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

Country Report - Czech Republic

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March– 2019

EUROPEAN COMMISSION

Directorate-General for Energy
Directorate B — Internal Energy Market
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Country Report - Czech Republic

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Directorate-General for Energy

March 2019

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Luxembourg: Publications Office of the European Union, 2019

ISBN: 978-92-76-03986-0
Doi: 10.2833/820175

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The Czech electricity NRF constitutes a revenue cap regulatory regime. The Czech electricity TSO is ČEPS and the Czech NRA is the Energy Regulatory Authority (ERO). There is no clear statutory duty to innovate or to encourage innovation for the TSO nor for the NRA. Regarding security of supply, the TSO's task is to ensure the secure, reliable and efficient operation, renewal and development of the transmission system. The NRA's main power aimed at security of supply is their power to approve the Development Plan. The NRA also has the power to impose a fine if the TSO does not fulfil its duties.

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The NRF works well in general and stakeholders expressed their satisfaction with the system, especially because the WACC is at a level that is favourable for all investments. Yet, a couple of potential barriers were mentioned by the stakeholders:

- Uncertainty about the conditions of the next regulatory period;
- The OPEX is based on historical costs and is adjusted though an inflation/efficiency factor. For new OPEX investments, the TSO needs to negotiate additional finances separately.

Options for improvement

The following options for improvement could be considered:

- Favouring of OPEX-based solutions; and
- Statutory reference to innovation.

The improvement options could potentially reduce the regulatory barriers mentioned above, but would likely not result in a substantial increase in investments. Note that the options also have drawbacks, such as a potential increase in the administrative burden for TSOs and the NRA, favouring OPEX-based solutions could also result in inefficient investment decisions. These need to be considered when further developing and fine-tuning the options.

Assessment of the NRF and the regulatory practice of the gas sector in Czech Republic

The gas NRF in Czech Republic

The Czech gas NRF constitutes a revenue cap regulatory regime. NET4GAS is the exclusive Czech gas TSO while ERO is the Czech NRA. There are no specific duties regarding innovation for the TSO nor NRA. Regarding security of supply, the TSO's task is to ensure the secure, reliable and efficient operation, renewal and development of the transmission system. The NRA's main power aimed at security of supply is their power to approve required changes to be made to the Ten-year Development Plan and also the power to decide on the implementation of the investment resulting from the TYNDP, which has not been implemented within the timeframe set by the TYNDP. The NRA also has the power to impose a fine if the TSO does not secure a reliable, safe and effective transmission.

The regulatory practice in the gas sector in Czech Republic

The stakeholders did not recognise many of the barriers mentioned in the questionnaire (see Annex III), but they rather pointed to other barriers which are more related to the implementation of the regulation and the PCI regulation in relation to innovation and security of supply.

For innovation, these barriers included:

- The NRF includes a limited list of allowed investments which excludes some innovative investments;
- Lack of long term innovation plan; and
- No specific signal from the EC regarding the role of TSOs and NRAs in innovation in regards to decarbonisation.

For security of supply these barriers include:

- Lack of clarity in regards to the PCI regulation.

Options for improvement

The following options for improvement could be considered:

- Statutory reference to innovation.

The improvement options could potentially reduce the regulatory barriers mentioned above, but would likely not result in a substantial increase in investments. Note that the options also have drawbacks, such as a potential increase in the administrative burden for TSOs and the NRA. These need to be considered when further developing and fine-tuning the options.

1. INTRODUCTION

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

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

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

The Country Report is based on previous study deliverables and analyses. It is divided into two main sections, Section 2, which is related to electricity, and Section 3, which is related to gas. Each of these sections examines the legal framework (Section 2.1 for electricity and Section 3.1 for gas), including specific rights and duties of relevant parties, such as TSOs and NRAs (hereafter also referred to as stakeholders), mechanisms for the financing of investment projects and the regulatory rules regarding innovation and security of supply in particular. Having studied the legal regulatory framework, Section 2.2 for electricity and Section 3.2 for gas examine the regulatory practice in the Czech Republic, 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 the Czech Republic. Lastly, options for improvement of the regulatory practice and the regulatory framework are discussed in Section 2.3 for electricity and Section 3.3 for gas.

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

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

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

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

i. by immediately reducing overall cost as compared to a conventional solution;

ii. by prospectively reducing overall cost in the future, subject however to a “learning curve” as to the cost level of the innovative solution;
iii. by accelerating the process of transmission capacity expansion and thus reducing social welfare loss caused by temporarily insufficient transmission capacities; or
iv. by providing improvements with respect to other criteria that are often difficult to monetarise, like environmental or public acceptance aspects.

Innovative investments, especially those whose benefits fall into category ii., iii. and iv. named above, can suffer from barriers and market failures. We have identified five categories of 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 Czech Republic

2.1.1. Overview of the regulatory framework of Czech Republic– legal rules

For the purposes of the Legal Framework in the Czech Republic, "transmission" is defined as 400kV, 220 kV or 110 kV.[1]

The Energy Act No. 458/2000 Coll. is the primary legislation governing the Legal Framework for the electricity in the Czech Republic. The Energy Regulation Office ("**ERO**"), the regulatory authority, issues decrees and decisions on the basis of the powers delegated in the Energy Act. Also, the Ministry of Industry and Trade of the Czech Republic ("**Ministry of industry**") is the central government authority for the energy industry and may exercise powers delegated by Energy Act.

Both ERO and Ministry of Industry have duties and powers, which include:

- The Ministry of industry issues a binding opinion on the 10-year Transmission System Development Plan and the 10-year Transport Development Plan;[2]
- The Ministry of industry issues a binding opinion for development / building of the electricity transmission system, the gas transmission system, the gas storage facilities and the electricity generating plant with a total installed power of 100 MW or more;[3]
- The Ministry of Industry monitors compliance with safety and reliability requirements of the electricity and gas system and reviews the results achieved and further monitors investment in new capacities in relation to the security of electricity and gas supply;[4]
- The Ministry of Industry is responsible for developing the National Energy Concept, observing international commitments and treaties;
- ERO coordinates the creation of rules for the operation of electricity transmission systems (and gas transmission systems);[5]
- ERO resolves disputes concerning access to the transmission system, the distribution system, underground gas storage facilities, and gas recovery lines, including disputes on access to cross-border capacity for electricity transmission, gas transmission or electricity or gas distribution;[6]
- ERO approves or establish rules on transmission system operation;[7]
- ERO approves the 10-year Transmission System Development Plan and the 10-year Transit Development Plan; which is a subject to a binding opinion of the Ministry of industry;[8]
- ERO may decide to regulate the prices of other activities carried out by a Transmission system operator ("TSO").[9]

The Czech Republic has implemented the relevant provisions of the third energy package and Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency (REMIT) into the Energy Act, so it sets up the licensing regime for the electricity market in the Czech Republic. ERO, as regulator, administers this regime. Licensable activities include electricity generation, transmission, distribution, trading and market operation. The entity requesting the licence must have the professional capacity, financial and technical assumptions while the legal person as a requesting entity must have the responsible representative who is responsible for the performance of the licensed activity under the Energy Act. The ERO decides to grant a licence on the basis of meeting the conditions of the Energy Act (the ERO issues licences for the activities mentioned above).

