraging innovation

There are no express duties encouraging innovation in general terms.

Specific duties of the NRA aimed at encouraging innovation

Under the present Legal Framework, the Commission has limited powers to encourage innovation.

It is worth mentioning that Item 7.3.3. of the Methodology prescribes that the rate of return on investment (ROI) (which is set under the general legal basis for setting regulated energy companies' prices) may be increased by a decision of the Commission for electricity companies' strategic investments which contribute to the achievement of national and the EU energy policy objectives.

However, no additional details in this regard are provided and uncertainty of its practical applicability (i.e. ROI increase) holds.

Moreover, Items 13 – 14 of the Methodology encourages company's effectiveness in regard to economically justified (necessary) annual operating costs (OPEX). In the case of increased effectiveness of the OPEX in regulated activities, the Methodology prescribes specific rules to increase ROI.

2.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

As described in Section 2.1.2, the Law on Electricity mainly provides general objectives to safeguard security of supply and establishes requirements to indicate effective measures to ensure sufficiency of capacities and security of supply in the grid development plan.

Specific duties of the NRA aiming at safeguarding security of supply

The Commission exercises its powers and duties relevant to security of supply through the mechanisms described in Section 2.1.2 (e.g. a 10 year development plan of transmission networks which includes effective measures to ensure security of supply).

In accordance with Article 33(7), the Law on Electricity ensures that, in case the TSO failed to make any investment which according to the grid development plan ought to have been executed in the subsequent three years, the Commission should take the following measures to ensure that the investments would be made if they are needed according to the latest grid development plan: (1) obligate the TSO to make appropriate investments; (2) obligate the TSO to organize a tender open to all interested investors, taking into consideration the requirements

²⁰ Following Article 74(2) of the Law on Electricity and Items 7(6) and 7(9) of the 'Rules on procedure for provision of public service obligations in the electricity sector and the determination of their extend' approved by Resolution No 916 of the Government of the Republic of Lithuania, dated 18 July 2012.

for the independence of the TSO provided for in the Law on Electricity; or (3) obligate the TSO to increase the undertaking's authorised share capital in order to finance the necessary investments and allow independent investors to participate in the capital, having considered the requirements for the independence of the transmission system operator provided for in the Law on Electricity.

2.2. Regulatory practice

2.2.1. Overview over regulatory practice in Lithuania

Information about the general regulatory framework in Lithuania

The TSO, as underlined in Section 2.1.3, recoups its investment by the application of tariffs, which are to be approved by the Commission, and subsidies from the European Commission. These methodologies properly accommodate the TSO's duties to invest in the development of the Lithuanian transmission line. The current regulatory frame does not hinder the TSO from investing in infrastructure projects, being it oriented to the implementation of innovation or security of supply solution. The "price-cap" financial mechanism, described in Section 2.1.3, allows the TSO to have a regulated profit proportional to the value of the Regulated Asset Base ("RAB"). It follows that, CAPEX intensive investments are generally preferred over OPEX based ones since they are able to expand the RAB. Notwithstanding this fact, as outlined in Section 2.1.4, the Methodology offers the possibility to offset against this bias by allowing higher Return on Investment for those projects promoting OPEX efficiency in TSO's services, and achievement of national and EU energy policy objectives.

Looking at the ongoing projects, it may be concluded that the share of innovative projects is currently very low compared to "traditional" transmission line development investments. Of particular importance as to transmission, network development is the non-PCI project regarding the upgrading of the wide-area measurement system.

Main regulatory barriers

The interviewees remarked that, in general, there is no regulatory barrier hindering innovative investments from being financed.

2.2.2. Regulatory practice related to innovation

Innovative projects do not account for 5-10% for the electricity sector. Innovative infrastructure projects are understood as being as a "tool" whereby the TSO is facilitated to make its operations more efficient while providing more services for customers to maintain its competitiveness and business continuity.

Adequacy of the NRF relating to its support for innovative investments

The current NRF is well designed to allow the TSO to invest in innovative investments.

