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

Country Report - Slovenia

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Country Report - Slovenia

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The NRF in Slovenia

The Slovenian transmission network is owned and operated by the electricity TSO, the company ELES, d.o.o. Plinovodi/TSO is the owner and operator of the gas transmission network and transmission provider in Slovenia. The TSO is required to carry out investment/development projects to deliver on their legal/regulatory duties. Investment projects are provided by the TSOs in the development plan and investment plan that is based on the development plan.

The TSOs' operations are entirely regulated by the national regulator the Energy Agency. The ELES management is regulated by the Ministry of Infrastructure. The allowed revenue is determined by the Energy Agency for the current 3-year regulatory period. It is intended to cover operational and maintenance costs, capital costs and other eligible cost.

For both electricity and gas, there is a revenue cap in Slovenia, which, in the case of electricity, is accompanied by some incentives, which appear to favour new technologies and innovation, e.g. investments in smart meters, in smart grid projects and in pilot projects as well as free of charge obtained EU funding. There are hence explicit references in the tariff methodology/incentives for electricity. For gas, new investments are only approved if they increase the infrastructure standard or reduce the critical risks in the security of supply risk assessment. For gas, there is no reference to innovation or linked concepts in the NRF except for new use of gas.

The regulatory practice in Slovenia

For electricity, the stakeholder interviews show that the NRF is well-designed and functional for security of supply and that the TSO is innovative, investing in both various innovative typological investments and in R&D projects. Yet, despite the fact that the TSO is investing in innovative and R&D projects and using the NRF to this end to its fullest, there is room for improvement regarding smart grid investments, the perceived CAPEX bias and the absence of explicit incentives for innovation in the current NRF (2016-2018).

For gas, the stakeholder interviews show that the NRF is well-designed and functional for security of supply projects. Yet, stakeholders point at issues regarding security of supply projects with no commercial benefits and the lack of incentives for innovative projects as EU support for gas projects is very limited.

The options for improvement below try to tackle the problems mentioned here.

Options for improvement

Given the problems mentioned above, the following options for improvement are suggested for the electricity and gas NRF:

1. Favouring of OPEX-based solutions is an option to improve the electricity NRF, since stakeholders are worried about a bias in favour of CAPEX solutions and little incentives for, e.g., smart grid projects;
2. Statutory authorisation to consider alternatives could be a more general approach to foster OPEX-based solutions in electricity in the long-term;
3. A statutory reference to innovation could be beneficial to both the gas and electricity NRFs as it aims at ensuring that incentives for innovation are incorporated into the NRF and the implementation practice, such that the TSOs also in the future will be able to innovate;
4. Stakeholder consultations and consultations on investment plans are relevant both for electricity and gas to ensure that social and environmental benefits of investments are accounted for.

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, a 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 analyses. It is divided in 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 Slovenia, 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 Slovenia. 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 carry out 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 investmentsn 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 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 Slovenia

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

The Slovenian transmission network operates at a high voltage level of 110 kV, 220 kV and 400 kV.

By joining the EU, Slovenia became a part of the internal energy market, therefore, it was obliged to implement a system comparable to other EU countries. On the basis of EU directives and regulations, Slovenia implemented the liberalization of the energy market, with which the rules allowing the development of competition between market participants were set. In accordance with the provisions of the legislation, the Energy Agency is established as the national energy regulator and responsible for preparation of and compliance with these rules.[1]

The regulator's task is providing the circumstances for development of competition and ensuring its operation by taking into account the requirements for sustainable, reliable and high-quality supply. In order to act in the interest of all market participants, the regulator must be politically and financially independent. Therefore, the Energy Agency is not financed from the state budget, but from network charges (compensation from gas and electricity TSOs for the Energy Agency's regulatory tasks).[2]

The Slovenian Energy Act (Official Gazette of RS no. 14/17 and no 81/15) ("**Energy Act**") is the principal piece of primary legislation governing the Legal Framework for electricity in Slovenia. The Energy Act established the Energy Agency.[3] This law sets out the principles of energy policy, the rules for the functioning of the energy market, the ways and forms for the implementation of public utility services in the field of energy, the principles and measures for achieving security of energy supply, to increase energy efficiency and energy saving and to increase the use of energy from renewable sources, determines the conditions for the operation of energy devices, regulates the competencies, organization and operation of the Energy Agency and the powers of other bodies performing tasks under Energy Act.[4]

The Energy Agency shall, acting under public authorization, carry out the administrative and other tasks specified in the Energy Act, EU regulations, which determine the competences of the national energy regulators, or general acts of the Energy Agency adopted on the basis of energy legislation. The tasks can be summarized in the following areas:

- regulation of network activities, which covers economic regulation of all electricity and gas system operators and the regulation of the network with respect to issuing consents to the general acts;
- regulation of the supply of heat and other energy gases;
- ensuring a reliable supply of natural gas;
- promoting the production of electricity from renewable sources and cogeneration;
- promoting efficient use of energy;
- monitoring of electricity and natural gas market;
- supervising the providers of energy operators' activities;
- protecting the rights of consumers[5].

The Energy Agency must, at least once a year by 30 June for the preceding year, submit a report on the state of the energy sector to the Government of the Republic of Slovenia and the National Assembly of the Republic of Slovenia. The report shall include the data on activities and measures carried out by the Energy Agency with regard to the fulfilment of its tasks.[6]

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1 https://www.agen-rs.si/web/en/about-the-agency.
2 https://www.agen-rs.si/web/en/about-the-agency.
3 See Section 6, Article 383 of the Energy Act.
4 See Section 1, Article 1 of the Energy Act.
5 See Section 6, Article 385 of the Energy Act.
6 https://www.agen-rs.si/web/en/tasks-of-the-energy-agency.

The Energy Agency in performing its task establishes conditions that encourage regulated companies to improve performance and investments. It supervises and monitors the implementation of regulated activities by determining the right balance between the quality of supply and prices for regulated services and promotes the efficient use of existing infrastructure. It ensures the transparency and openness of the regulatory process. It cooperates in the preparation and amending of the rules and general acts regulating market operation, and promotes transparency and non-discrimination.[7]

The Energy Agency is continuously improving the regulation of the energy market in accordance with best professional practice. It participates in the creation of the internal energy market at regional level. The Energy Agency is a member of the Agency for the Cooperation of Energy Regulators (ACER), which coordinates the work of Regional Initiatives and oversees the implementation of regional and cross-border projects within this area. Regional markets arose as a result of EC and NRAs initiatives in order to gradually achieve the goals of the internal energy market.[8]

Slovenia is a part of the following regional markets for electricity: Central Eastern Europe (CEE), Central Southern Europe (CSE) and Energy Community.[9]

2.1.2. Specific legal rights and duties

Role of the TSO

The Slovenian transmission network is owned and operated by the electricity TSO, the company ELES, d.o.o.

The transmission system operator must within nine months after the adoption of the State Development Energy Plan (DREN), prepare the development plans for the system and obtain the consent of the Ministry of Infrastructure on the basis of the methodology prepared by the said Ministry. Development plans must be made for at least 10 years and must be in line with DREN. The TSO must adopt the development plans of the system every two years. The Ministry of Infrastructure must decide on the consensus regarding the development plan.[10]

The legal framework for the preparation of the Development Plan includes provisions by the Republic of Slovenia and the EU, provisions of the Resolution on the National Energy Programme and the Resolution on National Development Projects, as well as technical requirements and recommendations by the European Network of Transmission System Operators ENTSO-E.[11]

The development plan should define the main infrastructure for the transmission of electricity, which should be built or modernized in the next ten years for the security of electricity supply, the safe operation of the networks and adaptation to further developments in the production of electricity from renewable sources, the introduction of intelligent network services and the provision of storage facilities. In doing so, it must take into consideration the forecasts of electric power offtake, as well as from the forecast covering electric power offtake. The development plan should include an assessment of the potential for increasing the energy efficiency of electricity infrastructure with load balancing and interoperability, connectivity with energy production plants, including micro-production, and define time dynamics and financial evaluation of planned investments and actual measures for cost-effective improvements in network infrastructure.[12]

Transmission network planning is based on information on its condition in previous operation and long-term forecasts of the production capacities, the consumers' needs and electric power flows from and to other networks through the Slovenian transmission network. In this regard, ELES considers:

- technical criteria for selecting new network elements;
- economic criteria for the optimisation of expenses and income; and

7 https://www.agen-rs.si/web/en/tasks-of-the-energy-agency.
8 https://www.agen-rs.si/web/en/tasks-of-the-energy-agency.
9 https://www.agen-rs.si/web/en/international-activities.
10 See Section 2, Article 30 of the Energy Act.
11 https://www.eles.si/en/development-of-the-transmission-network.
12 See Section 2, Article 30 of the Energy Act.

