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

Country Report - Bulgaria

March– 2019

EUROPEAN COMMISSION

Directorate-General for Energy
Directorate B — Internal Energy Market
Unit B.1 — Networks & Regional Initiatives

Contact: Henriette Nesheim

E-mail: Henriette.NESHEIM@ec.europa.eu

European Commission
B-1049 Brussels

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

Country Report - Bulgaria

Authors: Robert Haffner, Laura Heidecke, Harry van Til, Karolina Ryszka (Ecorys), Wolfgang Fritz, Alexander Ladermann, (Consentec), Emiliano Catalini, Søren Løvstad Christensen, Frederik Roose Øvlisen (Ramboll), Gordon Downie, Samuel Hall, Liz McRobb (Shepherd & Wedderburn), Hans Auer (TU Wien), Leigh Hancher

Directorate-General for Energy

March 2019

Europe Direct is a service to help you find answers to your questions about the European Union.

Freephone number (*)**:**

00 800 6 7 8 9 10 11

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Luxembourg: Publications Office of the European Union, 2019

ISBN: 978-92-76-03991-4
Doi: 10.2833/318153

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Assessment of the NRF and the regulatory practice of the electricity sector in Bulgaria

The electricity NRF in Bulgaria

The Bulgarian regulatory regime for Electricity TSOs can be characterised as Rate-of-Return combined with cap on prices. The general principles that apply to the NRA are oriented towards creating incentives for effective development of secure and reliable networks in accordance with the interests of customers. Regarding innovation we have not found any expressed duties neither for the TSO nor for the NRA:

The regulatory practice in the electricity sector in Slovakia

We have not received any feedback to our questionnaires and requests from the electricity sector. Therefore, a description and analysis of the regulatory practice cannot be given.

Options for improvement

Due to the lack of response, we could not identify any improvement options.

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

The gas NRF in Bulgaria

The Bulgarian regulatory regime for Gas TSOs can be characterised as Rate-of-Return combined with cap on revenue. Additionally, efficiency and quality indicators, basis criteria and various other benchmarks are included in the revenue setting. If an investment can be justified in terms of developing and maintaining an efficient, coordinated and economical transmission system then it is likely to be approved. Both the NRA and the TSO have no explicit duties aimed at encouraging innovation but due to the efficiency orientated regulation implicitly cost reducing innovative solutions are incentivised.

The regulatory practice in the gas sector in Bulgaria

We received only limited response from the gas sector. Therefore, the analysis of the regulatory practise might not cover views of all relevant stakeholders. Nevertheless, interviewees we have spoken to were generally satisfied with the NRF regarding support of security of supply as well as innovative projects. But some interviewees remarked that there are not many innovative projects being implemented presently. Due to this lack of innovative projects, it is hard to predict for the interviewees what kind of innovative projects might encounter what kind of issues during the approval process.

Regarding security of supply some interviewees confirm one of the potential regulatory barriers from annex III (Investments in security of supply – projects without commercial benefits) as a possible issue. But at the same time, they stated that in practice this barrier has not turned out to be a problem.

Options for improvement

Although there were no major complaints about the NRF currently in place for innovation and security of supply, using the issues drawn from the above discussion, the following options for improvement could be worth being considered:

(i) Statutory reference to innovation;
(ii) Social cost benefit analysis; and
(iii) Consultation on investment plans (enlargement of existing consultations).

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 Bulgaria, 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 Bulgaria. Lastly, options for improvement of the regulatory practice and the regulatory framework are discussed in Section 2.3 for electricity and Section 3.3 for gas.

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

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

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

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

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

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

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

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

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

2. ELECTRICITY

2.1. Legal analysis of the NRF in Bulgaria

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

Definition of Electricity Transmission Network and Legal Fundamentals

The definition of "electricity transmission network" is provided for by the Bulgarian Energy Act (the "**EA**").[1] The EA defines "electricity transmission network" as the system of electric power lines and electric fixtures, which serves for transmission of electricity, transformation of electricity from high-voltage to mid-voltage and redistribution of electric power flows.[2] The secondary Rules on Management of the Electricity System ("**Rules on Management**") further specify the technical parameters of the electricity transmission network.[3,4]

The EA is the principal piece of primary legislation governing the Legal Framework for electricity in Bulgaria (BG). EWRC, the independent energy regulator for the BG electricity industry (known as the State Energy and Water Regulatory Commission), derives its primary duties, objectives and powers from the EA.[5] Both the regulator and the Minster of Energy have duties, powers and objectives derived from this Act. These duties and objectives (as relevant to transmission network development) include:

- The principal objective in respect of their functions is to safeguard and provide for quality and security of supply, energy independence and development of the physical infrastructure for transmission of electricity. The ultimate objective is to create a competitive and financially stable energy market in electricity;[6]
- While EWRC has a central role in regulation, continuing development of the network and supervision of licensees and performance of licensed activities, the Minister for Energy is more broadly in charge of the national energy policy. The Minister for Energy elaborates on and drafts the Energy Strategy of the Republic of Bulgaria in line with the above objectives and submits the draft strategy before the Council of Ministers (and then to Parliament) for approval. The Minister is competent in matters related to monitoring of the energy sector, drafting of plans, programs and forecasts in the energy sector, etc.;[7]

Licensing, Tariff Regulation and Other Powers of EWRC

The duties and powers (as relevant to transmission network development) of EWRC are listed under Article 21 of the EA and include amongst others the following powers:

- Issuance, amendment, supplement, suspension, termination and withdrawal of licences;
- Prices/ tariff regulation for interconnection, access to and transmission by transmission network;
- Determination of maximum amounts of technological costs of electricity which may be recognized in pricing regulation upon generation, transmission and distribution of electricity in accordance with a methodology or instructions adopted by EWRC;
- Define the terms for access to the electricity transmission network;[8]
- Issuance of certificates to the operators of the electricity transmission networks for compliance with the requirements for independence and monitoring their compliance (certification);[9]

---

1 The EA was promulgated in the Bulgarian State Gazette on 9 December 2003 (issue No. 107 of 2003) and entered into force on 13 December 2003. It has undergone a number of substantial amendments and supplements since its adoption.