The Energy Act sets up the licensing regime for the electricity market in the Czech Republic.

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1 Section 2 (2)(a)(10) of the Act No. 458/2000 Coll.
2 Section 16 (m) of the Act No. 458/2000 Coll.
3 Section 16 (x) of the Act No. 458/2000 Coll.
4 Section 16 of the Energy Act.
5 Section 17 (5) of the Act No. 458/2000 Coll.
6 Section 17 (7) (c) of the Act No. 458/2000 Coll.
7 Section 17 (7) (g) of the Act No. 458/2000 Coll.
8 Section 17 (7) (i) of the Act No. 458/2000 Coll.
9 Section 17 (12) of the Act No. 458/2000 Coll.

The licences for transmission are exclusive. The licence for transmission of electricity is issued by the ERO as an exclusive licence for the entire territory of the Czech Republic. Based on the Act No. 458/2000 Coll. (currently effective version) the licence is granted indefinitely. From the 1st June 2001, the licence was granted to ČEPS, a.s ("**ČEPS**").[10] The 100% owner and the sole shareholder of ČEPS is the State of the Czech Republic.

ČEPS is a company controlled by the Ministry of Industry and Trade. ČEPS is thus a company wholly owned by the State – the Czech Republic. The Ministry of Industry and Trade is charged by the State with exercising shareholder rights.

While ČEPS is the only licensed entity for electricity transmission, there is a wide scope of rights and obligations which the transmission system operator has to follow and there is also a restriction prohibiting the TSO from holding another licence.[11]

In the regulation of prices for electricity transmission, ERO has the power to set prices to cover the necessary cost of ensuring the efficient performance of licensed activities, as well as depreciation and a reasonable profit providing a return on investments in equipment used to perform the licensed activities.[12]

2.1.2. Specific legal rights and duties

Role of the TSO

Even though the transmission grid is developed by ČEPS (a private limited company that is independent and has independent board members) in practice, the operation and development of the transmission grid is fully under State control and performed in the public interest.

One of ČEPS's mandatory tasks under the Energy Act is to plan development of the transmission network and plan the works which: "*reflect the requirements of power producers and ensure the reliable transfer of their sources' output into and across the grid. At the same time, the development of the Transmission system (also "**TS**") must satisfy the demands of all power market participants for the transmission of electric power, in the required scope and quality, always reflecting the geographic distribution of sites at which electric power is being produced and at which it is being consumed within the TS. The development of the TS must also take into account the demands imposed by the fact that the Czech transmission system is part of a larger international network of interconnected systems and must respect the obligations to which European laws and regulations and international treaties give rise*."[13]

The TSO must draw up a ten-year investment plan every two years.[14] The current development plan for 2017 – 2026 is available on the ČEPS website. The Ministry of industry gives an opinion on the plan and the ERO approve the plan by decision.

The Development Plan contains the following:
a) sections of the transmission system necessary to be constructed or extended in the following 10 years;
b) all transmission system investment projects already decided by the Company to be implemented, including implementation schedule; and
c) new investment projects to be implemented in the following 3 years, including implementation schedule.

Obligations and responsibilities

According to the transmission development plan ČEPS, acting in its capacity as the exclusive TSO of the Czech Republic, shall:

- ensure safe, reliable and efficient operation, upgrade and development of the TS and its interconnection with other systems; providing to this end ancillary services and ensuring

[10] http://licence.eru.cz/detail.php?lic-id=130100001&sequence=&total=0.
[11] See Section 24 of the Act No. 458/2000 Coll.
[12] Section 19a (1) of the Act No. 458/2000 Coll.
[13] ČEPS. Transmission system development. See: https://www.ceps.cz/en/transmission-system-development.
[14] Section 24 (10) (j) of the Act No. 458/2000 Coll.

the TS long-term capability to satisfy reasonable demand for power transmission, collaborating with the operators of interconnected TS, and being actively involved in the internal European electricity market integration;
- provide electricity transmission on the basis of the contracts concluded;
- control electricity flows within the transmission system while respecting electricity transmissions between the interconnected systems of other countries and co-operating with the distribution system operators within the electric power system;
- be responsible for the provision of system services for the electric power system on the TS level; and
- participate in the compensation mechanism and perform payments between TSOs on the basis of the compensation mechanism, in compliance with the Regulation on the conditions for access to the network for cross-border exchanges in electricity; and provide cross-border electricity transfers to market participants while maintaining the transmission system security and reliability.

Furthermore, ČEPS is also obliged to:
- connect to the TS the equipment of anyone and provide transmission services to anyone who applies for it and meets the conditions specified in the Transmission System Operating Rules, except for cases of evidenced lack of capacity of the transmission equipment or possible threats to the reliable operation of the transmission system;
- provide equal conditions for all electricity market participants when connecting their equipment to the transmission system; and
- provide equal conditions for all electricity market participants when transmitting electricity along the transmission system.

Undertaking of investments

The TSO, i.e. ČEPS, is required to ensure the reliable operation, renewal and development of the transmission system and shall cooperate with the operators of interconnected transmission systems.[15]

The investment plan of the TSO is established on the basis of long-term strategies, capacity calculations and the analysis of future capacity needs analysis. The TSO is required to carry out any investment projects and business plans to deliver on their legal/regulatory duties.

Role of NRA

According to Section 17(7)(i) of the Energy Act, ERO approves the 10-year Transmission System Development Plan and this plan is also subject to a binding opinion of the Ministry of industry.

As the TSO has an obligation to draw up a ten-year investment plan every second year, ERO is in a strong position to control transmission system development.