- environmental protection criteria for ensuring the minimum impact of the network on the people and the environment.[13]

By planning, ELES strives to eliminate the current network overload and to ensure its long-term capacities, a reliable supply in case of network element outage and a stable operation with suitable voltage conditions for the supply of high-quality electric power.

The Development Plan thus includes:
- projects for renovating the existing network elements; and
- projects for strengthening or expanding the network through new elements.[14]

The activity of the system operator is a compulsory state economic public service. Examples of the economic public service system operator's activities are:
- safe, reliable and efficient operation and maintenance of the transmission system;
- the development of the system taking into account the foreseeable needs of system users, the requirements for safe and reliable operation of the system, and the direction of the development plan of the system operator referred to in Article 30 of this Act;
- ensuring the long-term transmission system capacity so that it provides reasonable requirements for connection to the system and for the transmission of energy;
- ensuring quality of supply in accordance with minimum standards.[15]

The system operator must perform tasks in such a way as to promote, in particular, the integration of the electricity market.[16]

For the performance of compulsory public utility services of the TSO, the Republic of Slovenia as a concession grantor grants a concession to a natural or legal person for the whole territory of the Republic of Slovenia for a maximum period of 50 years, which is not subject to the concession fee.

The activity of a system operator may be performed by a concessionaire who fulfils the following requirements:
- owns a transmission system;
- holds electricity TSO certification; and
- has been designated as a system operator.[17]

The operation of the system operator is financed from the network charge and other revenues for the implementation of the public utility service.[18]

Undertaking of investments

The electricity TSO every two years prepares development plans of the transmission network for a period of ten years, which are evaluated and approved by the Ministry of Infrastructure. The plans take into account the strategic national energy policy; in the planning the prescribed methodology is used which takes into consideration the long-term demand forecast, analysis of expected operational conditions, the level of supply reliability and economic analysis, as well as the possible locations of the new large production sources. Development plans determine the planned physical and financial scope of investments in new facilities and reconstruction of existing facilities on the transmission network. The latest development plans for the Slovenian transmission network were prepared for the period 2017-2026. The electricity TSO in its development plans by 2024 follows the fundamental guidelines covering new connections with neighbouring systems, management of uncontrolled power flows, and ensuring adequate voltage support and reliable and safe supply in compliance with the recommendations and criteria set by ENTSO-E (European Network of Transmission System Operators for Electricity).

13 https://www.eles.si/en/transmission-network-planning.
14 https://www.eles.si/en/transmission-network-planning.
15 See Section 2, Article 54 of the Energy Act.
16 See Section 2, Article 54 of the Energy Act.
17 See Section 2, Article 55 of the Energy Act.
18 See Section 2, Article 57 of the Energy Act.

In addition to a development plan, the electricity TSO by 31 January of the year, in which the Energy Agency decides on the regulatory framework, prepares an investment plan and submits it to the Energy Agency. The electricity TSO's investment plan includes a financial evaluation of the investments under the applicable ten-year network development plan to be carried out in the next regulatory period. In the plan, the investments to be funded by the revenue from the congestion-management of cross-border lines under Regulation (EC) No 714/2009 are disclosed separately. In the procedure for setting out the regulatory framework, the Energy Agency examines and evaluates the investment plan. The evaluation provides the basis for specifying the planned eligible costs in the next regulatory framework.

Role of NRA

The Ministry of Infrastructure, in relation to energy planning and monitoring of the implementation of energy policy, among several others tasks, carries out also the monitoring of investments in energy infrastructure and gives consent to the ten-year development plan of the TSO.

When the system operator fails to provide sufficient ancillary services (automatic frequency restoration reserve, manual frequency restoration reserve, black start and voltage regulation), or if it fails to acquire them under competitive conditions, the Energy Agency may, at the request of the TSO without prejudice to the concluded supply contracts, impose on one or more suppliers, generators or consumers of electricity which are able to offer appropriate quantities of ancillary services under most favourable conditions ("**Obliged Person**"), to conclude a contract for provision of system services to the TSO. The Energy Agency shall determine the methodology for determining the prices of the system services by a general act. In determining the methodology, the Energy Agency derives from the costs of providing system services, including an appropriate rate of return on investment, based on the funds invested, taking into account the risks involved. In doing so, the Energy Agency may also take into account prices that are available for comparable system services to system operators in the region. If for reasons that are on the side of the Obliged Person, there is no conclusion of the contract, such Obliged Person is fined. The Obliged Person who acts contrary to the decision shall be obliged to reimburse the participants in the electricity market and the system operator for any damage caused to them. The Obliged Person has the right to demand adequate compensation from the Republic of Slovenia, if it suffers damage caused by the execution of the measure.[19]

2.1.3. Mechanism for financing of investment projects

The ELES operation is entirely regulated by the national regulator the Energy Agency, as determined by the Energy Act and other legal acts. The ELES management is regulated by the Ministry of Infrastructure. Its constant responsibility is to ensure that the operation complies with the legal and regulatory frameworks.[20]

The allowed revenue is determined by the Energy Agency for the current 3-year regulatory period. It is intended to cover operational and maintenance costs, capital costs and other eligible cost. In the allowed revenue of the current period the deviations from previous regulatory periods are included.

The first part of the allowed revenue is the network charge that network users pay through payment orders for electric power. The second part is the auction income created at auctions, where ELES assigns cross-border transmission capacities for trading with electric power. The ELES network is not only a network ensuring electricity supply to domestic consumers; it is also a transit network for traders who buy and/or sell electric power in Slovenia and abroad.[21]

Setting the network charge

The methodology for setting the network charge determines the principles of economic regulation of electricity services of general economic interest and sets the eligible costs of the electricity system operators. The methodology is based on the regulated network charge with the aim that by setting the network charge and other revenues, and taking into account identified deviations from previous years the system operator is capable of covering all eligible costs of the regulatory period.

[19] See Section 2, Article 74 of the Energy Act.
[20] See section 1, Article 32/1 of the Energy Act.
[21] https://www.eles.si/en/key-data-on-operation.

Charging the network charge

The methodology for charging the network charge determines the procedures and elements to charge the network charge and to divide consumers into various consumer groups. For calculating the network charge the non-transaction method of postage-stamp is used, which means a system of uniform tariffs of calculating the network charge on the territory of Slovenia within the individual consumer group. For the allocation of costs for different voltage levels, the gross approach to calculating the network charge for transmission and distribution network is used.

Incentives

The method of regulated network charge is also based on incentives, which depend on:

- Incurred eligible costs;
- Achieved quality of supply level;
- The provision of free ancillary services;
- The acquisition of non-refundable European funds;
- Savings in the purchase of smart electricity meters with communications module;
- Realized investments in smart grids projects;
- Realized pilot projects.

If system operator achieves higher or lower eligible costs of actually incurred eligible costs, this difference is reflected in its income statement.

Incentives concerning the achieved quality of supply level are determined according to the achieved level of supply continuity from the reference level and are reflected in increased or decreased eligible costs.

If the system operator provides one or more ancillary service, free of charge, which is not the result of legislation, incentives of 10% of saving that equals the amount paid for the ancillary service will be recognized to the system operator.

If the system operator obtains non-refundable European funds, incentives of 5% of the current value of the assets is granted to the system operator in the year when the assets was put into service.

If the system operator achieves a lower annual average acquisition price than price-cap of smart meters in accordance with the methodology, a single incentive of 10% of the realized annual saving is recognized to the system operator.

If the system operator realizes the investments in smart grids that meet the requirements set out in the methodology, a single incentive is acknowledged amounting to 3% of the current value of the asset in the year in which the asset was put into service.

If the system operator meets all requirements for the projects promoting investments in smart grids set out in the methodology, pilot tariffs can be used for these projects. Such projects are focused on distribution system operators with billing power up to 43 kW.

Deviations from the regulatory framework

The electricity system operator must identify deviations from the regulatory framework after each year of the regulatory framework. Deviations are established as a difference between planned and actual eligible costs of the system operator and a difference between planned and actual revenue sources, which include the identified surplus or deficit of the network charge from previous years. The Energy Agency issues a separate decision if its calculation of deviation differs from the deviations determined by the TSO.

The Energy Agency keeps under review the implementation of the regulatory framework during the regulatory period by monitoring the monthly realization of the network charge, by analysing the criteria of the costs, and by calculating deviations from the regulatory framework.

When the Energy Agency establishes that during the regulatory period the significant changes in the consumption of electricity in comparison to planned consumption occurs, which results in more than 10% change of the planned network charge for the transmission or distribution system, the regulatory framework is amended already during the regulatory period.

The regulation in the regulatory period from 1 January 2016 to 31 December 2018 is carried out on the basis of the Act on the methodology determining the regulatory framework and the methodology determining the network charge for the electricity system operators.