2 Item 20 of the Supplementary Provisions of the EA.

3 Promulgated in State Gazette on 21 January 2014 (issue No. 6 of 2014) and entered into force on 25 January 2014.

4 Section II, Chapter II of the Rules on Management of the Electricity System.

5 The Energy and Water Regulatory Commission (EWRC), was created in 1999 by Decree 181 of the Council of Ministers and was initially called The Energy Regulatory Commission. In 2005 on the ground of The Regulation of Water Supply and Sewerage Services Act, it was transformed into State Energy and Water Regulatory Commission, which since 2015 operates under the name Energy and Water Regulatory Commission. EWRC consists of nine members elected directly by Parliament.

6 Art. 2 of the EA.

7 Art. 3 and 4 of the EA.

8 Art.21, para.1, p.13 of the EA.

9 Art.21, para.1, p.27 of the EA.

- Approval of 10-year plans for development of the transmission network, monitor and control its implementation;[10]
- Prescription of efficiency assessments for reduction of technological/ transmission losses. This assessment shall include an analysis of transmission, distribution, loan management, network functioning and access possibilities for distributed energy generators. On the basis of the assessment EWRC requires that network development plans include specific measures and investments for energy efficiency improvement in the networks and a timetable for their implementation;[11]
- Performing assessments with respect to introduction of smart metering systems;[12]
- Decisions with respect to matters related to the ownership over electricity lines and systems commissioned by third parties, developers (i.e. whether infrastructure belongs to transmission, distribution networks or consumers who are developers), and issuance of mandatory prescriptions for the transfer of ownership over and/ or provision of access to such infrastructure;
- Supervision over the implementation of the investment plan of the electricity transmission network operator and inclusion in EWRC's annual report of an evaluation of the operator's investment plan in relation to their conformity with the 10-year plan for development of the networks in the European Union under Article 8, paragraph 3, item "b" of Regulation (EC) No. 714/2009. Such evaluation may include recommendations for change of the investment plan;
- Liaise and cooperate with European Union institutions.[13]

With respect to price regulation, EWRC may apply various methods of regulation, including determination of efficiency indicators and other benchmark criteria. Prices/ tariffs must be transparently approved, non-discriminatory and based on objective criteria. They shall provide for recovery of economically justifiable costs/ expenses and reasonable rate of return on investment/ capital.[14]

The general principles which EWRC needs to follow in performance of its powers and obligations are oriented, *inter alia*, towards creation of incentives for effective development of secure, reliable and effective networks in accordance with the interests of the clients, creating incentives for investment in infrastructure in a non-discriminatory manner.

International Decommissioning Fund Kozlodui (IDFK)

The International Decommissioning Fund Kozlodui ("IDFK") was established by a Framework Agreement of 15 June 2001 signed by and between the European Bank for Reconstruction and Development and the Republic of Bulgaria (for more information click here). The Framework Agreement was ratified by law and approved in Parliament on 28 March 2002.[15] EBRD monitors IDFK performance and the bank is supported by the Bulgarian Minister for Energy.

The IDFK's primary objective is the management of grants from the EU under the Phare Program (a pre-accession instrument made available to Bulgaria) for reduction of the negative impact from the early decommissioning of units 1-4 of the Nuclear Power Plant (NPP) Kozlodui. Apart from the financing within the "nuclear window", there is a dedicated budget for grants in "non-nuclear" activities in the energy sector. Various projects related to transmission of electricity have been approved (see Section 6 below).

Development of the transmission network

The transmission network operator in the territory of Bulgaria is the Electricity System Operator EAD ("**ESO**"). EWRC issued the ESO with a Licence for transmission of electricity. Accordingly, the ESO performs transmission activities, operative planning, coordination and management of the electricity system in Bulgaria, as well as its parallel operation to the systems of neighbouring countries. The ESO also ensures maintenance and functioning of the electricity transmission network. The ESO is certified as an Independent Transmission Operator (ITO) by EWRC on grounds of EA and secondary regulations (implementing the Third Energy Package).

[10] Art.21, para.4, p.4 of the EA.
[11] Art.21, para.1, p.19a of the EA.
[12] Art.21, para.1, p.20 of the EA.
[13] Art.21, para.1, p.24 of the EA.
[14] Art.31 and Art. 32 of the EA.
[15] Ratification act/ instrument was promulgated in Bulgaria State Gazette № 38 of 12 April 2002.

The basic requirements and principles of the licensing regime, including the certification of the transmission system operator are further implemented in the procedure on award of licence[16] and the procedure for certification,[17] both of which are governed by Ordinance № 3 of 21 March 2013 on Licensing of Activities in the Energy Sector (the "**Ordinance on Licensing**").[18] EWRC is the competent regulatory body for both procedures.

Statutory Requirements for Conduct of Transmission Business

The rights and obligations in relation to the management and development of the transmission system have been imposed on ESO by the licence terms and conditions. The licence itself is not publicly available for review. However, licence terms and conditions are derived from statutory provisions.