2.2.3. Regulatory practice related to security of supply

Security of supply projects

Around 46% of the projects in the national ten-year development plan are related to the Synchronization of the national electricity system with the European intercontinental system.

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

The national regulatory framework is considered adequate to support security of supply investments in general.

2.2.4. Illustrative specific projects

Among the most recent projects aiming at enhancing security of supply, the interconnections between Lithuania and Sweden (NordBalt) and Poland (LitPol link I) also Synchronisation project are the most significant in terms of integration of the Lithuania electricity system with the European Power system. They all serve as examples of how the current regulatory regime, supports investments in security of supply enhancing projects.

NordBalt

Description and aim

Nordbalt was aimed at developing the electricity market in the Baltic Sea region and connecting the Lithuanian and Swedish power systems.

Approval process

The NRF did not undergo any project specific adaptations or amendments in regards to project approval.

Financial mechanisms

The project has been granted EUR 131 million under the European Energy Programme for Recovery. The European Commission's approved financial aid for the project had to be distributed as follows: (i) financial support of up to 81 million EUR for construction of a submarine cable; (ii) financial support of up to 50 million EUR provided for construction of converter stations at connection points of the submarine cable, i.e. Klaipėda (Lithuania) and Nybro (Sweden). With regard to remaining investments, it was agreed between the partners that the remaining costs of the project shall be distributed according to the principle, that costs related to the construction of sub-sea cable (from landing point to landing point) shall be distributed by the parties on equal proportions, while the costs for the land cables / overhead line and converters on their national territory shall be borne by parties separately.

According to interviewees, the approval process for the project was facilitated by the fact that the project was subsidized by the European Commission.

LitPol link

Description and aim

Electricity transmission interconnector LitPol Link is the joint project of Lithuanian TSO and PSE (a Polish power grid operator). Electricity interconnector LitPol Link ensures integration of Lithuania and Poland to electricity systems of continental Europe. The project aims were aligned with EU energy policy goals and had an essential impact for the energy independence of Lithuania.

Approval process

The LitPol Link electricity interconnector project was featured on the Commission's list of Projects of Common Interest, which gave it access to a EUR 27.4 million Connecting Europe Facility grant for works carried out in Lithuania. It also benefitted from the EU's structural funds for construction works carried out in Poland, a loan from the European Investment Bank of EUR 55 million and a Nordic Investment Bank loan of EUR 50 million.

Financial mechanisms

Part of LitPol Link project (EUR 76.3 million) was financed by the funds of the Lithuanian TSO, thus this part of the investments was included into the regulated asset base (RAB) of the Lithuanian TSO (i.e. the electricity transmission tariff).

Synchronisation project

Description and aim

The Baltic electricity synchronisation project is a joint Lithuanian, Latvian and Estonian project which aims at synchronising the electricity network of the three Baltic States with the continental European network (CEN). The synchronisation of the three Baltic States' electricity grid with the continental European network is a PCI due to its importance for the achievement of the Energy Union.

Approval process

This project is on the PCI list. National decisions by Latvian, Estonian, Lithuanian regulatory authorities to approve the project were taken in September 2018. Baltic TSOs applied for grant from Connecting Europe Facility in October, 2018.

Financial mechanisms

The approved total amount of the project in CBCA agreement is the following:

- Lithuania: 167,05 Million EUR;
- Latvia: 77,72 Million EUR;
- Estonia: 187,79 Million EUR.

If grant from CEF will be received, the amount included into regulated tariffs will be reduced accordingly.

2.3. Options for improvement

The current regulatory framework, based on the financial mechanism described in Section 2.1.3, does not preclude the TSO from investing in innovative or security of supply related investments, which generate net benefits from a financial and social-economic perspectives.

2.3.1. Options to improve regulatory practice

The above discussion shows that the NRF works reasonably well for security of supply and especially interconnection projects, which are important to integrate the Lithuania electricity system with the European Intercontinental electricity system.

Yet, the process in TEN-E regulation for approval and assessment of investments may be streamlined in order.