Relevant product categories

There is no regulation in Slovenia that would determine different categories of the projects, which are typically accommodated under different types of financing mechanisms, unless perhaps projects for increase of cross-border transmission capacities, which are financed only through auction income. All projects are financed through grid fees and the Energy Agency does not want to increase the grid fees.

ELES is trying to change current Energy Agency's politics regarding better finance mechanisms for projects that would encourage innovation – for example smart-grid network brings a lot of social benefits but are poorly financially supported by the Energy Agency (only 3% incentive, please see answer under 3 (ii) above; subtitle "**Incentives**" for further detail).

Features of the financing mechanism designed to incentivise investment in innovation

The key elements that relate to innovation are, namely:

- Energy Agency's role in implementing the economic regulation to prevent monopolistic behaviour of market participants and in order to enable companies to meet opportunities and incentives similar to those in a competitive market;
- Regulated network charge – the method of regulated network charge which is also based on incentives and depend on various factors (please see the list of factors under 3 (ii) above).

However, in practice ELES as Slovenian TSO experiences setbacks when it comes to raising funds for innovation. The foreseen incentives are too low for innovation projects and ELES is faced with more bureaucratic challenges when receiving the incentive for such projects than there are benefits from the received incentive. The major financial support comes from the EU funds. Also (according to the information collected from the ELES) the system of network charge does not in fact incentivise investment in innovation or innovative projects but rather has a limiting effect in that respect. Namely, the Energy Agency would need to increase the network charge in order to provide more funds to ELES.

Also, the auction income created at auctions can (for example) be used only for financing projects that refer to cross-border transmission capacities for trading with electric power.

2.1.4. Regulatory rules with respect to innovation

Specific duties of the TSO aimed at encouraging innovation

The development plan, prepared by the TSO, should define the main infrastructure for the transmission of electricity, which should be modernized in the next ten years for the security of electricity supply, and adaptation to further developments in the production of electricity from renewable sources, the introduction of intelligent network services and the provision of storage facilities. The development plan should among other things include actual measures for cost-effective improvements in network infrastructure.[22]

The Energy Act foresees (among other things) the following activity: development of the system taking into account the foreseeable needs of system users.

Please refer also to Section 2.1.2 above.

However, from the information that we collected from the Slovenian TSO, these duties are not really effective in practice, because there are no effective (or sufficient) financial mechanisms to support the actual performance of such duties.

Specific duties of the NRA aimed at encouraging innovation

Please refer to Sections 2.1.1, 2.1.2 and 2.1.3 above. Additionally, there are no measures taken by the Energy Agency that would prevent any project taken by the TSO regarding the

[22] See Section 2, Article 30 of the Energy Act.

innovation, however the Energy Agency does not provide financial support for all projects or provides minimal financial support.

Most financial support for innovation in Slovenia comes from EU (non-refundable grants), the largest of such EU financing schemes being Horizon 2020.

2.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

Please refer to Sections 2.1.1 and 2.1.2 above.

Specific duties of the NRA with respect to security of supply

Please refer to answers to Sections 2.1.1, 2.1.22.1.2 and 2.1.3 above.

2.2. Regulatory practice

2.2.1. Overview over regulatory practice in Slovenia

Information about the general regulatory framework in Slovenia

The NRA is not responsible for the approval of the ten-year development plan and potential improvement requirements. The Ministry is responsible for reviewing and approving the 10-year development plans of the TSOs. The development plan can be implemented in case it has no significant impact on the tariff: this is ensured by the evaluation of three years investment plan, which is prepared by the TSO and approved by the NRA. The NRA also checks whether the investment plan is in line with the ten-year development plan. Yet, the NRA cannot cancel investments, only postpone individual investments.

Main regulatory barriers

The stakeholders identified three potential barriers, which might hinder (innovative) investments in Slovenia:

- Investments in smart grid elements/technology aimed at replacing planned grid investments;
- Lower TSO TOTEX but shift in the CAPEX/OPEX ratio: although there is not TOTEX regulation in Slovenia, interviewee points out that there is an investment bias towards CAPEX. Smart girds projects implying more OPEX are not stimulated so far. Yet, in the upcoming regulatory period costs of maintenance of smart grids are defined as non-controllable OPEX and hence a pass through cost. Moreover, future OPEX is determined in advance according to the OPEX from the last three years.

The changes in regulatory framework in the domain of incentives are subject to certain limitations according to the provisions of Energy Law. The flexibility of the framework is hence limited.

According to some stakeholders, the scope of the TSO's role is a barrier, as it does not involve new technologies, such as storage. For Slovenia, the question of investing in and operating storage has a specific importance due to the perceived lack of ancillary services from its neighbouring Southern countries and balancing issues in these countries.

Another challenge is to include tools to account for more than financial gains and include environmental and social benefits.

2.2.2. Regulatory practice related to innovation

Innovative projects

ELES, the only TSO-E in Slovenia, has established the Department for Strategic Innovation last year; however before this the TSO was working to increase its innovativeness, i.e. for the last 3-4 years.

With regard to the examples for innovative infrastructure as presented in Annex I, the stakeholders mention that projects concerning TSO and DSO process integration are important.

Example projects related to the list of typological investments in Annex I are:

1. New transmission lines, based on innovative technology: they are not seen as purely innovative;
2. Projects entailing dynamic capacity rating are present aiming at utilising existing transmission lines or transformers at higher levels, e.g. the introduction of dynamic capacity rating: an example of a PCI in this area is Sincro Grid;
3. Power flow control components: this typological investment is also not seen as particularly innovative, shifting transformers have been used by the TSO already for some time and the TSO has invested a lot in phase shifter transformers;
4. Ancillary services provision components: there are investments into components contributing to ancillary services provision; Sincro Grid is an example as it also entails storage components;
5. New/extended power system control and automation technology aiming at lowering the risk of disturbances threatening security of supply: WAMPAC technology is an example of what Slovenia is doing in this category. WAMPAC is not only about wide area measurement as WAMS, but extended with control functionality. they do a lot in wide area management and real time system usage;
6. Partial automation of system operation processes for better utilisation of existing grid capacities; and
7. Improvement of approaches to curative congestion management.

Regarding types 6 and 7, the aim is to solve problems related to grid capacities and congestion management with phase shifting transformers in order to avoid re-dispatching or curtailment on TSO level. Within the OSMOSE project, they will also address the possibility of better use of existing cross border infrastructure by using conventional storage facilities. They are also in the beginning stage of two projects that are investigating the coupling of technologies, one is related to transport and the other to gas.

Other types of projects considered innovative encompass the integration of information systems based on standards (CIM) and efficient data exchanges between SOs. As mentioned before, storage is seen as an important innovative area to invest in, which is not included in the list of typological investments in Annex I. Micro grids are also lacking as typological investment.

Examples of innovative investments and R&D projects

An example for a micro grid project is the city-wide micro grid of the city of Ljubljana. It was built as an answer to an icing problem when the TSO lost transmission lines to supply the city. A part of the project is a smart grid multi-functional storage device, a new battery storage. It serves multiple purposes: it can be storage for ancillary services, for isolated operations, it can improve the quality of supply and reduce voltage dips.

An example for a PCI is the interconnection line to Hungary, although it is not really innovative. But it will, in combination of other ongoing projects, like FutureFlow, enable better cross-border exchange of flexibility services between Slovenia and Hungary and improve security of supply in times of stressed market conditions.

The TSO is researching the possibility to conduct a project about drone inspection in the case of physical outage.

ELES is very active regarding smart grids, leading the first smart grid PCI. In this project, DSOs and TSOs of two EU countries working together (http://www.sincrogrid.eu/).

The TSO has a “budget under coordination” of 130 million Euro for innovation. Within this budget, the main focus is on R&D, demonstration projects and pilot projects which range from core-business practices to international cross-border cooperation and cross-border market projects.

ELES is a coordinator of a 13 million Euro H2020 project FutureFlow, which establishes a cross border cooperation between four neighbouring TSOs.

Moreover, the TSO coordinates two big innovative investment projects and 7 or 8 R&D projects funded by the EU, e.g.:

- A project of 90 million Euro of which 50% is covered by the EU (SINCRO.GRID). This project is implementing mature advanced technologies, it is the way it is designed which is innovative;

- The project with NEDO costs 36 million, of which 20 million is covered by NEDO, where the logic is similar to SINCRO.GRID but more space is given to innovation;
- The rest is related to the H2020 research projects, where medium to highly innovative ideas are developed.

Adequacy of the NRF relating to its support for innovative investments

The NRA believes that current regulation framework is generally adequate. They note that the next regulatory framework (regulatory period 2019-2021) will include some improvements, based on identified shortcomings.