The basic requirements for transmission activities are governed by the EA and secondary regulations, which have been harmonized with the European legislation in that field (i.e. Third Energy Package). Accordingly, the ESO shall undertake:

- The operation, maintenance, and development of secure, efficient and economic electricity transmission network ensuring an open market in line with the requirements for environmental protection, energy efficiency, and effective use of energy;
- Investment planning, which should ensure the long-term capacity of the network to meet demand, and to ensure security of supply, as part of the activity on transmission of electricity;[19]
- Secure the expansion, reconstruction, and modernisation of the transmission network, in accordance with the long-term electric power industry development forecasts and plans.[20] The transmission operator shall develop the transmission system in accordance with long-term forecast for network development and electricity consumption;
- The operator shall act and conduct its business activities in a manner that guarantees available funds/ resources for development and efficient operation of the transmission network and auxiliary networks/ grids.[21]

Duties related to development of the network are further specified in the Rules on Management. Their aim is more technical and directed towards management and reliable functioning of the transmission network and its effective development.[22] The Rules on Management directly envisage the procedures for planning of the development of the network. Again, the procedures stress on the necessity to ensure safe, secure and effective work of the electricity system and the continuing supply of electricity to consumers.

Transmission Business Plans[23]

Business plans are prepared on a regular basis by the ESO and other licensed undertakings and approved by EWRC. Business plans consist of investment program, maintenance and repair program, social program, forecast structure and amount of expenses/ cost for performance of the respective activity, and forecast financial statements.[24] Business plans must be synchronized with the 10-Year Development Plan (see below).

---

16 Article 1, paragraph 1, item 1 of the Ordinance on Licensing, Chapter 3 of the Ordinance on Licensing.
17 Article 1, paragraph 1, item 4 of the Ordinance on Licensing, Chapter 6 of the Ordinance on Licensing.
18 Promulgated in State Gazette on 5 April 2013 (issue No. 33 of 2013) and entered into force on 9 April 2013.
19 Article 86 of the EA.
20 Article 87, paragraph 1 of the EA.
21 Art.170 of the EA.
22 Chapter 1 of the Rules on Management.
23 Business plans are approved on grounds of Article 13 of Ordinance № 3 of 21.03.2013 on Licensing of Activities in the Energy Sector - secondary regulation adopted by EWRC (acting on grounds of EA) and promulgated in State Gazette № 33 of 4 April 2013.
24 The latest business plan of ESO has not been made publicly available, not the EWRC decision approving it.

Undertaking of investments

10-Year Development Plan

In the development of core business activities (transmission), the ESO is guided by the long-term vision and strict planning that supports a sustainable development in the sector in BG, the region and Europe.

In compliance with its statutory obligations (EA), the ESO prepared its 10-year network development plan for the period 2018-2027. The currently effective 10-year plan has been approved by EWRC.[25] Prior to approval, EWRC conducts a public discussion of the plan with all current and potential users of the network and provides the opportunity for submission of statements.

In order to guarantee the secure operation of the electricity system, the currently applicable 10-year plan envisages gradual development of the transmission system and lists the assets that need to be constructed or renovated in the 10-year period.[26] The scheduled costs for such development are approx. EUR 660 Million. It is further specified that a financing from the EU of approx. EUR 75 million has already been ensured.[27]

Broadly speaking, the aim and scope of the planning[28] is to the ensure the timely and gradual construction and putting into operation of new elements of the transmission system in a way that guarantees the safe and efficient work of the system and to identify the new elements which need to be constructed, their technical parameters, place in the transmission system, terms and conditions for putting into operation. The main principles of planning are also envisaged in the Rules on Management and refer to the obligation for the transmission system operator, ESO, to develop and present a 10-year plan for management of the transmission network aimed directly at the maintenance and development of the network.

Furthermore, pursuant to the Rules on Management[29], the plan is prepared on the basis of information on, *inter alia*, introduction of new technology, ensuring higher quality and security of services, as well as effectiveness of the activity. According to the Rules on Management, the plan constitutes a document, which is purported to:

- Describe the future changes and the development of the transmission system;
- Determine the expected working parameters of the transmission system;
- Present to market participants the main infrastructure to be development in the next 10 years;
- Contain every investment for which a decision had already been adopted and determines the new investments to be made;
- Include a schedule of all investment projects.

The plan should also point out those points of the transmission network, which are most appropriate from technical and economical perspective for construction of new connections for transmission of electricity.

Role of NRA

Here we explain the mechanisms EWRC uses in order to facilitate the development of the transmission network. In particular, we focus on mechanisms aimed at encouraging financing of projects that support security of supply and innovation. These are explained in Sections 2.1.3 to 2.1.5 below.

Institutional or procedural constraints on the performance of these roles

The statutory duties, powers and associated licencing regime set out in the answers above, do tend to act as a constraint on the performance of specific roles, whether this is from EWRC or the regulated network companies (transmission operator). This is particularly prevalent when duties conflict with each other. For example, the requirement for EWRC to encourage the development of competition in the market and the network to deliver investment objectives,

[25] EWRC Decision № ДПРМ-2 of 25.09.2017 by EWRC.
[26] Table 10.1 and table 10.2 of the 10-year plan.
[27] Item 10.4 of the 10-year plan.
[28] Chapter 2, Section II of the Rules on Management.
[29] Article 6, paragraph 2 of the Rules on Management.

may conflict with other objectives and duties in certain circumstances (i.e. supply of energy at lowest costs, consumer interests).

In order to execute changes or implement specific policies within the legal framework, EWRC will often be required to do so in accordance with governance mechanisms to execute such change. An example of this would be the amendment of secondary (delegated legislation) and/ or modification of licence conditions. The process for this often requires consultation, statutory notice periods, and may be appealed by licensees or third interested parties before courts of law.[30]

Planning processes and legislation associated with the obtaining of appropriate planning consents (e.g. environmental, aviation, health and safety) can clearly act as a legal constraint on the development of the transmission network in any particular project. Any project promoter will need to develop such projects in line with the requirements of the legal framework, as a whole, and this will include planning processes. The fact that almost all of the acts related to the development of a construction (act for approval of detailed zoning plan, construction permit, confirmation for the environmental compliance of the project, etc.) shall be subject to appeal (and the appealing procedures may take years) prevents the project promoters and the investors in general, from making any grounded assumption of the time frame of the development of the construction and commissioning process.