ERO assesses compliance with legal requirements. The ten-year development plan has to:
1. indicate which parts of the transmission system are to be built or extended over the next ten years;
2. define all the investments in the transmission system that the independent TSO has decided upon the transmission grids of the independent transmission system operator and new investments to be made over the next three years; and
3. stipulate the deadlines for realisation of the investments referred to in point 2 above).[16]

When the development plan for the transmission system is filed, the ERO has 2 months to order the TSO to make any changes.[17]

Institutional or procedural constraints on the performance of these roles

The Energy Act regulates ERO's duties, powers, requirement to publish, consult, licence, supervise, etc. ERO has a strong position in exercising its powers, for example the ERO may decide about a) granting, changing, renewing or revoking a licence, b) the imposition of a

[15] Section 24 (1) (a) of the Act No. 458/2000 Coll.
[16] Section 58k (3) of the Act No. 458/2000 Coll.
[17] Section 58k (10) of the Act No. 458/2000 Coll.

supply obligation beyond the licence, c) the imposition of the obligation to provide, in an emergency, an energy facility for the performance of a supply obligation beyond the licence, d) price regulation according to the Prices Act etc.[18]

The powers and obligations of TSO are described in Energy Act. When it comes to licence regime, the licence holder is not permitted to hold more than one licence. The licence is agranted indefinitely. The licence is issued as an exclusive for the Czech Republic territory. When a new network is built or the licensee decides not to use a part of network the licence holder submits the documents proving such changes and apply for a change in the licence decision. Then ERO decide on a change in the licence decision or in some cases on the revocation of the licence.[19]

The TSO is allowed to sell the electricity for covering losses and for proper use of transmission system. The situation in Czech Republic is also specific as the Czech electrical grid is synchronised with the rest of continental Europe. Cross-border interconnections exist with all neighbouring countries, i.e. Germany, Poland, Slovakia and Austria, and with five transmission systems: 50Hertz and TenneT (Germany), PSE (Poland), SEPS (Slovakia), and APG (Austria). At the respective cross-border point transmission capacities continue to be allocated on the basis of coordinated calculation within the Central and Eastern European region (known as Central Eastern Europe, CEE), which also includes Slovenia and Hungary in addition to the neighbouring countries.[20]

2.1.3. Mechanism for financing of investment projects

Investments within the Legal Framework are implemented in the Czech Republic (and have so far been implemented) by ČEPS as a TSO. The funding of projects may be divided into several categories:

Costs Socialization (through Transmission Tariffs)

This is the most common tool by which the ERO controls and monitors costs for investments. Using this tool, these costs are reflected through transmission tariffs.

To set the prices for electricity transmission, ERO has principles (currently for the period of 2016 – 2018[21]) and also ERO uses a methodology for setting the prices.[22] The truth is that the prices for system services are highly influenced by TSO investment activity.[23]

In the Czech Republic, the *cost + fee* model is applied, which means that the regulated price for access to the transmission system and electricity transmission (the maximum price) shall be determined by the sum of the cost items, which also include planned and approved (by the ERO) depreciations related to the regulated activity as well as costs for projects. To set the final price – the Transmission Tariff – ERO uses a mathematic model described in the principles of price regulation.

It is also important to say that there is a charge for capacity booking and a charge for transmission network use. The charge for capacity booking is computed from the allowed revenues and the annual booked capacity for customers taking electricity from the transmission system and the charge for transmission network use is calculated from the TSO's variable costs and the electricity quantity planned to be transmitted (without exports and transit). The TSO's

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18 Section 17 (6) of the Act No. 458/2000 Coll.

19 Section 9 (1) of the Act No. 458/2000 Coll.

20 National Report of the Energy Regulatory Office on the Electricity and Gas Industries in the Czech Republic in 2016. Available: https://www.eru.cz/documents/10540/488714/NR_ERU_2016/3e05aa8c-0a79-4c3c-9389-6d0c3c313e1e.

21 Principles of price regulation for the period 2016-2018 for the electricity and gas sectors and for the operations of the market operator in the electricity and gas sectors. Available: https://www.eru.cz/documents/10540/462862/Zasady-cenove-regulace-IV-RO.pdf/e438802a-b956-4df7-8353-89ccfd72a1ae.

22 ERO report on the regulatory methodology for the forth regulatory period. ERO 2015. Available: https://www.eru.cz/documents/10540/462862/R%C3%A1mec_metodiky_IV+RO_2015-02-16.pdf/1370f896-8d16-441c-9153-d3fb6d6f3ffe.

23 National Report of the Energy Regulatory Office on the Electricity and Gas Industries in the Czech Republic in 2016. Available: https://www.eru.cz/documents/10540/488714/NR_ERU_2016/3e05aa8c-0a79-4c3c-9389-6d0c3c313e1e.

variable costs are set on the basis of the permissible amount of losses in the transmission system, and the average purchase price of the electricity to cover these losses.[24]

The price for using the networks is subject to a correction for the total cost. Also, the existing incentive practice will be followed by the inclusion of a guaranteed profit of CZK 5 million for the optimization of the price to cover losses through the organisation of tenders and the energy pipeline on the short-term market by the transmission system operator. [25]

The costs incurred by the TSO in connection with the investment into developing the network in accordance with the ten-year plan are considered as costs for ensuring the effective performance of the licensed activity which is required i.e. they are included within the allowed price control sum.[26] The investment projects are financed from TSO income (namely, the charges for capacity booking and charges for transmission network use) but it is ERO who sets the prices to cover the necessary cost of ensuring the efficient performance of licensed activities, as well as depreciation and a reasonable profit providing a return on investments in equipment used to perform the licensed activities.[27] In this way, investment projects in the development of the transmission network are paid for by the end-users, as the retail charge for electricity includes transmission charges as a cost component of this.

Projects of Common Interest – Connecting Europe Facility

ČEPS ten-year development plan contains projects meeting conditions of Regulation (EU) No. 347/2013 i.e. requirements on safe and reliable operation of the Czech transmission system as well as contribution to the fulfilment of European targets concerning safe operation of the whole interconnected system. These are Projects of Common Interest (PCI). These projects are eligible for receiving subsidies, so they are co-financed by the EU.