The current regulatory framework includes one main option for incentivizing innovative actions of the TSO: investments that take advantages of smart grid technologies.

As mentioned above, there are already several innovative projects such as SINCRO.GRID, FUTURE FLOW and NEDO. Moreover, as mentioned above, there are several other R&D projects that have been already started by TSO under current regulation and are funded under EU Horizon program. Given the types of projects reported to the incentive scheme, the NRA concludes that the TSO uses the scheme to its full extent.

At the end of 2017, the TSO formally proposed the extension of the current scheme onto the segment of research and development with reasoning that some of the project costs not covered by EU funds are not treated as eligible costs in the regulatory framework. The TSO also proposed to the NRA the increase of the incentive percentage for investments in smart grids.

In the new regulatory framework, which is currently in the process of public consultation and which will be active for 2019 through 2021, the incentive scheme will be enhanced and a third option (in addition to the two mentioned above) is planned to be introduced, namely the TSOs may be directly incentivized by implementing research and innovation projects and by including other partners from the electricity value chain in the projects (market actors, aggregators, research institutes, etc.). The mechanism is similar to OFGEM's NIA.

The TSO acknowledges the incentives established by the regulator, but is of the opinion that much more could be done. The TSO notices that the new regulatory scheme in preparation is more favourable to innovation activities, but is still not aligned to innovation projects' life cycles and complexity. Nevertheless, the TSO hopes that the new NRF will encourage DSOs to engage more in innovation and cooperation with TSOs.

The adequacy of the current NRF to support innovative projects is hence rated low, but the expectations are that the new regulation will provide more stimuli to the TSO to be innovative.

A possible reason for the shortcoming of the current regulatory framework to incentivise innovation is that the regulator only looks at the regular business of the TSO and that the regulator sees innovation as an extra. In the current regulatory period, the costs of innovation are included in the controllable OPEX and other revenues deriving from obtaining EU funds are part of the allowed revenue, this could be seen as a negative innovation incentives. However, in the upcoming regulatory framework, costs of innovation are defined as an additional eligible cost.

2.2.3. Regulatory practice related to security of supply

Security of supply projects

Security of supply projects which were mentioned encompass the interconnection between Slovenia and Hungary, which is a PCI in permitting phase, the Sincro.Grid project, which is a PCI in the implementation phase. The Sincro.Grid project is an innovative project, which also addresses security of supply issues, such as system stability, WAMS, island operation, DTR.

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

The interviewees mention that security of supply in electricity is at a very high level in Slovenia.

2.2.4. Illustrative specific projects

The following projects are considered examples of innovative and security of supply projects. The first three projects can be considered innovative projects and next two are security of

supply projects. The projects illustrate how the current framework incentivises innovation and security of supply projects. For all projects listed below, there are provisions to tackle the mismatch between realised and expected costs in place, there is ex-ante CAPEX approval, stability arrangements are present, but there is no additional WACC incentive.

SINCRO.GRID (PCI)

Description and aim

This SINCRO.GRID is considered an innovative project. The project, which is a Project of Common Interest to the EU and builds up network capacities through Slovenian-Croatian cross-border cooperation by integration of synergetic, mature technology-based solutions in order to increase the security of operations of the Slovenian and Croatian electricity systems simultaneously.

Approval process

According to the Slovenian methodology this projects automatically qualifies for the additional incentive for smart grids investments because it has been qualified and approved as PCI Smart Grid project at the EU level (PCI Smart Grids qualification is in line with regulatory requirements on national level for qualification into incentive scheme). The approval process hence has been smooth, no amendments were needed to the design of the project.

Financial mechanisms

From the perspective of incentives, this project was treated as any other project but with an additional incentive for qualified smart grids, projects granted for activated assets due higher investment risks and different cost allocation.

FUTURE FLOW

Description and aim

FUTURE FLOW links interconnected control areas of four transmission system operators of Central-South Europe, which today do face increasing challenges to ensure transmission system security: the growing share of renewable electricity units has reduced drastically the capabilities of conventional, fossil-fuel based means to ensure balancing activities and congestion relief through redispatching. Research and innovation activities are proposed to validate those consumers and distributed generators can be put in a position to provide balancing and redispatching services, within an attractive business environment.

NEDO

Description and aim

NEDO, an example of an innovative project, is a three-year smart grid project whose principal partners are NEDO and its authorized contractor Hitachi, and ELES (TSO). Alongside ELES, a large number of stakeholders from Slovenia will participate in the project, which is why it can rightfully be called a national project and is one of its kind in Europe.

Approval process

The project has been qualified according to the NRAs methodology for operational incentive enabling the project to use the pilot dynamic critical peak network charge tariff. Moreover, a SCBA has been used to assess the project. The approval process has also been smooth, no amendments were needed to the project.

Financial mechanisms

Part of the project is considered a pilot project and uses dynamic network tariffs. The other part of the project is investment project, which the TSO can obtain incentive for.

WAMPAC

Description and aim

A development step further from WAMS onwards represents the so called **WAMPAC** (Wide-area measurement protection and control) system, which is able not only to monitor variables in real-time but also provides the operator with information about the type and location of

disturbances, and it is able to suggest and even to implement adequate measures. The goal is to improve operation of the system and in critical situations even to prevent collapse of the system.

Approval process

The project has been started, but the system operator has not reported any asset activation and accordingly the approval process has not started yet. Moreover, a SCBA has been used to assess the project.

A similar project regarding advanced metering infrastructure (AMI), WAMS, has not been approved, as the criteria on smart grids were not matched.

Financial mechanisms

but it will not qualify automatically. However, we can confirm that it matches NRA's criteria on smart grids projects, so it is compliant with incentive scheme.

Interconnection between Slovenia and Hungary

Description and aim

The interconnection between Slovenia and Hungary is considered a security of supply project. Net transfer capacity at borders and control of electricity transit flows provide security of domestic electricity supply. In the preparation phase is the connection with the transmission system of Hungary, which will increase the reliability of the Slovenian power system, and significantly increase import transfer capacity and reliability of the transmission system. The project will enable better integration of the regional markets and facilitate the access to Eastern electricity markets, which will allow in the long term more favourable prices of electricity for the Slovenian consumers.

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 projects. Despite the fact that the TSO is investing in innovative and R&D projects and using the NRF to this end to its fullest, it sees room for improvement regarding smart grid investments, the perceived CAPEX bias and the absence of innovation in the NRF. The following options for improvement focus on these aspect.

(i) Favouring of OPEX-based solutions

Slovenia does not have a TOTEX regulation and the stakeholders were concerned about a bias in favour of CAPEX solutions. They are also concerned about a CAPEX bias in view of smart grid projects, which, according to the TSO, need a larger incentive than the existing one. Moreover, they noted that the future OPEX allowance is determined by using historical OPEX figures. Without changing to a TOTEX regulation, specific incentives for OPEX-based solutions which have been identified as advantageous or necessary could be introduced. Such an approach has already been taken with regard to smart grid projects: monetary rewards have been introduced to stimulate these types of projects. These rewards could be increased and extended to other important OPEX-based solutions, which would fall outside of the OPEX allowance determined by historical OPEX figures. Another possibility would be the introduction of a specific budget, e.g. for IT-technology.

(ii) Statutory authorisation to consider alternatives

A more general approach to foster OPEX-based solutions in the long-term, i.e. above beyond a single regulatory period, 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. This approach should be coupled with monetary incentives (like option (i)) for the TSO to invest in OPEX solutions to counteract the CAPEX bias. Furthermore, this approach seems incompatible with an OPEX allowance based on historical OPEX figures.

(iii) Statutory reference to innovation

The stakeholders reasoned that the shortcomings of the current NRF regarding innovation stem from the fact that the NRA focusses on the 'regular business' of the TSO and perceives innovation as an 'extra'. The measures so far, such as the monetary rewards given for specific innovative projects, have been ad hoc and introduced as a consequence of the NRA assessing current and mid-term needs. A long-term strategic perspective could change the perception of the NRA, but 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.

(iv) Stakeholder consultation

Stakeholder consultation can be used to determine OPEX solutions to be favoured from option (i) and help shaping the long-term perspective on innovation of option (iii), thereby potentially ensuring that social and environmental benefits of investments are accounted for in an NRF. Yet, the organisation of stakeholder consultations has disadvantages, such as the additional organisational burden on the party organising the consultation (the TSO or NRA) and a potential delays in implementing an investment project. Hence, one needs to think carefully how often and for which purposes one wants to consult stakeholders.

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.

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.