(i) Introduce a wide social CBA for national investments

Three of the most important projects the Lithuanian electricity TSO, Litgrid, has invested in are NordBalt, LitPol Link and Synchronisation project of the Baltic States' electricity network with the Continental European Network (its implementation time is expected by 2025, the approval of the project was taken September 2018).

The projects are of cross-border importance and are considered beneficial for the development of the European electricity grid, on one hand, and the integration of the European electricity market with the Baltic electricity market, on the other. The approval process of LitPol Link project was quite lengthy due to discussions among relevant member states on beneficiary countries and cost allocation among them and needed ACER involvement as indicated by Infrastructure (TEN-E) regulation. On the other hand, the Synchronisation project approval process was very smooth and swift.

2.3.2. National law mechanism(s) for implementing options

We consider that the above mentioned change could be implemented using legal powers already available to the NRA under the existing NRF, as the NRA already applies CBA method to evaluate costs and benefits of investments of the energy companies.

As regards proposal of incorporating a wide social CBA for CBCA as a mandatory requirement, it could be implemented by including such an obligation in the Description of Energy Companies Investments Evaluation and Approval by the National Commission for Energy Control and Prices (the NRA decision No O3-100 of July 10, 2009) (Description). We understand that the amendment of Sub-section 3 of the Section 3 of the Description should be made.

2.3.3. Impact assessment

A negative side effect of option (i) could be the introduction of delays in the initial phase of implementation of investment projects given the introduction of the additional analysis. However, with time, when the implementation of this option becomes mature, the measure will facilitate the collaboration among the TSOs in the underlying cross-border cost allocation decision process.

As the current CBA is based on TYNDP, which is drafted on EU level among TSOs, a purely national decision would not lead to any substantial change of the situation. Amendments should be done on EU level in regards to projects with cross border effect and specifically – TEN-E regulation.

3. GAS

3.1. Legal analysis of the NRF in Lithuania

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

The Law on Energy of the Republic of Lithuania of 16 May 2002 “**the Law on Energy**” is the principal piece of primary legislation governing the Legal Framework for the energy sector, including the gas sector, in Lithuania.

The following actors have duties, objectives and powers relevant to transmission network development in the gas sector, which are established and derived from the Law on Natural Gas and the Law on Energy:²¹

- The National Regulatory Authority (the National Commission for Energy Control and Prices) the “Commission”; as the independent national regulatory authority for the Lithuanian energy sector, it derives its primary duties, objectives and powers from the Law on Energy;
- the Parliament of the Republic of Lithuania, the “Parliament” and the Government/Ministry of Energy of Lithuania, the “Ministry”.

The Law on Energy is not only applicable to the Commission. Other institutions such as the Ministry of Energy and the Government, the Parliament of the Republic of Lithuania and energy companies, have duties and objectives derived from the Law on Energy.

These duties and powers (as relevant to transmission network development) include:

- an obligation to the Ministry of Energy to prepare the draft of the National Energy Independence Strategy of Lithuania “Strategy”, which encompasses most essential infrastructure projects in all energy sectors in Lithuania, and submit it for assessment to the Government²². After Government assessment, the Strategy is submitted for approval to the Parliament²³. Specifically, the Strategy contains provisions on the national energy security and security of supply measures, required investment in the gas sector, transmission system network development measures, and other main issues and forecast of the energy sector; and incentives of the energy sector. The transmission system operators “the TSOs” in electricity and gas, the Commission and other entities in the energy sector must follow the Strategy;
- The Law on Energy states that energy assets of state level importance must be developed in accordance with the provisions of the Strategy²⁴;
- Energy companies, including the gas TSO, have an obligation to participate in the preparation and development of sustainable, efficient energy supply, distribution and transmission plans²⁵;
- Energy companies whose prices are regulated, e.g. the gas TSO, must coordinate their investments with the regulator (the Commission). Investments which are not approved by the regulator cannot be included in the regulated asset base “RAB” and regulated tariffs²⁶, i.e. return on investment “ROI” from such investments is not ensured;
- The Ministry of Energy also has an obligation to approve development plans of smart energy grids and smart energy accounting systems²⁷.