2.1.2. Specific legal rights and duties

As noted in Section 2.1.1 above, the operations of the Kozlodui Decommissioning Fund (IDFK) have been promulgated by national law, nevertheless this is rather an *ad hoc* instrument for fostering investments in the energy sector. Key stakeholders are the **European Bank for Reconstruction and Development (EBRD)** and the Bulgarian **Minister for Energy**.

Other key stakeholders with a key influence on transmission network development are primarily those relating to the formal planning process. In this context, construction permit shall be required for the vast majority of construction projects (i.e. extension/ rehabilitation or a new high-voltage transmission line). Key stakeholders may include:

- **Architects and engineers**: the commissioning of almost all kind of constructions including of a transmission line requires elaboration of investment drawings/designs. Such designs can be prepared only by architects and engineers with the respective capacity and admitted as members of the respective professional chambers (i.e. Construction Chamber);
- **National Constructions Supervision Directorate**: from its very beginning the construction process shall be supervised by a construction supervision company which shall be duly registered with the National Construction Supervision Directorate;
- **Minister of Regional Development and Public Works:** the construction permit for a transmission line, which is passing through more than one regions (which is the standard case), shall be issued by the Minister of Regional Development and Public Works. The minsters shall as well be the authority competent to approve the investment drawings related to the planned construction;
- **Mayors/ Regional Governor(-s)**: easement rights necessary for the development of the intended construction shall be issued by the Mayor of the respective municipality or by the Regional Governor, as the case may be;
- **Minister for Environment and Waters**: the development of any construction in BG shall require prior approval of the investment intention subject to authorization by the environmental authorities. The Minister of the Environment and Waters shall approve the development of transmission line, which is passing through more than one regions (which is the standard case). The positive statement issued by the said Minister shall be considered as a condition precedent for issuance of the construction permit for the construction;
- **Minister for Agriculture, Foods and Forests**: in case the planned transmission line is passing through land plots which are agricultural land or are included in the forestry fund (which is almost inevitable in constructing of such a wide project as transmission line) the preapproval of the route/ trace of the transmission line by the Minister of Agriculture, Foods and Forests shall be required and shall as well be considered as a condition precedent for issuance of the construction permit for the construction;

[30] The licence modification process and other appeals are governed by Art. 13-20 of the EA.

- **Other stakeholders**: the approval of the route/ trace of the intended transmission line by the respective utility companies and the fire safety department should also be required prior to issuance of the construction permit for the site;
- **Ministry of Culture**: Ministry of Culture through its directorates should also confirm the route/ trace of the transmission line prior to issuance of the construction permit related to it;
- **The Director of the National Construction Supervision Directorate** issues operational permits for commissioned transmission line projects.

Compulsory acquisition powers: in the absence of voluntary agreement (or where voluntary agreement is not possible) transmission licence holders are able to use compulsory purchase powers of the state which obtains ownership over the land or rights in land necessary to develop the respective energy-related project. The compulsory purchase process in the BG is relatively complex and any compulsory purchase requires the consent of the relevant minister.

2.1.3. Mechanism for financing of investment projects

EWRC's primary mechanism to ensure the delivery of appropriate investment in the transmission network is through price controls for transmission (i.e. access to electricity network and transmission). The price controls for access to network and transmission sets the limits on what the ESO can charge for development and operation of the transmission network. Secondary regulations prescribe the applicable methods, terms and procedure for price regulation - specified in the Ordinance № 1 of 14 March 2017 on Regulation of Prices of Electricity (the "**Ordinance on Prices**"). The Ordinance on Prices envisages two main methods of price regulation:[31]

- Capital Rate of Return; and
- Cap on Prices or Cap on Revenue.

The costs for investments are reimbursed through the regulated prices determined by EWRC in accordance with the EA and the Ordinance on Prices.

Currently, ESO's prices are determined though the method "capital rate of return" applying a regulatory period of 1 year. Each year, following a regulatory review, EWRC investigates whether the costs are directly related to the activity, whether they are reasonable and expedient, thereafter it approves the required revenue and prices chargeable by the electricity transmission operator. The required annual revenue includes the economically reasonable costs and a return of the capital (added). The general price control equation is formed as Annual Revenue = Annual Costs + (Regulated Asset Base x Rate of Return). The prices must ensure an economically justified rate of capital return.

The return of the capital is, in turn, calculated by multiplying the asset base and the capital rate of return:

- The assets base comprises (i) the recognized value of the assets whereon the transmission operator receives return on the capital employed and including the elements: the recognized value of the assets, which are used and have a useful life determined on the basis of the cost of the acquisition reduced by depreciation, determined for regulatory purposes, over the period of use the assets acquired for the purpose of performing the licensed activity and calculated applying the linear method and (ii) the required working capital;
- The capital rate of return determined by EWRC is equal to the estimated weighted average cost of capital. EWRC sets the capital rate of return, taking into account factors such as: risk-free returns, comparisons with others enterprises with a similar degree of risk, access to finance, current financial and financial services economic conditions in the country, alternative cost of capital, specific risk of enterprise, financial policy and capital structure of the enterprise, financial enterprise history on the basis of market value statistics and / or officially published forecast information.

The costs for investments are reimbursed through the regulated prices determined by EWRC in accordance with the EA and the Ordinance on Prices.

[31] Article 3, paragraph 2 of the Ordinance on Prices.

Furthermore, EWRC has adopted a methodology and assessment criteria for risk mitigation arising out from the regulatory framework and specific investment risks for significant projects/ Project of Common Interest (PCIs). This methodology applies with respect to the commissioning of new infrastructure or significant increase of existing infrastructure, the project implementation of which may require certain exemptions from price regulations and/ or certification requirements, or other appropriate incentives. This methodology is adopted on grounds of Article 13 (6) of Regulation № 347/ 2013/ EU.[32]

Mechanisms to foster innovation:

More details on the specific mechanisms and how they incentivize innovative approaches are already described above. Furthermore, we have not identified financing mechanisms, which have the effect of limiting investments.