Regarding the option (ii) (Statutory authorisation to consider alternatives), the suggestion of incorporating an obligation for TSO to consider OPEX-related innovative options in the network development plan, could be implemented by including such an obligation in the Energy Act or implementing regulation via Slovenian Legislative Process.[23]

[23] The Slovenian Legislative Process entails the following: draft law may be submitted to the President of the National Assembly by the Government (which is a collective body whose members are ministers responsible for a certain field of work and presided by the Prime Minister), a member of the National Assembly ("**deputy**"), the National Council, or at least 5,000 voters. The proposer sends the draft of (amending) law to the President of National Assembly. Legislative Process has three readings of the draft. The first reading of a draft law begins when the draft law is forwarded to the deputies and to the President of the National Council (and also to the Government of the Republic of Slovenia, if it did not propose the amendment). Within 15 days of the draft law being forwarded to the deputies, at least ten deputies may request that the National Assembly holds a debate on the reasons that require the adoption of the law and on the principles, goals, and basic solutions of the draft law (the general debate) after which it decides whether the draft law is appropriate for further reading. The President of the National Assembly determines the working body responsible and refers the draft law to it for discussion. The second reading of a draft law is first held within the working body responsible and then, pursuant to the report of the working body responsible, at a session of the National Assembly. If no general debate on the draft law has been held, the representatives of the deputy groups may present the deputy group's position on the draft law at a session of the National Assembly. In the second reading, individual articles or parts of the draft law are debated and voted on and the title of the law is only debated and voted on if an amendment to it has been tabled. The working body responsible debates and votes on individual articles of the draft law. Amendments to a draft law may be tabled by deputies, a deputy group, working bodies and the Government. The proposer of the law, the working body concerned and the Government may deliver opinions on individual amendments. The National Assembly debates the individual articles to which amendments have been tabled and votes on individual amendments. If in the second reading amendments have been adopted to less than a tenth of the articles of the supplemented draft law, the National Assembly may decide on the proposal of the proposer to hold the third reading of the draft law at the same session, unless more than one third of the deputies present oppose. If no amendment to the supplemented draft law is adopted in the second reading, the National Assembly proceeds to a vote on the law at the same session. In the third reading the National Assembly debates individual articles of the draft law to which amendments have been tabled and votes on the amendments and the draft law. On the basis of the decisions of the National Assembly, the Legislative and Legal Service prepares the final text of the law. The National Council has the power to request reconsideration of a law prior to its promulgation. The new law is signed and

Turning to option (iii) (Statutory reference to innovation), we expect that this could be implemented by including statutory duties in the Energy Act through the Slovenian Legislative Process.

As regards option (iv) (Stakeholder consultation), we understand that this could be implemented by including the conditions for consultation in the Energy Act through the Slovenian Legislative Process.

2.3.3. Impact assessment

Option (i) results in more work for the NRA and potentially the TSO: innovative and socially beneficial OPEX solutions to be favoured by the regulation need to be defined. Such projects would need to be redefined for each regulatory period, possible in cooperation with the TSO and maybe including a stakeholder consultation. Option (i) is not easy to implement in balanced way. The option has the risk to turn out to be a technology-specific incentive that does not necessarily lead to efficient decisions and may even encourage abuse. Also, innovative and socially beneficial OPEX solutions to be favoured by the regulation need to be defined. Such projects would need to be redefined for each regulatory period, possibly in cooperation with the TSO and maybe including a stakeholder consultation in order to ensure technology neutrality. Therefore, depending on the specific implementation the effort for the NRA and the TSO can be high. Additionally, adequate incentives for efficiency must be set to avoid abuse.

The long-term strategic perspective on innovation mentioned in option (iii) necessitates efforts and coordination between the TSO and the NRA regarding the design of this long-term perspective (e.g. the organisation of stakeholder consultations, determining the scope of the innovation needed, monitoring and evaluating of how the statutory duty is translated into the long-term perspective).

As mentioned in option (iv) and the other options above, stakeholder consultations can contribute to introducing social and environmental benefits into the NRA. Yet, consultations could increase the organisational burden of the TSO and/or the NRA. Therefore, consultations as instrument need to be used wisely.

The TSO is already implementing many innovative and R&D projects, despite relatively little innovation incentives in the NRA. Therefore, we do not expect that the options mentioned above will result in a considerable increase of innovative or R&D projects. Rather, these changes are aimed at ensuring that incentives for innovation, which is socially and environmentally beneficial, are incorporated into the NRF and the implementation practice, such that the TSO will be able to innovative also in the future.

promulgated by the President of the Republic of Slovenia and must be published in the Official Gazette. The law enters into force 15 days after the publication, if not determined otherwise.

3. GAS

3.1. Legal analysis of the NRF in Slovenia

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

The Energy Act (Official Gazette of RS no. 17/14 and 81/15) ("**Energy Act**") is the principal piece of primary legislation governing the Legal Framework for gas in SLO. The Energy Agency is the regulator of the Slovenian transmission system operator ("**TSO**") and distribution system operators ("DSOs"). It derives its primary duties, objectives and powers from the Energy Act. Requirements under the Third Energy Package were implemented into Energy Act.

The security of supply of gas to customers is one of the principal objectives of all stakeholders involved in the functioning of the gas market. The Ministry of Infrastructure as the representative of the legislative branch provides adequate regulation of the market and of the individual entities that are necessary for the operation of this market. The Energy Agency, which is the competent authority for ensuring security of supply, ensures the implementation of rules and control of the functioning of the system operators. [24]

At least once a year, at the latest by 30 June, the Energy Agency submits to the Government of the Republic of Slovenia and to the National Assembly of the Republic of Slovenia a report on the situation in the field of energy for the previous year. This includes, inter alia, information on the activities and measures that the Agency has carried out in connection with the fulfilment of its tasks.

In SLO, the activity of the TSO is a public utility service. The Republic of Slovenia as a concession grantor grants the concession, whereas the Energy Agency certifies the natural gas TSO if it fulfils the legal requirements. Gas TSO activity may be performed by a concessionaire that fulfils the following requirements:

- owns a transmission system;
- holds a gas TSO certificate; and
- has been designated as a gas TSO.[25]

The company Plinovodi, d.o.o. ("**Plinovodi**"), is the TSO in Slovenia. It expands and maintains the transmission network and connects new customers. The most important activities of the TSO are:

- transmission of gas;
- operating the transmission network;
- enabling the connection of natural gas and access to the transmission network;
- ensuring the maintenance and development of the transmission network;
- provision of system services and transmission of measured data;
- establishing and monitoring mechanisms for managing flows and balancing deviations in the transmission network.[26]

The activity of the TSO is financed from the network charge and from other revenues for the performance of the public utility service.[27]

The Energy Agency's duty in relation to the development of the transmission network is to examine the 10-year development and investment plan, which are prepared by Plinovodi. In the process of evaluating the investment plan, the Energy Agency assesses the consistency of the content and form of the investment plan with the methodology for the investment plan. In relation to the investment plan, the Energy Agency issues an Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator ("**Act on methodology for investment plan**"). The Act on methodology for investment plan determines the methodology for the preparation of the 3-year investment plans of the natural gas TSO and the verification and evaluation of the investment plan by the Energy Agency.

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[24] https://www.agen-rs.si/izvajalci/plin/zanesljiva-oskrba.
[25] Article 178 of the Energy Act.
[26] Article 178 of the Energy Act.
[27] Article 180 of the Energy Act.

The Act on methodology specifies:

- a methodological basis for assessment and evaluation of investments;
- procedures and deadlines for the preparation of the investment plan and its submission to the Agency for verification and evaluation;
- mandatory content of the investment plan;
- criteria for determining the effectiveness of investments;
- procedures for assessing the investment plan and deciding on the volume of investments;
- a report on the implementation of the investment plan.[28]

The Energy Agency must also monitor and evaluate the implementation of the 10-year transmission network development plan.[29]

3.1.2. Specific legal rights and duties

Role of the TSO

Plinovodi/TSO is the owner and operator of the transmission network and transmission provider in SLO.

The most important activities of the TSO are described above in Section 3.1.1. The TSO carries out projects for the development of the transmission network. The TSO is obliged, in accordance with the Energy Act, to submit each year to the Energy Agency for approval, a 10-year transmission network development plan, which is based on the existing and envisaged supply and demand and contains effective measures to ensure the adequacy of the system and the security of supply each year after consultation with all relevant stakeholders and the investment plan which is in line with the development plan.[30]

On 9 October 2017, the Energy Agency granted approval to the to the 10-year transmission network development plan of TSO for the period 2018–2027.