For example, ČEPS received EUR 3.28 million for power line V458 between the existing Krasíkov and Horní Životice substations.[28] Another current co-financed PCI are an internal line between Vernéřov and Vítkov PCI 3.11.1; the internal line between Vítkov and Přeštice PCI 3.11.2[29]; the internal line between Přeštice and Kočín PCI 3.11.3; the internal line between Kočín and Mírovka PCI 3.11.4; and the internal line between Mírovka and Čebín PCI 3.11.5.[30]

2.1.4. Regulatory rules with respect to innovation

Specific duties of the TSO aimed at encouraging innovation

There is a general obligation for the TSO in Section 24(1)(a) of the Energy Act to develop the transmission system, but there is not a specific duty aimed at encouraging innovation. Notwithstanding this, ČEPS is using EU funds for innovation especially Operational Programme Enterprise and Innovations for Competitiveness. Significant for ČEPS is the Priority axis 3, where subsidies can be drawn under the chapter Smart Grids II – Transmission Grids. There are several projects that have been given support.[31]

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[24] Report on the approach to setting the key parameters of the regulatory formula and prices for the second regulatory period in the electricity industry. Available: https://www.eru.cz/documents/10540/462804/Report_II_ro_elec_en.pdf/cd365cec-b395-4f4f-a8bc-f67e7a898c9d. Page 16.

[25] ERO report on the regulatory methodology for the forth-regulatory period. ERO 2015. Available: https://www.eru.cz/documents/10540/462862/R%C3%A1mec_metodiky_IV+RO_2015-02-16.pdf/1370f896-8d16-441c-9153-d3fb6d6f3ffe.

[26] Section 58l (5) of the Act No. 458/2000 Coll.

[27] Section 19a (1) of the Act No. 458/2000 Coll.

[28] ČEPS has received an EU subsidy. Available at: http://ceps.cz/en/press-releases/news/ceps-has-received-an-eu-subsidy.

[29] For studies for the preparation of project documentation for the development of the national lines Vernéřov - Vítkov and Vítkov – Přeštice ČEPS received EUR 1 million subsidy from Connecting Europe Facility programme. Available at: http://www.ceps.cz/en/news-page/news/ceps-won-a-european-grant-for-strengthening-the-transmission-system.

[30] PCI - Projects of Common Interest. Available at: https://www.ceps.cz/en/pci-projects-of-common-interest.

[31] Operational Programme Enterprise and Innovations for Competitiveness. ČEPS 2017 [online]. Available: https://www.ceps.cz/en/operational-programme-enterprise-and-innovations-for-competitiveness.

Specific duties of the NRA aimed at encouraging innovation

We are not aware of any power or duty of ERO specifically aimed at encouraging innovation.

2.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

There is a general obligation in Section 24(1)(a) of the Energy Act to ensure the secure, reliable and efficient operation, renewal and development of the transmission system.

The Energy Act does not contain specific duties on safeguarding security of supply, but according to the rules of transmission system operation in order to secure the supply there exist a) preventive measures, b) dispatching measures in case of outages, c) technical measures in case of outages.

Preventive measures are:
- Regular control of transmission system;
- Optimization of the plan for switching-off of the transmission system during the network preparation;
- Obligation to elaborate measures for dealing with emergency situations (Shutdown Plan, Regulatory Plan, Frequency Plan, Recovery Plan, Defective Deflection Plan in transmission system); and
- International security cooperation.

Dispatching measures in case of outages are:
- Manipulation in transmission system including operation form backups;
- Coordination of distribution systems, use of free capacity of supply;
- Reallocation of capacity within the Czech Republic according to legislative possibilities;
- Assistance from foreign partners; and
- Using measures to deal with emergency situations.

Technical measures in case of outages are:
- Protection of lines and transformers;
- Automatic operations of network;
- Use of effect of frequency automation; and
- Ability of power stations to operate in island mode.[32]

Specific duties of the NRA with respect to security of supply

The ERO's main power aimed at safeguarding security of supply is their power to approve the 10-year Transmission System Development Plan. ERO has also the power to impose a fine for not securing reliable, safe and effective transmission.[33]

2.2. Regulatory practice

2.2.1. Overview over regulatory practice in Czech Republic

Main regulatory barriers

The interviewees were generally satisfied with the NRF in Czech Republic. Especially because the current regulatory period is favourable to new investments, (the WACC is currently at a relatively high level) and the approval of investment plans has been smooth so far. Yet, they also recognise two of the regulatory barriers mentioned in the questionnaire (seen Annex III):
- High TSO CAPEX, but lower expected OPEX within TSO;
- Lower TSO TOTEX but shift in the CAPEX/OPEX ratio.

[32] Section 2 (6) (1) of Rules of transmission system operation. Codex of transmission. system. ČEPS 2018. Available at https://www.eru.cz/documents/10540/3727955/%C4%8CEPS+PPPS+%C4%8D%C3%A1st+VI.pdf/c2288a05-df4c-43f8-8383-250e0996e075. Page 35.

[33] Section 91 (3) (d) of the Act No. 458/2000 Coll.

Additionally, they mentioned the following barriers:

- Uncertainty about the conditions in the next regulatory period and approval of an investment plan;
- The OPEX is based on historical and adjusted though an inflation/efficiently factor. For new OPEX investments, the TSO needs to negotiate additional finance separately.

There is also a penalty incentive. It is applied if the real activation/RAB is higher than planned due to delay or postponement of investments. This penalty incentive could be seen as a barrier to investing in innovative investments with a higher risk.

2.2.2. Regulatory practice related to innovation

Innovative projects

Innovative projects make up a relatively small share of investments, but these are likely to increase in the future. Stakeholders recognised our typology of innovative projects (Annex A).

In the Czech Republic, the type of projects that are currently undertaken in relation to innovation include:

- Replacing new transmission lines including overhead line poles and replacement of conventional overhead line conductors by high-temperature conductors;
- Dynamic capacity rating;
- Phase shifting transformers; and
- Automatic switching of network devices.

There are also investments in standard reactive power and voltage control. The TSO is not investing in smart grids and storage components, as innovation in those technologies occurs at the DSO level.

Adequacy of the NRF relating to its support for innovative investments

Currently there are no provisions in the regulation to explicitly facilitate innovation. However, as the regulatory period is favourable to new investments it also supports new innovative investments.

2.2.3. Regulatory practice related to security of supply

Security of supply projects

Security of supply projects make up most of the projects; however, it is hard to disentangle between innovation, security of supply, and business as usual projects. The stakeholders recognised our typology of projects (Annex A).