Measures to establish a balance between investing in new or innovative network infrastructure to meet the needs of current and future users in a timely manner and avoiding investment in stranded assets

EWRC seeks to find such balance through the general price controls regulation, as well as the issuance of secondary regulations (ordinances, methodologies), pricing and other regulatory decisions including review and approval of the 10-year plan for development of the network:

- First, the general principles which EWRC needs to follow upon discharge of its powers and obligations include both securing balance between the interest of the licensed undertakings and the clients, and the creation of incentives for effective development of secure, reliable and effective networks in accordance with the interests of the clients, providing incentives for investment in infrastructure in a non-discriminatory manner; and
- Second, the procedure for approval of the 10-year plan for development of the transmission network also aims to ensure such balance. It is required that the draft plan includes an assessment over the necessary investments. Moreover, EWRC investigates whether the plan includes all necessary investments and whether it complies with the plan of ENTSO-e. Prior to approval, EWRC also presents to third interested parties the opportunity to submit statements. Stranded assets are not likely to meet the criteria for approval under the 10-year plan. Hence, the ESO has an inherent incentive to avoid investment in such assets;
- Third, insofar as the rationale behind regulation is based on outputs, the deliverables to meet the required outputs may in fact be of an innovative nature, if they can be justified in terms of the ESO's duties to develop and maintain an efficient, coordinated and economical system of transmission.

2.1.4. Regulatory rules with respect to innovation

Specific duties of the TSO aimed at encouraging innovation

Duties, including those applicable to innovation, are more generally described in Sections 2.1.1 and 2.1.5. The ESO also has a role in delivering/ participating in mechanisms, which support the development of innovation. These mechanisms, and the ESO's role in them, are more generally explained in Sections 2.1.1, 2.1.3 and 2.1.5.

Specific duties of the NRA aimed at encouraging innovation

EWRC's duty to encourage innovation is implicit in the more general duties to ensure that it secures the efficient and economic execution of activities by licensees as well as defining the transmission and access prices. As a result, many of the mechanisms, outlined above at section 2.1.3 are aimed at promoting innovation as well.

[32] Methodology and Assessment Criteria for Investments in Infrastructure Projects for Transmission of Electricity and Natural Gas, adopted on grounds of Article 13 (6) of Regulation № 347/ 2013/ EU, EWRC adopted the methodology by Protocol decision № 47 of 15 March 2016.

2.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

Duties, including those applicable to security of supply, are more generally described above. In particular, under the EA the ESO shall ensure:

- Integrated management of the electricity transmission network with a view to its reliable, safe and efficient operation;
- Maintenance of the facilities and installations of the electricity transmission network in accordance with technical requirements and with safe operation requirements;
- Sufficient cross-border capacity with a view to integration of the Bulgarian electricity system to the European electricity transmission infrastructure;
- Operation, maintenance and development of a secure and efficient electricity transmission network with a view to guaranteeing an open market and environmental protection;
- Investment planning to ensure that the long-term capacity of the network would reasonably meet demand and to guarantee security of supply.

Secondary (delegated) regulations also impose specific duties on the ESO with respect to secure, reliable and un-interruptible supply. The ESO will also have role in delivering/ participating in mechanisms, which support security of supply objectives. These specific mechanisms, and the ESO's role in them, are more fully explained in Sections 2.1.1, and 2.1.3.

Specific duties of the NRA aiming at safeguarding security of supply

Please refer to Section 2.1.1, above, with regard to the legal powers and duties available to EWRC in terms of security of supply. EWRC exercises these duties largely through the mechanisms more widely described in Section 2.1.3 above.

Other important powers of EWRC in this regard are the licensing regime (issuing of licences to the TSOs and certificates to the TSOs for compliance with the requirements for independence) and approvals of business plans, and 10-year plans for development of the transmission network, monitoring and supervision of its implementation.

2.2. Regulatory practice

2.2.1. Overview over regulatory practice in Bulgaria

We have not received any feedback to our questionnaires and requests from the electricity sector. Therefore, a description and analysis of the regulatory practice cannot be given.

2.2.2. Regulatory practice related to innovation

(see above).

2.2.3. Regulatory practice related to security of supply

(see above).

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 practice.

Projects under the International Decommissioning Fund Kozlodui (IDFK)

A. Agreement for Grant № 013B between EBRD and ESO – Rehabilitation and Expansion of the National Electricity Transmission Grid to increase security of supply.

   Beneficiary: ESO;
   Total value of financing: EUR 35,55 million (EUR 25.43 million provided by IDFK);

   This project concerns rehabilitation and expansion of 10 sub-stations by replacement of 400 kV facilities in view of the secure and reliable operation of the transmission system after decommissioning of Units 3 and 4 of NPP Kozlodui.

B. Agreement for Grant № 036 between EBRD and ESO – Construction of 400 kV cable lines with total length of 250 km to increase security of supply

Beneficiary: ESO;
Total value of financing: EUR 54.2 million (EUR 38 million provided by IDFK).

C. Agreement for Grant № 055 between EBRD and ESO – Modernization and Expansion of Information Systems, Monitoring and Energy Management Systems of the Central Dispatching Center to ESO (innovation)

Beneficiary: ESO;
Total value of financing: EUR 8.35 million (EUR 4.25 million provided by IDFK).

This project concerns modernization of information systems, which is expected to deliver reductions in transmission losses and improvements in dispatching center activities.

Market Potential and Future Perspectives under the 10-Year Network Development Plan (ESO)

Based on the 10-year plan, the annual estimate of all costs for construction, extension, reconstruction and modernization of the parts of the electricity transmission network and of the systems for protection and management of the electricity system for the period 2018 – 2027 is approx. EUR 660 Million of which approx. 75 Million of EU funds.