The 10-year transmission network development plan for the 2018-2027 for transmission network aims to:

- define the main transmission infrastructure to be built or updated in the following years;
- contains all adopted investments and defines the new ones are to be carried out over the next three years; and
- provides a timetable for all investment projects.[31]

Undertaking of investments

The TSO is required to carry out investment/development projects to deliver on their legal/regulatory duties. Investment projects are provided by TSO in the development plan and investment plan that is attached to the development plan. TSO must follow all requirements regarding preparation of the investment plan as are provided in the Act on methodology for investment plan. In the process of evaluating the investment plan, the Energy Agency assesses the consistency of the content and form of the investment plan with the methodology for the investment plan, which is in more detail described in Section 3.1.3 below.[32]

Role of the NRA

The Energy Agency reviews and gives its consent to the investment plan which is a part of the 10-year transmission network development plan provided by the TSO as mentioned in Section 3.1.1, above.[33]

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[28] Article 1 of the Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator.
[29] Article 201 of the Energy Act.
[30] https://www.agen-rs.si/web/en/razvojni-nacrti.
[31] https://www.agen-rs.si/documents/54870/83474/Development-plan-for-2018-2027/70d6ba4d-a654-4fd9-88f9-3e3cba76dc26.
[32] Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator.
[33] Article 200 of the Energy Act.

In the process of evaluating the investment plan, the Energy Agency assesses the consistency of the content and form of the investment plan with the methodology for the investment plan as already explained in Section 3.1.1, above. The assessment of investments is based on a cost-benefit analysis of investments and criteria for the availability of sources of financing, financial criteria, economic criteria, security of supply criteria and development criteria.

The Agency also assesses the investment plan from the perspective of the impact of the investment plan on the costs and revenue of the TSO and the benefits of investments for consumers of natural gas.[34] The investment plan may thus have implications for the regulatory framework as described in Section 3.1.3 below. The Legal Act on the methodology for determining the regulatory framework of the natural gas transmission system operator sets out the methodology for the regulatory framework in which TSO determines eligible costs and resources to cover the eligible costs.[35]

If the investments that are taken into account and which are considered as eligible costs of the TSO would have too large impact on the network charge, the Energy Agency may require TSO to take into consideration only certain investments in priority order when determining eligible costs and preparing the proposal for the regulatory framework as defined in the investment plan (regulatory framework is described in Section 3.1.3 below).[36] The Energy Agency may require the TSO to amend its investment plan. The Agency must also monitor and evaluate the implementation of the 10-year transmission network development plan.[37]

Institutional or procedural constraints on the performance of these roles

Planning processes and the complex and time consuming nature of getting the required permits/consents/opinions (e.g. environmental, health and safety, etc.) to build the infrastructure can clearly act as a procedural constraint on the development of the transmission network in any particular project.

The general public may obstruct the planning of the project.

Additionally, in the process of adopting development and investment plan TSO must consult with all the relevant stakeholders by publishing the development plan on its website. The relevant stakeholder may provide comments to such plans. The comments must then be presented to the Energy Agency. In accordance with the provisions of the Energy Act, the Energy Agency must also consult with all actual or potential network users on the development plan by publishing the plan on its website. All these requirements tend to delay the projects.

3.1.3. Mechanism for financing of investment projects

The Energy Agency's primary mechanism to ensure the delivery of appropriate investment in the transmission network is through review and approval to the investment plan based on the issued Act on determining the methodology for investment plan.

The Energy Agency reviews and grants approval to the investment plan as explained in Section 3.1.2 above. According to the Act on determining the methodology for investment plan, when preparing the investment plan, the TSO must reveal the sources of financing that will be used to finance investments in the investment plan by disclosing:

- depreciation of investments;
- other dedicated sources for the financing of investments;
- payments/receipts from disposal of investments;
- the net profit that the TSO will allocate to finance the investments;
- taking new loans to finance investments; and
- repayment of the principal of existing, already borrowed loans for the financing of investments, taken as a deductible item.

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[34] https://www.agen-rs.si/documents/10926/20705/21_1_obraz_splet_prenos.pdf/a5a987e7-cde6-4d79-802b-3db5e3ec5273, Obrazložitev Akta o metodologiji za pripravo in ocenitev naložbenega načrta operaterja prenosnega sistema zemeljskega plina.

[35] Article 1 of the Legal Act on the methodology for determining the regulatory framework of the natural gas transmission system operator.

[36] Article 30 of the Legal Act on the methodology for determining the regulatory framework of the natural gas transmission system operator.

[37] https://www.agen-rs.si/web/en/nalozbeni-nacrti, Article 252 of the Energy Act.

Therefore, Calculation and disclosure of sources for the financing of investments have to be provided by the TSO.[38]

The Energy Agency assesses if the total value of investments is in line with the sources of financing that are available.[39] In order to establish the regulatory framework, the TSO prepares the investment plan. Assessment of the investment plan is the basis for the determination of the eligible costs of the TSO in the next regulatory period. Thus, the investment plan has the effect on the network charge, which is described below.[40]

Network charge, regulatory framework and regulatory methodology

The Energy Agency with economic regulation replaces normal competitive effects in order to prevent the abuse of market power of monopolistic market participants. The regulatory regime provides the companies with opportunities and incentives similar to those that they would otherwise meet in a competitive market.

The regulation in the regulatory period from 1 January 2016 to 31 December 2018 is carried out on the basis of the Act on the methodology for determining the network charge for the natural gas transmission operator[41] and the Act on the methodology for determining regulatory framework for the natural gas transmission system[42].

Network charge

The network charge is a sum that a user of the transmission system has to pay for the use of the system. It is calculated on the basis of network charge tariffs and the scope of the use of the system in accordance with the act governing the network charge calculation methodology for the gas transmission.

The network charge for the natural gas transmission system is intended to cover the costs of services of general economic interest carried out by the TSO.

The network charge for the natural gas transmission system is determined by the TSO and a subject to approval of the Energy Agency.

Regulatory framework

The regulatory framework is a specification of the amount of eligible costs and resources to cover the eligible costs of the TSO. The regulatory framework is determined by the TSO in compliance with the Act on the methodology for determining the regulatory framework of the natural gas transmission system operator.

Eligible costs of the TSO are:

- controlled operating and maintenance costs;
- uncontrolled operating and maintenance costs;
- depreciation costs;
- regulated return on assets.

Resources for covering eligible costs are the network charge and other revenues. In determining the resources for covering eligible costs, the deviations from the regulatory framework of the previous years are duly taken into account.

By using the method of regulated annual income and regulated network charges the TSO determines the regulatory framework in a way that with the planned annual income, surplus of network charges from the previous years, and the planned network charge deficit (maximum up to the amount of depreciation charge) covers the costs up to the amount of eligible costs for the regulatory period and the corresponding deficit of previous years.

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38 Article 8 and 9 of Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator.

39 Article 15 of Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator.

40 Article 252 of the Energy Act.

41 http://www.pisrs.si/Pis.web/pregledPredpisa?id=AKT_949.

42 http://www.pisrs.si/Pis.web/pregledPredpisa?id=AKT_948.

The TSO submits to the Energy Agency the request for granting consent to the regulatory framework, network tariff items and tariff items for other services for the relevant regulatory period. In the process of issuing approval, the Energy Agency assesses the compliance of the proposed eligible costs, network charge and other network charge items with the applicable methodologies.

The current valid regulatory period for the TSO runs from 1 January 2016 to 31 December 2018.

Deviations from the regulatory framework

At the end of each regulatory period, the TSO must determine the deviations from the regulatory framework. The deviations are determined as the difference between actual eligible costs and existing sources for covering eligible costs, which includes recorded income or network charge deficit from previous years. The Energy Agency issues a special decision if its calculation of deviations differs from the deviations determined by the TSO.

The Energy Agency monitors the implementation of the regulatory framework during the regulatory period.

Other services

The TSO may, in addition to the network charge, charge consumers also for other services, which are not directly connected with the performance of the service of general economic interest and do not have the characteristics of commercial services that can be offered by qualified providers in the market. Prices of individual services are approved by the Energy Agency in the process of issuing approval to the regulatory framework on the basis of the disclosure of costs of individual service, which have to reflect actual costs.

Other services are services, which are carried out at the request of a consumer or a third person and are not included among the tasks of the TSO that are covered by the revenues from distribution and metering charges. Such services are mainly related to disconnection or connection of a consumer, virtual point services, marking the pipelines, setting out of works, insulation control, pressure drilling, control of measuring devices, employees work costs and allowances per kilometre covered, which serve to the evaluation of individual services and cannot be treated as a standard service.

Setting the network charge

The methodology for determining regulatory framework defines the grounds of economic regulation of the activities of the TSO and determines the eligible costs of the TSO.

The regulation methodology is based on the method of the regulated annual income and regulated network charges of the TSO arising from:

- determination of eligible costs;
- taking into account, in addition to the network charge, all other revenues as sources of the system operator to cover eligible costs from the previous indent;
- the obligation of the TSO to transfer the surplus of the network charge and its dedicated use for covering eligible costs in the next regulatory period;
- the right of the TSO when determining the regulatory framework for the following years to take into account the coverage of the network charge deficit.