In the Czech Republic, the type of projects that are currently undertaken in relation to security of supply include:

- Phase-shifter transformers; and
- Replacing lines.

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

Currently there are no specific barriers for security of supply projects and project are being passed smoothly.

The topic of storage was touched upon during the interviews with stakeholders as there is currently an on-going discussion on a new tariff system to adapt to the new trends and technologies in the electricity market such as electric cars, storage etc. Regarding batteries, the new tariff system depends on a change of the Energy Act to allow use of storage as a licensed activity for market participants. There is a need for the NRF to keep up to date with these new trends and anticipate the new challenges and opportunities.

2.2.4. Illustrative specific projects

The following projects are examples of successful innovative or security of supply projects and hence illustrate how the regulatory regime works in practise. The first two projects are examples of successful innovative projects and the rest of the projects are successful security of supply projects.

Phase shifting transformer (Czech-Germany)

Description and aim

The phase shifting transformers is an example of an innovative project. The Phase shifting transformers (PSTs) will be placed in the Hradec substation the existing substations 420 kV Hradec (CZ) and Röhrsdorf (DE). The project will enable the elimination of negative effects of transit flows through the Czech TS and will thus ensure safe and reliable operation of the Czech TS. The PSTs will also help in facilitation of the implementation of an ambitious investment program of ČEPS, which will require long-term shutdowns of TS equipment.

However, the main aim of this project was to further integrate renewables into the electricity system because an EC study on European wind found that the Czech Republic needed to increase efficient integration of renewables into the electricity system. PSTs were chosen as the mechanism as various studies cited PSTs as a viable solution to integrate renewable.

Approval process

The approval process of the project was smooth and there were no regulatory barriers; however, political discussions contributed to the investment decision. The project was treated as a standard investment decision thus it was financed through the regulatory framework and approved by the regulator and ministry.

Dynamic line rating projects

Description and aim

The dynamic line rating projects are examples of successful innovative projects. The main aim of dynamic line rating is to monitor the ambient temperature. They allow TSOs to maximise the capacity of the lines and thus not have to build new lines at a higher investment cost. These projects are considered as a minor modernisation of the infrastructure.

Approval process

The projects are part of the standard operation decisions and are financed through the operating costs of the regulatory framework. They are not included in the transmission development plan. The project included pilot projects and multiple assessments to determine which lines will benefit most from dynamic line rating.

V490/491-Upgrade of a 220 kV double-circuit line Vitkov Prestice to a 400kV double circuit Line (PCI)

Description and aim

This project is an example of a successful security of supply project. The project was important for security of supply and integrated renewable energy into the system. As it was difficult to receive building permissions to build new lines the TSO opted for increase the capacity of existing transmission lines.

The project consists of constructing a double-circuit 400 kV line between the 420 kV substations Vítkov and Přeštice (total length of 87 km). The project will contribute to the safe transmission of the output from planned renewable energy sources in the Karlovy Vary Region and will significantly strengthen the Czech TS in terms of security of supply.

Approval process

The project is considered a standard investment decision. The current level of the WACC is favourable for all investments. It is part of the TYNDP and the project was approved by the NRA. There were no regulatory barriers. Even though the main approval process was smooth, the main issue was receiving the appropriate building permits.

V413/416- Loop of the existing 400 kV line Prosenice-Hradec vychod into the existing 420 kV Mirovka substation (PCI)

Description and aim

This project was important for security of supply. It was difficult to receive building permissions to build new lines thus in order to increase the security of the supply the TSO opted for increase the capacity of the line.

The projects consists of constructing a new 400 kV double-circuit line with a total length of approximately 25 km. The line route was designed to minimize environmental impacts, as well as the occupation of plots intended as forest land. Construction of the loop on the V413 line is absolutely necessary for directing power flows in the transmission system of the Czech Republic. It will also ensure the increase in reliability of electricity supply to areas in the Vysočina Region as well as the Czech transmission system as a whole.

Approval process

The project is considered a standard investment decision. The current level of the WACC is favourable for all investments. It is part of the TYNDP and the project was approved by the NRA. There were no regulatory barriers.

Building of a second circuit on the existing 400 kV power line Babylon Bezdecin (V451)

Description and aim

The main aim of this project was to increase security of supply. The project includes the construction of a double-circuit 400 kV line between the existing 420 kV Babylon and Bezděčín substations in the corridor of the existing single-circuit 400 kV line. The project will contribute to a significant increase of the reliability of the transmission of output from existing and planned generation sources concentrated in the northwest region of Bohemia. It will also positively impact the distribution of load, thus increasing security of supply.

Approval process

The project is considered a standard investment decision. The current level of the WACC is favourable for all investments. It is part of the TYNDP and the project was approved by the NRA. There were no regulatory barriers.

Impact of reactive power compensation (multiple projects)

Description and aim

The main aim of these projects was to increase security of supply. Voltage conditions in the Czech EPS that call for reactive power compensation are becoming an important aspect of the ČEPS development plan. After performing network analyses, new compensating measures of specified technical design and power range were defined. In the next ten years, more than 1,000 MVAr will be installed in the TS, using mainly the following compensation devices:

- A 45 MVAr reactor inserted in the tertiary winding of a 400/110 kV transformer;
- An adjustable reactor used at a nominal line voltage of 400 kV.

Approval process

The projects are considered standard investment decisions. The current favourable level of the WACC also applies to these projects. The projects are part of the TYNDP and were approved by the NRA. No regulatory barriers were encountered during the approval process, however the projects are not yet implemented. Once the installation starts, the TSO will need to negotiate for additional operating costs.

2.3. Options for improvement

2.3.1. Options to improve regulatory practice

The above discussion shows that the NRF is functional for investments for both innovation and security of supply. Yet, this is due to the current level of WACC, which is relatively high for all investments. The regulatory period ends in 2020 and there is uncertainty what will happen in the next regulatory period. Thus the tariff methodology could be improved to ensure investments for innovative and security of supply projects.

(i) Favouring of OPEX-based solutions

After consulting stakeholders, it is deemed that there is a bias in favour of CAPEX solutions even though some OPEX related projects have been implemented. The OPEX is based on historical costs and adjusted by an inflation/efficiency factor thus for new activities related to new innovation, the TSO needs to ask for additional finance and negotiate each item separately, thus OPEX based solutions should be incentivised. This can be done without changing to a TOTEX regulation, specific incentives for OPEX-based solutions, which have been identified as

advantageous or necessary, could be introduced. Another possibility would be the introduction of a specific budget, e.g. for IT-technology.