A. 400 kV Interconnection between Bulgaria and Greece (to increase security of supply and market integration)
A part of priority energy corridor "North – South" between the power networks in Central Eastern and South Eastern Europe (NSI East Electricity) is the construction of a new 400 kV interconnection between substation "Maritsa East" (Bulgaria) and substation "Nea Santa" (Greece), a part of cluster 3.7 "Bulgaria – Greece between Maritsa East and Nea Santa", which includes the following projects:

- New 400 kV interconnection between s/s "Maritsa East", Bulgaria and s/s "Nea Santa", Greece;
- New 400 kV power line between s/s "Maritsa East" and s/s "Plovdiv";
- New 400 kV power line between s/s "Maritsa East" and switchyard of TPP "Maritsa East 3";
- New 400 kV power line between s/s "Maritsa East" and s/s "Burgas".

All four projects are of common interest pursuant to Regulation (EU) 347/2013 for the construction of trans-European energy infrastructure. The total value of the four projects is approx. EUR 175 Million with co-financing from Connecting Europe Facility amounting to approx. EUR 29 Million.

B. New 400 kV Internal Power Line (to increase security of supply and market integration)
A part of priority energy corridor "North – South" is also the construction of a new 400 kV power line between "Dobrudja" and "Burgas", a part of cluster 3.8 "Cluster Bulgaria – Romania capacity increase". The project is of common interest and will contribute to the accommodation of highly concentrated RES generation in Northeast Bulgaria and Southeast Romania, thus providing conditions to achieve the long run European and national renewable and climate targets beyond 2020. The project has an important impact on the Romanian power system, as well. Commissioning of the line will guarantee the security of cross-border electricity exchanges between Bulgaria and Romania.

The total value of the project is approx. EUR 60 Million with co-financing from Connecting Europe Facility amounting to approx. EUR 30 Million.

C. Interconnector Development (to increase security of supply and market integration)
According to the 10-year plan, the work on a tripartite project Bulgaria - Greece - Turkey for assessment of the possibilities for building a third interconnection between Bulgaria and Turkey will be completed by the end of 2018.

The construction of a second interconnector with Serbia and third with Turkey is planned to take place after 2027 and is therefore not reflected in the currently effective ten-year plan.

A thorough cost benefit analysis in accordance with the ENTSO-e methodology has been carried out for each of the above projects. The indicators evaluated in this analysis are economic and technical. The results of the analysis show that with the planned development of generating capacities and electricity consumption in the region, the construction of these power lines is economically and technically justified. The economic benefits are an expected fall in electricity prices as a result of facilitating cross-border trade, as well as a reduction in technology transmission costs. The technical benefits of building these power lines are to improve the efficient operation of the transmission network by ensuring continuity of supply in normal and repair work schedules. This provides opportunities for improving trading conditions and facilitating the procedures for obtaining the various documents necessary for the preparation of building permits.

2.3. Options for improvement

2.3.1. Options to improve regulatory practice

Due to the lack of response, we could not identify any improvement options.

2.3.2. National law mechanism(s) for implementing options

(see above).

2.3.3. Impact assessment

(see above).

3. GAS

3.1. Legal analysis of the NRF in Bulgaria

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

For the purposes of the Legal Framework in BG, "transmission of natural gas" includes transmission of natural gas and operation of the national gas network[33] as well as the gas network for transit.[34] The gas operator (Bulgartransgaz) is also a combined operator as the company is in charge of the operation and management of the underground gas storage facility at Chiren – UGS Chiren.[35]

The Energy Act is the principal piece of primary legislation governing the Legal Framework for natural gas in Bulgaria (BG). EWRC, the independent energy regulator for the BG gas industry, derives its primary duties, objectives and powers from the Energy Act.[36] Both the regulator and the Minster of Energy have duties, powers and objectives derived from this Act. These duties and objectives (as relevant to transmission network development) include:

- The principal objective in respect of their functions is to safeguard and provide for quality and security of supply, energy independence and development of the physical infrastructure for transmission of natural gas. The ultimate objective is to create a competitive and financially stable energy market in natural gas;[37]
- While EWRC has a central role in regulation, continuing development of the network and supervision of licensees and performance of licensed activities, the Minister of Energy is more broadly in charge of the national energy policy. The Minister for Energy elaborates on and drafts the Energy Strategy of the Republic of Bulgaria in line with the above objectives and submits the draft strategy before the Council of Ministers (and then to Parliament) for approval. The Minister is the Competent Authority in matters related to security of gas supply within the meaning of Regulation № 994/ 2010 and related policy aspects such as continued monitoring of the energy sector, drafting of plans, programs and forecasts in the energy sector, etc.[38]

Licensing, Tariff Regulation and Other Powers of EWRC

The duties and powers (as relevant to transmission network development) of EWRC are listed under Article 21 of the Energy Act and include amongst others the powers to:

- Issue, amend and terminate licences to the transmission system operator (transmission and storage), monitor and administer the licencing regime;[39]
- Regulate prices/ tariffs and price components for sale-purchase of natural gas, interconnection to network, transmission and supply, access to storage facility and storage of natural gas;[40]

---

33 The national gas network supplies natural gas to local consumers (in BG). It comprises of approximately 1,835 km of main pipelines and pipeline branches at high pressure, including three compressor stations – CS Kardam-1; CS Valchi Dol; and CS Polski Senovets; with total installed capacity of 49 MW; the total capacity of the national network is about 7,4 billion cubic meters per annum. Maximum work pressure is 54 bars.