Transmission network development investments as well as provisions regarding security of supply are provided in more detail by the Law on Natural Gas of 10 October 2000 “the Law on Natural Gas”. Relevant regulatory framework requirements of the Law on Natural Gas are:

- The general objective of activities in the gas sector are security and reliability of gas supply, as well as, sustainable development of the sector in the attainment of the goals of the national environmental, economic and social policy²⁸;

²¹ Law on Energy, N. IX-884.

²² Article 6(3) of the Law on Energy.

²³ Article 14(2) of the Law on Energy.

²⁴ Article 15(1) of the Law on Energy.

²⁵ Article 15(2) of the Law on Energy.

²⁶ Article 15(3) of the Law on Energy.

²⁷ Article 6 (21) of the Law on Energy.

²⁸ Article 3(1) Item 1 and 3 of the Law on Natural Gas.

- Specific goals of the Commission in the natural gas sector are: to ensure efficient, reliable operation of infrastructure, to promote system and infrastructure adequacy and energy efficiency²⁹;
- The Commission, by setting regulated prices, must ensure necessary investments which ensure effective operation of infrastructure³⁰;
- The TSO has similar responsibilities in planning development of infrastructure as the Commission, i.e. the TSO must plan investments in advance, which ensure long-term infrastructure capacity adequacy and security of supply, and take any other necessary measures to ensure safe and reliable transmission of gas³¹;
- The most important measure to ensure transmission capacity adequacy, security of supply and other necessary investments in the infrastructure is the obligation for the TSO to prepare a ten-year network development plan, which must be assessed and approved by the Commission³². The network development plan shall identify effective measures to ensure the system's adequacy, modernization and security of supply. This plan is publicly reassessed by the TSO and the Commission every year. The plan is based on the current and foreseeable supply and demand, outcomes from the consultations with the energy society and compliance with the EU ten-year network development plan.

The Commission sets regulated tariffs for regulated services and approves further expansion and sustainable development of the infrastructure. The Ministry of Energy and the Government set the guidelines for the energy sector and goals by adopting the Strategy and approving the Strategy's implementation measures, which must be followed by all parties in the energy industry.

3.1.2. Specific legal rights and duties

Role of the TSO

AB Amber Grid is the operator of Lithuania's natural gas transmission system and is in charge of transmission of natural gas (transmission of gas through high pressure pipelines) to system users, and operation, maintenance and development of gas transmission system. On 10 April 2015, Amber Grid was issued with an open-ended gas transmission business licence and was designated as the Transmission System Operator, i.e. Amber Grid fully complied with the Third Energy package unbundling requirements. Amber Grid is permitted to carry out its activities through the TSO licence issued by the Commission, who also monitors compliance with the terms and conditions of the licensed activities.

The TSO has to comply with general statutory provisions and execute tasks defined in the Law on Natural Gas, including:

- While executing investments into projects the TSO has to take the Strategy into account;
- Every year Amber Grid has to submit to the Commission a revised ten-year network development plan based on existing and forecast supply and demand. That network development plan has to contain efficient measures in order to guarantee the adequacy of the system and the security of supply³³;
- Operate, maintain and develop under economic conditions secure, reliable, and efficient transmission to secure an open market. The ten year network development plan has to: indicate to market participants the main transmission infrastructure that needs to be built or upgraded over the years; contain all the investments already decided and identify new investments which have to be executed in the next three years; and provide a time frame for all investments projects³⁴; and
- Other functions necessary to ensure a secure and reliable transmission of gas.

Amber Grid has the right to receive from distribution system operators, system users and customers whose facilities are connected to the transmission system, metering data and other information necessary for planning long-term development.

²⁹ Article 6 (3) and (4) of the Law on Natural Gas.

³⁰ Article 9(5) of the Law on Natural Gas.