Calculation of the network charge

Users of the system pay for the use of the natural gas transmission system by the payment of the network charge, which is charged with the following tariff items:

- the network charge for entry points;
- the network charge for exit points;
- the network charge for own use of energy;
- the network charge for metering.

The network charge tariff items are set by the TSO before the start of the regulatory period for an individual year of the regulatory period, and they are previously approved by the Energy Agency with issuing an approval to the regulatory framework.

The method for charging the network charge for entry and exit points is the system of uniform tariffs for each entry and exit point. The network charging for entry and exit points takes into account the contractually agreed leased capacity. The network charge for own use of energy (fuel gas charge) depends on the delivered amount of natural gas on an individual exit point. The network charge for metering takes into account the size of the measuring device, number of pressure reductions and the ownership of the measuring devices at the exit points.

In charging the network charge for standard capacity products, which determine daily, monthly or quarterly lease of capacity, in addition to network tariff item also the tariff factor is taken into account. Calculation of interruptible capacity is carried in a way that the TSO in case of suspension or decrease in contractual capacity charges a network user the network charge with the corresponding discount.

Consumers' groups for exit points inside Slovenia, to which the TSO classifies users, are determined in accordance with the methodology for calculating the network charge, which among other defines:

- tariffs and tariffs items representing categories of the transmission system users in accordance with their use of the natural gas transmission system in certain maximum ranges of these categories;
- services, which can be charged to the system users in addition to the network charge by the natural gas TSO within the performance of service of general economic interest;
- the method of network charge calculation, the method of charging the network charge and other services.

Relevant project categories

Generally, the mechanisms are designed to capture and accommodate a wide variety of projects. It is the responsibility of the TSO to determine the specific categories of projects, whereby the Energy Agency assesses investment plans trough different criteria.

As already mentioned above, the Energy Agency assesses investment plan from different perspectives. Some of the criteria that the Energy Agency takes into account are financial and economic criteria.

With financial criteria, the Energy Agency assesses the effects that the investment brings to the TSO. The basis for calculating the financial criteria for determining the effectiveness of the investment is the financial analysis of the investment (financial cash flow). In the calculation of dynamic criteria, a discount method is used. Financial criteria indicators are financial net present value, financial internal rate of return and financial ratio of relative benefit.

When assessing the investment plan, the Energy Agency determines the financial viability of future investments, which are relating to the expansion of the transmission system or the increase in the operational reliability of the transmission system and the value of which exceeds EUR 5 million. The investment plan is financially justified if the financial net present value for investments is greater than zero, the financial internal rate of return is greater than the financial discount rate and the financial ratio of relative benefit is greater than one.[43]

With economic criteria, the Agency assesses the effects that the investment brings to the transmission system operator and other entities.

In addition to direct effects (costs and benefits), economic criteria also include indirect effects on the society as a whole (for example, environmental, safety and health effects). Economic analysis (economic flow) is the basis for calculating economic criteria when determining the effectiveness of an investment. When evaluating the investment plan, the Energy Agency determines the economic viability of the future investments, which are relating to the expansion of the transmission system or the increase in the operational reliability of the transmission system and where the value exceeds EUR 25 million.[44]

[43] Article 16 of the Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator.

[44] Article 17 of the Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator.

In the investment plan, the TSO must determine different types of projects/investments, which are considered within the criteria mentioned in this subsection and in the beginning of Section 3.1.3:

The type of investment are:
- gas pipelines;
- gas facility, equipment and installations, which are essential for the safe and efficient management of the transmission system;
- other investments, including non-energy investments.

Forms of investment are:
- investments in the expansion of the transmission system, which is the first construction of pipelines and associated facilities, and is related to the acquisition of land or the right to use, the relevant project documentation and the construction permit;
- investments in increasing the operational reliability of the transmission system, which include investments in renewal, reconstruction, transfer, modernization, abandonment, investments in improving the quality of operation, investments for the purpose of interoperability and system loop;
- other investments, including non-energy investments.[45]

3.1.4. Regulatory rules with respect to innovation

Specific duties of the NRA aimed at encouraging innovation

There is no express duty/power of the Energy Agency in the legal framework directly linked to encouraging innovation. However, encouraging innovation may derive from the more general duties of the Energy Agency described in Sections 3.1.1, 3.1.2 and 3.1.3 above.

Specific duties of the TSO at encouraging innovation

There is no express duty to support innovation in the regulatory framework.

Duties, which are implicitly also relevant or connected to innovation, are described above in Sections 3.1.1 and 3.1.2.

Encouraging innovation may indirectly follow from the investment plan of the TSO and respective projects.

TSO has developed an internal innovation-management system, which is intended to encourage employees for contribution of new ideas and innovations to improve the system operation and company procedures. Some new technological solutions were developed to optimize the operation costs and environmental impacts.

3.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

The TSO must at any time ensure the reliable and safe operation of the transmission system. In cooperation with suppliers, within the limits of their technical possibilities and legal requirements, it must ensure that all measures of suppliers that are provided for the successful management of the reliable supply with natural gas are implemented.[46]

The 10-year transmission network development plan prepared by the TSO must be based on the existing and envisaged supply and demand and contain effective measures to ensure the adequacy of the system and the security of supply each year after consultation with all relevant stakeholders. TSO measures the demand for natural gas transmission in the domestic energy market based on queries, approvals issued and connection contracts concluded with DSOs, industrial users and natural gas producers.[47]

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45 Article 7 of the Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator.

46 https://www.agen-rs.si/izvajalci/plin/zanesljiva-oskrba.

47 https://www.agen-rs.si/documents/54870/83474/Development-plan-for-2018-2027/70d6ba4d-a654-4fd9-88f9-3e3cba76dc26.

Specific duties of the NRA aiming at safeguarding security of supply

As described above, the Energy Agency, which is the competent authority for ensuring security of supply and for the control of the functioning of the system operators, ensures the implementation of rules.[48]

The Energy Agency carries out a risk assessment every two years. Through this assessment, it examines the technical, economic, environmental and socio-political impacts on the security of natural gas supply. In this way, it examines the impact of events in individual areas on the operation of the transmission system operated by the TSO and on the operation of suppliers who, through the purchase of natural gas abroad, ensure the sufficient supply to customers.

On the basis of the conducted risk assessment, the Agency issues two acts. With the Regulation on the preventive action plan for natural gas supply[49] it tries to ensure the readiness of the TSO and, in particular, suppliers, for potential situations in which the supply of natural gas will be difficult. With the Regulation on the emergency plan for natural gas supply[50], the Agency regulates the organizational aspects of the operation of individual key organizations for the supply of natural gas at the time of a crisis.[51]

As mentioned above, the Energy Agency assesses investments by the TSO. When considering the investment plan, one of the criteria is the security of supply. With the security of supply criteria, the Energy Agency determines the importance of an investment to increase the infrastructure standard (N-1), as well as whether the investment reduces the critical risks identified in the risk assessment referred to in Article 7 of the Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010.

With security of supply criteria, the Energy Agency assesses investments in the construction of the transmission system when the indicator of the financial net present value of the investment is negative, whereas the eligibility of the investment is demonstrated by a significant increase in security of supply.

The investment plan is in line with security of supply criteria if investments that are not financially viable show a significant increase in the infrastructure standard (N-1) or substantially reduce the critical risks identified in the risk assessment referred to in Article 7 of Regulation (EU) 2017/1938.[52]

3.2. Regulatory practice

3.2.1. Overview over regulatory practice in Slovenia

Main regulatory barriers

Stakeholders identified a possible barrier related to security of supply projects with no commercial benefits. Some stakeholders expressed that assessments of investment projects mainly account for the commercial benefits of a project, leading to insufficient support for projects, which primarily ensure security of supply.

According to stakeholders, there are no significant barriers for innovative projects, but there are no efficient incentives either. The example of innovations in the area of injecting new gases into the system, of new equipment or methods usually cause higher CAPEX, so without an extra incentives, TSOs are inclined to use investments which are cost-reducing.

48 https://www.agen-rs.si/izvajalci/plin/zanesljiva-oskrba.
49 http://www.pisrs.si/Pis.web/pregledPredpisa?id=AKT_914.
50 http://www.pisrs.si/Pis.web/pregledPredpisa?id=DRUG3996.
51 https://www.agen-rs.si/pravila-za-zagotavljanje-zanesljive-oskrbe.
52 Article 18 of the Act determining the methodology for preparation and evaluation of an investment plan of the gas transmission system operator.

3.2.2. Regulatory practice related to innovation

Innovative projects

The share of innovative projects is generally small, according to stakeholders.