34 The national transit network is mainly used for transit of natural gas from the Bulgaria-Romania interconnector entry point to the exits at Turkey, Macedonia, Greece. It comprises of approximately 930 km of main pipelines and pipeline branches at high pressure, including six compressor stations – CS Kardam-2; CS Provadia; CS Lozenets; CS Strandja; CS Ihtiman; and CS Petrich; with total installed capacity of 270 MW; the total capacity of the national network is about 17,8 billion cubic meters per annum (for all destinations). Maximum work pressure is 54 bars.

35 Underground Gas Storage (UGS) Chiren has been commissioned in place of the previously depleted gas field Chiren. It has 23 operational wells; a compressor station of 10 MW installed capacity; the current capacity of UGS Chiren is approximately 550 million cubic meters natural gas.

36 The Energy and Water Regulatory Commission (EWRC), was created in 1999 by Decree 181 of the Council of Ministers and was initially called The Energy Regulatory Commission. In 2005 on the ground of The Regulation of Water Supply and Sewerage Services Act, it was transformed into State Energy and Water Regulatory Commission, which since 2015 operates under the name Energy and Water Regulatory Commission. EWRC consists of nine members elected directly by Parliament.

37 Art. 2 of the Energy Act.

38 Art. 3 and 4 of the Energy Act.

39 Art.21, para.1, p.1 of the Energy Act.

40 Art.21, para.1, p.8 of the Energy Act.

- Issue (secondary, delegated) rules for trading with natural gas and other delegated legislation (network management);[41]
- Define the terms for access to the gas transmission network;[42]
- Issue certificates to the operators of the gas transmission networks for compliance with the requirements for independence and monitor their compliance (certification);[43]
- Approve a 10-year plan for development of the transmission network, monitor and control its implementation;[44]
- Require operators of transmission systems to perform efficiency assessments for reduction of technological/ transmission losses; [45]
- Perform assessments with respect to introduction of smart metering systems;[46]
- Liaise and cooperate with European Union institutions.[47]

With respect to price regulation, EWRC may apply various methods of regulation, including determination of efficiency indicators and other benchmark criteria. Prices/ tariffs must be transparently approved, non-discriminatory and based on objective criteria. They shall provide for recovery of economically justifiable costs/ expenses and reasonable rate of return on investment/ capital.[48]

International Decommissioning Fund Kozlodui

The International Decommissioning Fund Kozlodui ("IDFK") was established by a Framework Agreement of 15 June 2001 signed by and between the European Bank for Reconstruction and Development and the Republic of Bulgaria (for more information click here). The Framework Agreement was ratified by law and approved in Parliament on 28 March 2002.[49] EBRD monitors IDFK performance and the bank is supported by the Bulgarian Minister for Energy.

The IDFK's primary objective is the management of grants from the EU under the Phare Program (a pre-accession instrument made available to Bulgaria) for reduction of the negative impact from the early decommissioning of units 1-4 of the Nuclear Power Plant (NPP) Kozlodui. Apart from the financing within the "nuclear window", there is a dedicated budget for grants in "non-nuclear" activities in the energy sector. Various projects related to transmission of natural gas have been approved (see section 3.2.4 below).

Development of the transmission system

Bulgartransgaz EAD (https://www.bulgartransgaz.bg/en) owns and operates the national transmission system, transit network and UGS Chiren. Bulgartransgaz is a combined operator performing activities of natural gas transmission and storage. It is permitted to carry out its activities through licences (for natural gas transmission - Licenses № Л-214-06 and № Л-214-09 from 29 November 2006 and for natural gas storage - License № Л-214-10 from 29 November 2006) issued by EWRC. The authority also maintains, develops and monitors compliance with licence terms and conditions (yet licensing terms and conditions are not public). Bulgartransgaz has been certified as an Independent Transmission Operator in pursuance of the certification requirements under the Energy Act (implementing the Third Energy Package).[50]

Statutory Requirements for Conduct of Transmission Business

The basic requirements for transmission activities are governed by the Energy Act and secondary regulations, which have been harmonized with the European legislation in that field (i.e. Third Energy Package):

---

41 Art.21, para.1, p.9 of the Energy Act.
42 Art.21, para.1, p.13 of the Energy Act.
43 Art.21, para.1, p.27 of the Energy Act.
44 Art.21, para.4, p.4 of the Energy Act.
45 Art.21, para.1, p.19a of the Energy Act.
46 Art.21, para.1, p.20 of the Energy Act.
47 Art.21, para.1, p.24 of the Energy Act.
48 Art.31 and Art. 32 of the Energy Act.
49 Ratification act/ instrument was promulgated in Bulgaria State Gazette № 38 of 12 April 2002.
50 Chapter VIIIa of the Energy Act; Bulgartransgaz has been certified and designated as an ITO by virtue of EWRC Decision № C-4 of 22 June 2015 and Decision № C-6 of 5 November 2015. Bulgartransgaz is 100% owned by the Bulgarian Energy Holding EAD, which is a state-owned undertaking (its principal is the Minister for Energy).

- Transmission operator undertakes to secure operation and maintenance in view of safe and efficient functioning of the transmission network. An overarching objective/ duty for the operator is to attain the standard of a secure, efficient and economic gas transmission network for the purposes of preconditioning an open and competitive market, and protection of the environment. The operator shall act and conduct its business activities in a manner that guarantees available funds/ resources for development and efficient operation of the transmission network and auxiliary networks/ grids;[51]
- Transmission operator shall develop the transmission system in accordance with long-term forecast for network development and natural gas consumption. The operator is in charge of the investment planning which is aimed at securing the long-term capacity of the transmission network and guarantee security of supply;[52]
- Transmission operator shall provide for the maintenance of sufficient cross-border interconnection capacity for integrating the Bulgarian gas system to the European gas transmission system;[53]
- Maintenance of the facilities and installations of the gas transmission network and ancillary facilities in accordance with technical requirements;
- Transmission/ storage operator operates and manages, maintains and develops secure and reliable storage facilities;[54]
- Integration of natural gas from renewable sources into the gas transmission network to the extent technically possible and safe.