³¹ Article 30 (2) Item 6 and 8 of the Law on Natural Gas.

³² Article 31 of the Law on Natural Gas.

³³ Article 31(1) of the Law on Natural Gas.

³⁴ Item 1 of Article 26(1) of the Law on Natural Gas.

Undertaking of investments

One of the key tasks of the TSO is investment planning, which ensures long-term adequacy of the system (including cross-border capacity), i.e. ensuring current and expected future demand and guaranteeing security of supply. As mentioned in the above Section, every year the TSO has to submit a ten year network development plan (for the upcoming 10 year period) to the Commission for assessment and approval.

The approved ten-year network development plan is obligatory to the TSO, and if the TSO refuses to follow the investment schedule or to make any major and important investment, the Commission has a right to:

- require the TSO to execute the investment;
- organize a tender procedure open to any investors for the investment; or
- oblige the TSO to accept a capital increase to finance the necessary investments and allow independent investors to participate in the capital (Article 31(7) of the Law on Natural Gas).

Role of NRA regarding investment projects undertaken by the TSO

The TSO submits to the Commission a ten-year network development plan based on existing and forecast supply and demand, security of supply issues, efficiency etc.

Regarding the ten-year network development plan, the role of the Commission is:

- to consult all actual or potential system users on the plan in an open manner and publishes the result of the consultation process³⁵;
- to examine whether the plan covers all investment needs identified during the consultation process, and whether it is consistent with the EU-wide ten-year network development plan³⁶.

An overview of the overall Commission's role and duties (as defined in the Legal Framework) is more generally described in Section 3.1.1.

3.1.3. Mechanism for financing of investment projects

Here the mechanisms the Commission uses in order to facilitate the development of the transmission network are presented.

The "Price-cap" economic framework

The main mechanism for financing investment projects is through regulated profit, i.e. through set price caps (incentive regulation principle). The price cap regulation means that the price cap is set for a fixed 5 year period and the company is encouraged to reduce its costs and improve efficiency. For the next price control period, revenues or prices are recalculated based on the company's costs and given returns.

The Commission adopted the Methodology for the Determination of State Regulated Prices in the Natural Gas Sector No O3-367 of 13 September 2013 "Price Methodology" for setting state-regulated prices. The separate Methodology for setting income and prices for natural gas transmission was established by Commission's resolution No O3E-314 of 5 October 2018. According to the Methodology, the Commission sets (adjusts) and approves transmission price caps. The transmission price cap is set and adjusted per capacity unit. TSO prices are differentiated for each entry and exit point and approved by the Commission.

Price caps are set for a 5 year period, taking into account such cost of operation set by the Commission and factual costs, including the return on investments, amounts of factual provided services and outputs, efficiency indicators of the TSO for the previous period, planned upcoming period changes as well as previous regulatory period upcoming changes, which will influence the cost amount and structure. The price cap for transmission during the first year of regulation is set by the Commission, and later is adjusted for the second to fifth year, applying coefficient of inflation, investments, technological cost etc.

³⁵ Article 31(4) of the Law on Natural Gas.

³⁶ Article 31(5) of the Law on Natural Gas.

The Commission monitors economically reasonable costs, which are necessary to fulfil the regulated TSO activity. There are no objective criteria to define what costs are necessary, therefore TSO must justify all the necessary costs and the Commission has discretion to decide what constitutes necessary costs. Necessary costs are defined as costs, without which the TSO cannot safely and efficiently operate the regulated activity and its related legal acts and obligations. The TSO has to evidence all forecasted changes of costs.

Groups of necessary cost include technological processes, depreciation, repair, maintenance, staff and taxes.