Regarding the typological investments (Annex II), the following picture emerges:

- There are no projects to tackle the increased need for flexibility in narrow sense for market development and security of supply; also, no potential for these kinds of projects to happen is seen;
- There are no incentives to facilitate the upgrade of biogas to the transmission system; the NRA solely supports biogas-related projects if they are undertaken by private parties, not by TSOs;
- Digitalisation of operations, through e.g. drone inspections and AI resulting in safer and cost efficient operations is already day-to-day business to decrease operational costs in the long-run;
- Interconnections for security of supply and liquidity are not considered to be very innovative, as known technology is applied. There are project examples for this, e.g. a project regarding reverse flow gas from Croatia. Such projects can be and are planned.

Some stakeholders consider innovative infrastructure projects as those infrastructure projects on the transmission pipeline system, which improve the characteristics of the system using innovative technologies and/or approaches. Innovative projects encompass the installation of CHP in metering regulating stations, virtual power plants, heat optimization and control systems.

Examples of projects that are considered innovative by stakeholders encompass:

- The reverse flow on the Croatian-Slovenian interconnection point Rogatec;
- Slovenian-Hungarian interconnector (a PCI project);
- CHP in the metering and regulating station in Maribor.

The stakeholders stress that they see the role that innovation in the gas transmission system needs to play in achieving the goals of decarbonisation. They relate this especially to different types of gases.

Adequacy of the NRF relating to its support for innovative investments

The NRF has room to invest in innovations, particularly in those resulting in cost-savings.

The opinions diverge on the topic of renewable gas projects. The NRF will entail incentives for innovative biogas projects of private parties, however these incentives will have a negative effect on the TSO's income. Thus some stakeholders indicate that there is room for improvement regarding support for new gases, such as biomethane, synthetic gas and hydrogen.

3.2.3. Regulatory practice related to security of supply

Security of supply projects

At least one third of all gas projects are considered security of supply investments.

The interviewees view infrastructure security of supply projects, as those which improve the infrastructure standard, and characteristics of the transmission system. Security of supply project examples encompass:

- The Slovenia-Hungary interconnection (PCI);
- Border metering and regulating station at Rogatec which was constructed for reverse flow;
- System loop at Kozarje – Vevče.

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

The NRF is seen as adequate to support security of supply projects. Also, the security of supply situation in Slovenia is rated high. There is, however, room for improvement regarding security of supply projects and their commercial viability: some stakeholders see a case to treat security of supply projects separately from other projects, which have to meet a certain level of expected commercial utilisation.

3.2.4. Illustrative specific projects

The following projects are examples of innovation and security of supply projects. The first three are considered security of supply projects while the next three are considered innovative projects. The projects illustrates how the current framework incentivises innovation and security of supply investments and illustrates their approval process.

Reverse flow at Rogatec

Description and aim

This security of suply project was part of an investment plan with the objective to open the third supply route to Slovenia (beside Austria and Italy) for trade and security of supply reasons. However, at this (first) stage only for a minor capacity. The project will contribute to security of supply by enabling reverse flow from Croatia to Slovenia. It will also enable access to underground storages and potential LNG terminals.

Approval process

As the project improves the features of the entire network, a financial and/or economic assessment was not the only criterion used to determine the eligibility of the project. No SCBA has been used in the approval process. The project was approved by the regulator as part of the standard approval procedure. The approval process was smooth, no amendments were made to the project. The project is included in the TYNDP of the TSO.

Financial mechanisms

This project was not treated differently from any other project in the TSO investment plan. No provisions against cost-mismatch were applied, efficiency targets had no effect, the project was not exempted from general regulation. As with other projects, there was an ex-ante approval of CAPEX and it was helpful for the project realisation.

Slovenian-Hungarian interconnector

Description and aim

This security of supply project is still in an early planning phase and it has a PCI status (PCI 6.23). The goal of the project is to increase security of supply in Slovenia through access to gas storages in Hungary and LNG terminals in Italy and, in future, new gas sources and routes.

Approval process

The promotor announced a modification of project parameters. Thus, the approval process has not started yet and the project has not yet been approved, has not yet received FID. A SCBA is under preparation at the moment. If the project does not provide the prescribed rate of return, the TSO will act in accordance with Regulation 347/2013. The project is included in the TYNDP of the TSO.

Financial mechanisms

The NRF's financial provisions to apply have not yet defined due to very early phase of this project. A lot will depend on the market test.

System loop Kozarje Vevče for Ljubljana

Description and aim

The aim of the project is to increase security of supply for the Ljubljana region by creating a system loop. This system loop will also increase existing capacities.

Approval process

As the project improves the features of the entire network, a financial and/or economic assessment was not the only criterion used to determine the eligibility of the project. However, SCBA was not part of the approval process. The project was approved by the regulator as part of the standard approval procedure, however the NRA asked the TSO to prepare the hydraulic analysis (simulation of flows in the normal circumstances and in the peak flow situation – extreme winter conditions). Thus the TSO convinced the NRA that the project is really necessary. The project is included in the TYNDP of the TSO.

Financial mechanisms

As the project is still under preparation in the planning phase, an ex-ante approval of CAPEX has not been realised.

CHP in metering and regulating station Maribor

Description and aim

The CHP project in Maribor is considered an innovative project. The aim of this project was to install, commission and operate a combined production of heat and power (CHP) with gas piston engine unit in the metering and regulating station (MRS) Maribor . The project enabled the production of heat for the technological heating of natural gas in MRS Maribor throughout the year as well as the production of electricity.

Approval process

A SCBA was applied which included a monetisation of the reduced amount of CO_2 emissions due to the use of natural gas as a fuel for electricity instead of coal. However the SCBA had no influence on the approval of the project. The project was approved by the regulator as part of the standard approval procedure. The approval process was smooth, no amendments were made to the project.

Financial mechanisms

Ex-ante approval of CAPEX was gained and it was helpful for the realisation of the project. The Slovenian regulation allows for selected cogeneration a higher price of produced and sold electricity than the market price. This higher selling price is determined for a 10 year period.

Optimization of heating system at different locations

Description and aim

The aim of this innovative project was to decrease the consumption of natural gas for the technology process in metering and regulating stations through installing, commissioning and operating a system for optimisation of heating. By regulating the temperature of the natural gas according to the temperature of the ambient air dew point, the minimum required temperature of the heated water in the boilers and the minimum required outlet temperature of the natural gas from MRS are achieved as well as lower heat losses and lower consumption of natural gas for heating.

Approval process

A SCBA was not applied for this project. The project was approved by the regulator as part of the standard approval procedure. The approval process was smooth, no amendments were made to the project.

Financial mechanisms

Ex-ante approval of CAPEX was gained and it was helpful for the realisation of the project.

Virtual power plant at CS Ajdovščina and CS Kidričevo

Description and aim

The virtual power plant is considered an innovative project. The aim of this project was to provide electricity to the distribution network when needed through installing, commissioning and operating the system and equipment which provide operation of the back-up Diesel engines at CS Ajdovščina and CS Kidričevo in a virtual power plant. The project enables systematic services of tertiary regulation of frequency with management of the consumption and dispersed production of electricity, based on the advanced information and communications platform of the virtual power plant organizer.

Approval process

A SCBA was not applied for this project. The project was approved by the regulator as part of the standard approval procedure. The approval process was smooth, no amendments were made to the project.

Financial mechanisms

Ex-ante approval of CAPEX was gained and it was helpful for the realisation of the project. The TSO receives income for readiness and required production of electricity by operation of back-up diesel engines, as the service is needed to balance production and consumption of electricity in the network.

3.3. Options for improvement

3.3.1. Options to improve regulatory practice

The above discussion shows that the NRF is well-designed and functional for security of supply projects. Yet, stakeholders point at issues regarding security of supply projects with no commercial benefits and the lack of incentives for innovative projects. Thus after consulting the stakeholders and analysing the NRF, we propose the following options for improvement.

(i) Statutory reference to innovation

The stakeholders criticized that are no incentives for innovative investment, apart from innovations resulting in cost-savings. 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.

(ii) Consultation on investment plans and stakeholder consultations

The introduction of consultations on specific projects or possibly on the investment plans could prove effective to implement projects with social benefits and little commercial benefits.

3.3.2. 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 (i) (statutory reference to innovation), the suggestion of incorporating an explicit reference to innovation could be implemented by including such a reference in the Energy Act or implementing regulation via Slovenian Legislative Process.

3.3.3. Impact assessment

The long-term strategic perspective on innovation mentioned in option (i) necessitates efforts and coordination between the TSO and the NRA regarding the design of this long-term perspective (e.g. the organisation of stakeholder consultations, determining the scope of the innovation needed, monitoring and evaluating of how the statutory duty is translated into the long-term perspective).

We have not encountered any specific examples of projects that have been cancelled due to the regulatory framework. Yet, if a long-term strategic perspective on innovation could be attained, the share of innovative projects could increase in the long-term.

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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