(ii) Statutory reference to innovation

Even though the regulatory framework is currently favourable to all investments, to further ensure that investments are made in innovative projects, it may be an option to introduce a statutory reference to innovation. A long-term innovative strategic perspective can 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.

2.3.2. National law mechanisms for implementing options

As regards option (i) (Favouring of OPEX-based solutions), we understand that the legal mechanism for implementing this option would involve the modification in the Energy Act 458/2000 Coll. through the Czech Legislative Process.[34]

As regards option (ii) (Statutory reference to innovation) the suggestion of incorporation a mandatory requirement in legislation for TSO to innovation could be implemented by including such an obligation in Article 24 (10) of the Energy Act 458/2000 Coll. via the Czech Legislative Process.

Moreover, we also expect that both of the options for improvement could be implemented in the new Energy Act, which is currently being prepared and expected to be adopted in about 3 years.

2.3.3. Impact assessment

Option (i) is not easy to be implemented well-balanced. 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 (ii) 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).

[34] In Czech Republic, most of the bills, as well as their amendments, are drafted and prepared by ministries and other central bodies of the state administration. The drafts are submitted to the relevant bodies for comment. A list of these bodies is stated in the Government Legislative Rules. Comments are divided into fundamental and the other comments which are usually in the form of recommendation, proposal and such like. The Government Legislative Council and its commissions, as an advisory body of the government, is also involved in the legislative process. Its opinion is important for the debate at the government meeting. After the comment procedure, materials are presented to the government meeting. The government bill in the printed form is dispatched by the Prime Minister to the Chairperson of the Chamber of Deputies. The Chairperson of the Chamber of Deputies passes the text of the government bill to the Steering Committee of the Chamber of Deputies, to all deputies and political group of deputies. The debate on a government bill is held in the framework of three readings. In case the bill is adopted by the Chamber of Deputies, it is passed to the Senate. After the approval of a law by the Senate, the Chairperson of the Chamber of Deputies forwards every act of law to the President. The President has the power to agree with the law (then the act of law is published in the Collection of Laws) or to pass the law back to the Chamber of Deputies (then, if voted for by majority of all deputies, the act of law is published in the Collection of Laws). (See more details about Czech legislative process here: https://icv.vlada.cz/en/cotoje/what-is-a-legislative-process--61107/tmplid-676/).

3. GAS

3.1. Legal analysis of the NRF in Czech Republic

3.1.1. Overview of the regulatory framework of Czech Republic– legal rules

The Act No. 458/2000 Coll., on the Conditions of Business and State Administration in Energy Industries and Changes to Certain Laws (hereinafter the Energy Act) is the principal piece of primary legislation governing the Legal Framework for gas in the Czech Republic (hereinafter "CZ"). The general part of the Energy Act regulates the execution of the state administration in the energy sectors belonging to the Ministry of Industry and Trade of the CZ (hereinafter the "Ministry") and the Energy Regulatory Office as an independent economic regulator (hereinafter the "ERO"). These bodies derive their primary duties, objectives and powers from the Energy Act.

Both the ERO and the Ministry have duties and powers, which include:

- The Ministry issues a binding opinion on the 10-year Transmission System Development Plan and the 10-year Transport Development Plan;[35]
- The Ministry issues a binding opinion for the building of the electricity transmission system, the gas transmission system, the gas storage facilities and the electricity generating plant with a total installed power of 100 MW or more;[36]
- The Ministry monitors compliance with safety and reliability requirements of the electricity and gas system and reviews the results achieved and further monitors investment in new capacities in relation to the security of electricity and gas supply;[37]
- The Ministry is responsible for developing the National Energy Concept, observing international commitments and treaties, and granting the State's consent to the building of direct lines and selected gas facilities in the gas industry;
- ERO coordinates the creation of rules for the operation of transmission systems in the electricity and gas transmission systems;[38]
- ERO resolve disputes concerning access to the transmission system, the distribution system, underground gas storage facilities, and gas recovery lines, including disputes on access to cross-border capacity for electricity transmission, gas transmission or electricity or gas distribution;[39]
- ERO approves or establishes rules on transmission system operation;[40]
- ERO approves the 10-year Transmission System Development Plan and the 10-year Transit Development Plan; which is subject to a binding opinion of the Ministry of industry;[41]
- ERO may decide to regulate the prices of other activities carried out by a Transmission system operator ("TSO").[42]

CZ has implemented the relevant provisions of the third energy package and Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency (REMIT) into the Energy Act so it sets up the licensing regime for the electricity market in the Czech Republic. ERO, as regulator, administers this regime. Licensable activities include gas production, gas transmission, gas distribution, gas storage, gas trading, market operator.[43] The entity requesting the licence must have the professional capacity, financial and technical assumptions while the legal person as a requesting entity must have the responsible representative who is responsible for the performance of the licensed activity under the Energy Act.[44] The ERO decides to grant a licence on the basis of meeting the conditions of the Energy Act (the ERO issues licences for the activities mentioned above).

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35 Section 16 (m) of the Energy Act.
36 Section 16 (x) of the Energy Act.
37 Section 16 (l) of the Energy Act.
38 Section 17 (5) of the Energy Act.
39 Section 17 (7) (c) of the Energy Act.
40 Section 17 (7) (g) of the Energy Act.
41 Section 17 (7) (i) of the Energy Act.
42 Section 17 (12) of the Energy Act.
43 Section 4 of the Energy Act.
44 Section 5 of the Energy Act.

3.1.2. Specific legal rights and duties

Role of TSO

NET4GAS holds an exclusive gas Transmission System Operator (TSO) licence in the Czech Republic. NET4GAS operates more than 3,800 km of pipelines and its transmission system is a guarantee of safe and reliable gas transmission services.

According to the Section 97a of the Energy Act, the ERO approves Rules for the Operation of the Transmission System Operation Rules, Distribution System Operation Rules, the Transmission System Operator Code, the Distribution System Operator Code, the Underground Gas Storage Facility Operator Code, the commercial conditions for the market operator and other commercial conditions.