In addition to costs ROI is also included in price cap, which is calculated by *multiplying* a WACC rate with regulated asset value "RAB". WACC rate is set as average weighted capital price, while applying optimal funding structure set by the Commission (e.g. 60/40). RAB is set as a sum of residual (not revalued) value of long-term assets and compulsorily retained storage minus (i) the unemployed or temporarily unemployed value of assets which the TSO has not started to exploit, except the unfinished construction of strategically important investments to help achieve national and international competitiveness European energy policy goals, (ii) amounts obtained through received subsidies, (iii) other grants and funds, e.g. from connection fees. As mentioned, the Commission evaluates the reasonability of investments to be made by the TSO. If investments are not approved by the Commission, they cannot be recognized as reasonable and are not included into the RAB and tariff (Article 15(3) of the Law on Energy).

By applying this method, WACC is calculated and acknowledged as reasonably regulated profit. Earned regulated profit by the regulated energy company could be used for further investments in network development. This Price Methodology for calculation of tariffs does not contain special provisions applicable to funding mechanisms that would directly encourage the development of any innovative projects. Still there are several means to foster investments in general:

- TSO projects with strategic importance could be granted additional ROI based on NRA assessment;
- the unfinished construction of strategically important investments to help achieve national and international competitiveness European energy policy goals in the case where additional ROI is not granted;
- the reduction of ROI in the case of decreasing quality indicators is foreseen, which encourages natural gas companies to make investments which guarantee reliable and uninterrupted natural gas supply;
- additional ROI is allowed in the case of reduction of OPEX due to efficiency.

The Second financing mechanism includes investments made using borrowed fund from third parties, e.g. financial institutions. In such case, the cost of the loan is covered and included in the regulated tariff. The Third financing mechanism includes investments made using EU or other state funds – i.e. subsidies. However, investments into the asset made using subsidies are not included into the RAB and no regulated profit is earned from assets financed by using subsidies.

3.1.4. Regulatory rules with respect to innovation

Specific duties of the TSO aimed at encouraging innovation

Duties, including those applicable to innovation are established in the Law on Natural Gas, which provides that TSO has to optimise the use of natural gas by:

- providing energy management services;
- developing innovative pricing formulas;
- introducing intelligent metering systems or smart grids; and
- promoting efficiency in the use of natural gas³⁷.

Additionally, the TSO has to comply with legal act requirements, which encourage innovation, e.g. Rules on Principles for Implementation Smart Grids Natural Gas Networks No 1-146 of 5 June 2015, adopted by the Minister of Energy, which sets the main principles that must be followed by gas energy companies, when involved in the construction and development of new infrastructure or modernization and reconstruction of existing infrastructure:

³⁷ Article 15(5) of the law on Natural Gas.

- Smart grid technologies must ease integration into EU internal market, ensure a higher security of supply standard, or reduce overall impact on climate and environment; and
- Smart grid technologies must ensure a higher level of services for customers, higher efficiency level, reduce losses or ease natural gas trading.

Specific duties of the NRA aimed at encouraging innovation

There are limited duties on the Commission to encourage innovation in terms of statutory framework. Yet, the duty to encourage innovation is inherently implicit in the more general duties on the Commission. These comprise that the Commission has to adopt the rules, criteria and methodologies in accordance with development of the technology of smart grids³⁸, ensure growing efficiency and more environmental friendly measures.

3.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

Duties, including those applicable to security of supply, are thoroughly described in Section 3.1.1 and 3.1.2.

Specific duties of the NRA aiming at safeguarding security of supply

One of the duties of the Commission is to supervise compliance with rules of natural gas system security and reliability³⁹. It should also be noted, that one of the objectives of the ten-year network development plan is to guarantee the security of supply. Therefore, the Commission safeguards security of supply by approving the ten-year network development plan.

3.2. Regulatory practice

3.2.1. Overview over regulatory practice in Lithuania

Information about the general regulatory framework in Lithuania

The TSO recoups its investment by the application of tariffs approved by the Commission, and subsidies from the European Commission, as illustrated in Section 3.1.3.

The current regulatory frame does not hinder the TSO from investing in infrastructure projects, being it oriented to the implementation of innovation or security of supply solution.

The “price-cap” financial mechanism allows the TSO to have a regulated Return on Investment (ROI) proportional to the value of the Regulated Asset Base (“RAB”). There is therefore an inherent bias towards investing on CAPEX intensive projects able to increase the RAB than on OPEX based projects. On the other hand, however, the “Methodology” offers the possibility to allow higher Return on Investment for those projects promoting OPEX efficiency in TSO’s services, and achievement of national and EU energy policy objectives.

Out of the current ongoing projects 80% are security of supply related, while the remaining are centred on innovation. Focus on innovation is drawn upon intelligent metering system and digitalization. This includes the introduction of new market platform aiming at interlacing the Baltic gas market with the European gas market, as well as remote control of the transmission system.

Main regulatory barriers

There is no evident example of project showing how the current regulation framework might stymie the TSO from undertaking investments on either security of supply or innovation related projects.

Regarding the main barriers in the questionnaires (see Annex III), the NRA underlines that none of them are present in the current framework. Incentive mechanisms do not incentive innovation per se, but they reward all solutions, which lead to efficiency of operation. According

³⁸ Item 9 Article 19(2) of the Law on Natural Gas.

³⁹ Item 10 of Article 7(1) of the Law on Natural Gas.

to the NRF, reduction in OPEX is remunerated through a corresponding increase of regulated ROI for the TSO.

3.2.2. *Regulatory practice related to innovation*

Innovative projects

Innovative projects do not account for more than 20% of the gas infrastructure investment. Efficiency of performance of the TSO and the resulting efficiency gains are key elements in the incentive mechanism in the NRF. Innovative projects are understood as being projects, which allow the TSO to lower down OPEX in exchange of a higher level of regulated return.

Adequacy of the NRF relating to its support for innovative investments

As far as innovative investments are concerned, the TSO is constrained by finding solutions, which create efficiency gains. If the NRF is adequate in bolstering investments in modernization of the current gas grid based on operational cost reductions, the bureaucracy of the project overall approval process represents a pitfall which dilute the average approval time. Currently, the approval time is 30 days from all necessary information submission. However, the duration of approval might be delayed if not all, insufficient, low-quality information is submitted to the regulatory authority which then hinders smooth and coherent process of the project evaluation.

In two projects regarding the modernization of the gas transmission system ("Change of valve knot and connection to SCADA" and "Installation of intelligent pig launcher/ receiver"), the approval process was extremely difficult given the level of bureaucracy the TSO should go through and lasted above a minimum of 6 months.

3.2.3. *Regulatory practice related to security of supply*

Security of supply projects

Around 80% of the projects are related to security of supply. Security of supply projects encompass additional capacities for capacity reinforcements for the integration of the gas market of the domestic Baltic countries with the European gas market.

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

The NRF is considered adequate to support security of supply investments in general.

3.2.4. *Illustrative specific projects*

The enhancement of Latvia-Lithuania Interconnection is an example of a major gas infrastructure project, that largely is driven by security of supply. As such, it is an example of how the current regulatory regime works in practice.

This project aims at enhancing the capacity of the gas systems interconnection between Latvia and Lithuania, ensuring safe and reliable natural gas supply, and achieving a more effective use of the infrastructure and better integration of the gas markets of the Baltic States. Goals of the project are to:

- enhance the capacity of the gas systems interconnection between Latvia and Lithuania;
- ensure security of gas supplies;
- create conditions for a better integration of the gas markets of the Baltic States; and
- ensure security and reliability of operating gas system.

Moreover, it is important to increase the capacity between both countries because it will ensure better utilisation of PL-LT interconnection (GIPL), LNG terminal in Klaipėda, and Inčukalns Underground Gas Storage Facility. Currently, the interconnection capacity is limited by Kiemenai gas measurement station in Lithuania whose daily maximum capacity is circa. 67 MWh, while after the enhancement capacity could reach up to 125 GWh per day.

To achieve the required Latvia-Lithuania interconnection capacity increase, it's necessary to perform the market and technical research. JSC "Conexus Baltic Grid" and Lithuanian transmission system operator AB "Amber Grid" received funding from European Infrastructure interconnection fund to perform such research.