Undertaking of investments

The TSO is required to ensure the reliable operation, reconstruction and development of the transmission system and to this end shall cooperate with the operators of interconnected transmission systems.[45]

The TSO prepares the Czech Ten-year Network Development Plan (hereinafter the "Ten-year plan") on a yearly basis as required in Section 58k of the Energy Act. The objective of this plan is to analyse the development of peak daily and annual consumption and the sufficiency of the Czech Republic's entry and exit capacity with regards to N – 1 formula defined by Regulation (EU) 2017/1938. The plan outlines implemented and forthcoming investment projects, which increase network capacity, and provides an analysis of the security of supplies.

The Ten-year plan is established on the basis of long-term strategies, capacity calculations and the analysis of future capacity needs analysis. The TSO is required to carry out any investment projects and business plans to deliver on their legal/regulatory duties. Most of these are projects of which implementation will ensure an adequate capacity of the transmission system (Capacity4Gas Project DE/CZ, Capacity4Gas - CZ/SK), or to meet the requirements necessary to ensure adequacy of the transmission system (Project Moravia). Each of them affects the security of gas supply in the Czech Republic according to the formula N-1 in compliance with the Regulation (EU) no. 2017/1938.The list of investments is included in the ten-year plan for the development of the transmission system submitted to the Ministry and the ERO by the TSO every year (as described in paragraph iv below).

Role of NRA

The ERO executes its power regarding the investment projects through Section 58k and 58l of the Energy Act, which stipulates that the ERO may, within two months after the Ten-year plan was submitted, require changes. The ERO monitors and evaluates the implementation of the ten-year plan and if the TSO does not realize the investment to the transmission system, which was to be carried out within the stipulated deadline pursuant to Ten-year plan, and the investment is still relevant, the Energy Regulatory Office may:

(i) issue an order to realize the investment within the deadline set by the ERO;
(ii) decide to conduct a tender for the provision of a loan to finance the investment to the transmission system and to lay down the terms and conditions of this procedure or to carry out the issuance of TSOs bonds and determination of the conditions for such issue;
(iii) issue an order to increase the TSOs share capital and set conditions for this increase.[46]

The ERO has a strong position in exercising its powers. For example the ERO may decide about a) granting, changing, renewing or revoking a licence, b) the imposition of a supply obligation beyond the licence, c) the imposition of the obligation to provide, in an emergency, an energy facility for the performance of a supply obligation beyond the licence, d) price regulation according to the Prices Act etc.

The powers and obligations of TSO are described in Energy Act. One of the most important competences of the ERO is the licensing competence. The license is designed as exclusive - the licence holder is limited to hold more than one licence and the licence is issued for the Czech

[45] Section 58 (8) (a) of the Energy Act.
[46] Section 58l of the Energy Act.

Republic territory only.[47] Based on the Act No. 458/2000 Coll. (currently effective version) the licence is granted indefinitely. Changes of the licence are subject to ERO decisions, which supervise the licensed entities permanently.[48]

3.1.3. Mechanism for financing of investment projects

There are several types of financing for transmission system development project. The TSO mainly finances projects from internal sources but for some projects may use external sources. External financing is usually issuance of bonds or taking a loan or receiving subsidies.

The ERO monitors the profits and costs of the TSO through regulated prices for gas transmission and gas distribution prices) which the ERO regulates in the form of officially established prices, i.e. a price control, for example regulating how much the TSO can charge users. When regulating the price of a related service in the gas industry, the ERO proceeds in such a way that the regulated prices cover the economically justifiable costs of ensuring the reliable, safe and efficient performance of the licensed activity, depreciation and reasonable profit to ensure the return on realised investments in facilities used to perform the licensed activity, energy efficiency in the construction and operation of the transmission system.

The gas transmission prices set in the ERO price decision are valid for the duration of the ERO price decision. The pricing decision is issued annually. Part of the pricing process is to respond to the development of the gas market in the Czech Republic.

Profits of the TSO for example from users of the transmission system can be used as financial resource for future investments.

ERO analyses profits, expenses and depreciations of regulated entities (such as the market operator) and indirectly motivates them to implement investment plans for example through the reference parameter the “Recovery and Development Fund” – if the TSO will not redeem fully revalued depreciation during the period under review back to asset renewal and development, the ERO will recognize only the relevant part of the revalued depreciation to that entity for the immediately following regulatory period. Revalued depreciation will therefore be reduced for the next regulatory period by the not invested revalued depreciation over the relevant period.

The costs incurred by the TSO in connection with the implementation of the investment in accordance with the ten-year plan for the development of the transmission system are considered as costs for ensuring the effective performance of the licensed activity, which is required.[49] The investments project are financed from TSO income but on the other hand it is ERO who set the prices to cover the necessary cost of ensuring the efficient performance of licensed activities, as well as depreciation and a reasonable profit providing a return on investments in equipment used to perform the licensed activities.[50]

To set the prices for gas transmission ERO has principles now for period of 2016 – 2018[51] and also ERO uses a methodology for setting the prices.[52]

3.1.4. Regulatory rules with respect to innovation

Specific duties of the NRA aimed at encouraging innovation

As mentioned above, the motivation for innovation is mostly through the financial “sanctions” that ERO can levy on the TSO.

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47 Section 4 of the Energy Act.
48 Section 9 of the Energy Act.
49 Section 58l (5) of the Energy Act.
50 Section 19a (1) of the Energy Act.
51 Principles of price regulation for the period 2016-2018 for the electricity and gas sectors and for the operations of the market operator in the electricity and gas sectors. Available: https://www.eru.cz/documents/10540/462862/Zasady-cenove-regulace-IV-RO.pdf/e438802a-b956-4df7-8353-89ccfd72a1ae.
52 ERO report on the regulatory methodology for the forth-regulatory period. ERO 2015. Available: https://www.eru.cz/documents/10540/462862/R%C3%A1mec_metodiky_IV+RO_2015-0216.pdf/1370f896-8d16-441c-9153-d3fb6d6f3ffe.

If the TSO does not redeem fully revalued depreciation during the period under review back to asset renewal and development, the ERO will recognize only the relevant part of the revalued depreciation to that entity for the immediately following regulatory period. Revalued depreciation will therefore be reduced for the next regulatory period by the not invested revalued depreciation over the relevant period.

Specific duties of the TSO at encouraging innovation

The TSO is obliged to prepare a Ten-year plan for the development of the transmission system, which must be submitted to the Ministry and the ERO every year.[53] The scope of the Ten-year plan are the measures, which should be taken to ensure the adequacy of the system and the security of gas supply. The Ten-year plan defines all investments to the transmission system that the TSO has decided to undertake and new investments to be made over the next three years and set the deadlines for realization of investments.