The research will consist of the following main elements: Identification of the requirements of regional gas market; Research of different alternatives, including the location of pipeline; Calculation of the required capital investments; analysis of cost benefits; and preparation of other documents in accordance with the methods elaborated by ENTSG. The foreseen completion date is 2021.

Approval process

The approval process was not considered cumbersome by the TSO given the support of the EC, but lasted 6 months.

The cost benefit analysis was prepared according to the provisions of the EU Regulation on guidelines for trans-European energy infrastructure and consistent with the ENTSG methodology.

Financial mechanisms

No amendment of the NRF was necessary for the investment.

The project was included into EU List of Projects of Common Interest (14 October 2013) and granted with EU funding under the Connecting Europe Facility (CEF). The investment approval underwent Investment Cross-Border Cost Allocation (CBCA) decision between the Lithuanian and Latvian NRAs.

Gas Interconnection Poland - Lithuania (GIPL)

The gas interconnection Poland-Lithuania (GIPL) is a transmission system development project of regional importance (Project of Common Interest), and implemented by Amber Grid and Polish TSO GAZ-SYSTEM S.A.

The main set out goals of the project are so synthesized:

- Integrate the gas markets of the Baltic countries and Finland into a single EU gas market;
- Diversify gas supply sources and routes;
- Increase security and reliability of gas supplies;
- Increase the flexibility of the gas transmission system in BEMIP region and establish the mechanism of solidarity in case of emergency; and
- Create preconditions for a competitive regional gas market.

Approval process

The approval process for this project required 9 months despite the approval was not complicated upon the intervention of the Agency for the Cooperation of Energy Regulators (ACER).

The challenge in the approval was the lack of agreement between the different (Poland, Lithuania, Latvia, Estonia) member states' NRAs concerning Cross-Border Cost Allocation (CBCA) decisions.

Financial mechanisms

The total (LT and PL side) construction cost of the project amounts at EUR 558 million.

Around EUR 305, million are co-financed on both sides of the project under the Connecting Europe Facility (CEF). Financed by EU funds, loans and Amber Grid own funds, the overall project cost on the Lithuanian side amounts at around EUR 136 million.

3.3. Options for improvement

The current regulatory framework, based on the financial mechanism described in Section 3.1.3, does not preclude the TSO from investing in innovative or security of supply related investments.

3.3.1. Options to improve regulatory practice

The above discussion shows that the NRF works reasonably well for security of supply and especially interconnection projects, which are important to integrate the Lithuanian gas system

with the European Intercontinental gas market. However, the process for approval and assessment of investments may be streamlined in order to reduce the complexity of approval and cost allocation in case of cross-border investments.

(i) Introduce a wide social CBA for national investments

The approval process of the kind of project described in Section 3.2.4 has been complicated by cost allocation between neighbouring/interconnected countries. One possible solution to get over such impediment would be to include social CBA in national plans; not only would such approach ameliorate the final investment decision making process, but also it might constitute the basis for cost allocation decision between the involved countries' TSOs during consultation phases.

3.3.2. National law mechanism(s) for implementing options

We consider that the above mentioned change could be implemented using legal powers already available to the NRA under the existing NRF, as the NRA already applies CBA method to evaluate costs and benefits of investments of the energy companies.

As regards proposal of incorporating a wide social CBA for CBCA as a mandatory requirement when developing the national plan, it could be implemented by including such an obligation in the Description of Energy Companies Investments Evaluation and Approval by the National Commission for Energy Control and Prices (the NRA decision No O3-100 of July 10, 2009) (Description). We understand that the amendment of Sub-section 3 of the Section 3 of the Description should be made.

3.3.3. Impact assessment

A negative side effect of option (i) could be the introduction of delays in the initial phase of implementation of investment projects given the introduction of the additional analysis. However, with time, when the implementation of this option becomes mature, the measure will facilitate the collaboration among the TSOs in the underlying cross-border cost allocation decision process.

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	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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).

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

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	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• (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.	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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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