3.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

There is a general obligation on the TSO in Section § 58 (9) (a) of Energy Act to ensure the secure, reliable and efficient operation, renewal and development of the transmission system.

The Ministry and the ERO ensure the safeguarding security of supply through the Decree of the Ministry No 344/2012 Coll., on the state of emergency in the gas industry and safeguarding security of gas supply (hereinafter the "Security Decree") which regulates the safeguarding security of gas supply mechanism (hereinafter the "BSD").[54]

BSD is a mechanism to ensure security of gas supply for so called protected customers (for example households, health and welfare facilities, food businesses, etc.). For these selected customer groups, traders are required to secure a part of gas by storing in gas storages. This method of BSD should guarantee safe deliveries especially in the winter season and avoid supply outages in the case of, for example, disruptions of supply from transit countries.[55]

The market operator is obliged to update and publish the input data for the calculation of the security standard every year.[56] The gas trader supplying gas to protected customers provides written documents of how to secure the security standard of gas supply in the forthcoming period to the ERO.

Specific duties of the NRA aiming at safeguarding security of supply

ERO's main power aimed at safeguarding security of supply is the power to approve or require changes to be made to the Ten-year plan. ERO has also the power to impose a fine for not securing reliable, safe and effective transmission.[57]

3.2. Regulatory practice

3.2.1. Overview over regulatory practice in Czech Republic

Main regulatory barriers

The stakeholders did not recognise many of the barriers mentioned in the questionnaire (see Annex III), but they rather pointed to other barriers which are more related to the implementation of the regulation and the PCI regulation in relation to innovation and security of supply.

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53 § 58k of the Energy Act.
54 Section § 98a of the Energy Act.
55 ERO press release from 20 October 2015 https://www.eru.cz/documents/10540/1130534/20151020_TZ_plyn_BSD.pdf/bb5e70b1-bb01-4409-9249-675edbbb62ba.
56 Section § 11 of the Security Decree.
57 Section 91 of the Energy Act.

3.2.2. Regulatory practice related to innovation

Innovative projects

The stakeholders indicated that there are almost no innovative projects in the Czech Republic. In the Czech Republic, the type of projects that are currently undertaken in relation to innovation include:

- Operational innovations, for instance drone inspections are currently being considered; and
- Interconnectors are part of the TSOs business as usual investments.

Adequacy of the NRF relating to its support for innovative investments

The interviewees indicated that the NRF includes a limited list of allowed investments thus prohibiting the TSO from investing in certain innovative projects such as increasing flexibility (i.e. Power-to-Gas, increased withdrawal and injection capacity in storages, and allowance of higher pressure in selected pipeline/routes) and incentivising and facilitating the upgrade of biogas to the transmission system. The list of investments includes traditional investments such as metering, pipelines, compressor stations.

The interviewees indicated that a clear signal is needed from the EC regarding the role of TSOs and NRAs, especially in regards to the decarbonisation path of the EU. There is no long term strategy for innovation, and the policies regarding innovation are short-term oriented can change from one regulatory period to another.

The Recovery and Development Fund in the Czech Republic could be seen as a mechanism to incentivise investments. It works in such a way that if not enough investments have been made, the gap between allowed depreciation and investments over a chose period are accumulated and then deducted from allowed revenues, thus penalising the company for not investing. However, the fund mostly targets classic replacement investments for guaranteeing reliable and secure supplies and as many types innovative investments are not on the list of allowed investments.

3.2.3. Regulatory practice related to security of supply

Security of supply projects

Almost all projects in the Czech Republic have a security of supply aspect. The regulation regarding security of supply is clearer than for innovation as they have a clear duty regarding security of supply.

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

In general, the regulatory framework is adequate to support security of supply projects. There seem to be no barriers for investment in reconstructions and upgrades, which are in the regulatory asset base. There do seem to be problems when implementing large domestic and cross-border projects. The stakeholders noted that the wording in the PCI regulation is not always clear and can be interpreted in different ways. This has resulted in disagreements between the TSO and NRA and led to projects being cancelled or delayed.

3.2.4. Illustrative specific project

The project below is a security of supply project that has yet to be implemented. It illustrates the problem of implementing large cross-border and domestic projects outlined above. It is to be noted that in general, the regulatory framework is adequate for security of supply and that this project is considered exceptional.

Increasing security of supply in Northern Moravia Region

Description and aim

The project is part of the future North-South Gas Corridor. In case of its realisation, it will substitute potential realisation of Moravia pipeline project. The common aim is among others to secure gas supply to the Northern Moravian region of the Czech Republic. This region is highly dependent on coal and thus the project aims to enable a higher level of security of gas supply, flexibility and to extend the capacity availability for development of these regions.

Approval process

The project consists of several parts. One part concerns the PCI project in cluster 6.2 (cross-border one), another serves national and partly cross-border capacity (transit flow) needs. Even though the domestic part of the project will be fully covered and the PCI part is also approved, the transit flow part is a source of contention. The TSO and NRA do not agree on how this part will be financed. The TSO would like the transit flows to be covered by tariffs, while the regulator does not want to bear the Czech customers with the costs of transit flow. Even though the discussion between the TSO and NRA started in 2013 and the CBCA decision for the project was taken in October 2014, the project is yet to be implemented.

3.3. Options for improvement

3.3.1. Options to improve regulatory practice

The above discussion shows that generally the NRF is well-designed but that there are issues regarding both innovative and security of supply projects.

(i) Statutory reference to innovation

After consulting stakeholders, it is deemed that there is no long-term perspective for innovative investments. A long-term strategic perspective can only be developed if the regulatory framework contains an explicit reference to innovation. This long-term strategic perspective could shaped by governmental policies, statutory duties or could be included in the NDP.

3.3.2. National law mechanism(s) for implementing options

As regards option (i) (Statutory reference to innovation), we expect that this could be implemented by including such a requirement in Article 58 (8) of the Energy Act 458/2000 Coll. through the Czech Legislative Process (see footnote 35).

Moreover, we also expect that both of the options for improvement could be implemented in the new Energy Act, which is currently being prepared and expected to be adopted in about 3 years. In this new Energy Act, the issue regarding the national approval and recovery of investments of PCI projects could be addressed.

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).

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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MJ-03-19-364-EN-N

Publications Office

doi: 10.2833/820175