Transmission Business Plans[55]

Business plans are prepared on a regular basis by TSO and other licensed undertakings and approved by EWRC. Business plans consist of investment program, maintenance and repair program, social program, forecast structure and amount of expenses/ cost for performance of the respective activity, and forecast financial statements.[56] Business plans must be synchronized with the 10-Year Development Plan (see below).

Undertaking of investments

10-Year Development Plan

In the development of core business activities (transmission, transit transmission and storage), Bulgartransgaz is guided by the long-term vision and strict planning that supports a sustainable development in the sector in BG, the region and Europe.

In compliance with its statutory obligations (Energy Act), Bulgartransgaz prepared its 10-year network development plan for the period 2017-2026 (available for download here).[57] The plan includes among other things measures for security of supply (also risk assessments under the N-1 standard), improvements in safety, security and reliability of transmission infrastructure, as well as protection of the environment, meeting demand requirements of consumers, increasing accessibility/ connectivity of infrastructure, diversification of supplies, etc.

The plan is developed in the context of the certification obligations under the Energy Act and implementation of the Third Energy Package.[58] Furthermore, EWRC has adopted a secondary methodology for assessment criteria of investments in infrastructure projects on grounds of Article 13 (6) of Regulation № 34/ 2013/ EU.[59] The assessment criteria under the methodology

[51] Art.170 of the Energy Act.
[52] *Ibid*.
[53] *Ibid*.
[54] Art.168 of the Energy Act.
[55] Business plans are approved on grounds of Article 13 of Ordinance № 3 of 21.03.2013 on Licensing of Activities in the Energy Sector - secondary regulation adopted by EWRC (acting on grounds of Energy Act) and promulgated in State Gazette № 33 of 4 April 2013.
[56] The latest business plan of Bulgartransgaz has been approved by EWRC by Decision № БП-7 of 1 August 2017 for the period 2017-2019.
[57] The latest 10-year plan of Bulgartransgaz has been approved by EWRC by Decision № ДПРМ-1 of 1 August 2017 for the period 2017-2026.
[58] Art. 81g of the Energy Act.
[59] Methodology for Assessment Criteria of investments in infrastructure projects on grounds of Article 13 (6) of Regulation № 34/ 2013/ EU available (in Bulgarian language at http://www.dker.bg/bg/za-kevr/normativka-baza/metodiki.html).

is one of the guiding principles for the 10-Year Development Plan as the methodology contains risk mitigating measures with respect to the regulatory framework for natural gas.

Plans are prepared in collaboration with all stakeholders and submitted to EWRC for approval since plans are intended to provide certainty and transparency into the future perspectives for infrastructure development. In the course of drafting the 10-Year, Plan the TSO takes into account all available information with respect to any changes in the natural gas extraction/ production rates, supplies, consumption and cross-border exchanges, as well as any investment plans of neighbouring operators.[60] The content of the 10-Year Development Plan includes:

- Transmission infrastructure which will be commissioned in the following 10 years/ investments planned in short-term (three-year) and long-term (ten-year) period;
- Investments authorized and/ or planned, as well as the need for additional investments;
- Timeline for all investment projects/ schedule for implementation of investment projects and forecasts for utilization of the gas infrastructure capacity.[61]

The national 10-Year plans developed by the transmission system operator is also part of the Regional Development Plan of the common European gas transmission network.

Role of NRA

EWRC's role and duties (as defined in the legal framework) are more generally described in Section 3.1.1, above. Here we explain the mechanisms EWRC uses in order to facilitate the development of the transmission network. In particular, we focus on mechanisms aimed at encouraging financing of projects that support security of supply and innovation. These are explained in Sections 3.1.3 to 3.1.53.1.5.

Institutional or procedural constraints on the performance of these roles

The statutory duties, powers and associated licencing regime set out in the answers above, do tend to act as a constraint on the performance of specific roles, whether this is from EWRC or the regulated network companies (transmission operator). This is particularly prevalent when duties conflict with each other. For example, the requirement for EWRC to encourage the development of competition in the market and the network to deliver investment objectives, may conflict with other objectives and duties in certain circumstances (i.e. supply of energy at lowest costs, consumer interests).

In order to execute changes or implement specific policies within the legal framework, EWRC will often be required to do so in accordance with governance mechanisms to execute such change. An example of this would be the amendment of secondary (delegated legislation) and/ or modification of licence conditions. The process for this often requires consultation, statutory notice periods, and may be appealed by licensees or third interested parties before courts of law.[62]

Planning processes and legislation associated with the obtaining of appropriate planning consents (e.g. environmental, aviation, health and safety) can clearly act as a legal constraint on the development of the transmission network in any particular project. Any project promoter will need to develop such projects in line with the requirements of the legal framework, as a whole, and this will include planning processes. The fact that almost all of the acts related to the development of a construction (act for approval of detailed zoning plan, construction permit, confirmation for the environmental compliance of the project, etc.) shall be subject to appeal (and the appealing procedures may take years) prevents the project promoters and the investors in general, from making any grounded assumption of the time frame of the development of the construction and commissioning process.

3.1.2. Specific legal rights and duties

As noted in Section 3.1.1 above, the operations of IDFK (Kozlodui Decommissioning Fund) have been promulgated by national law, nevertheless this is rather an *ad hoc* instrument for fostering investments in the energy sector. Key stakeholders are the **European Bank for Reconstruction and Development (EBRD)** and the Bulgarian **Minister for Energy**.

---

60 The currently applicable 10-Year Development Plan (Bulgartransgaz) has been approved by EWRC Decision № ДПРМ-1 of 1 August 2017.

61 Art. 81g of the Energy Act.

62 The licence modification process and other appeals are governed by Art. 13-20 of the Energy Act.

Other key stakeholders with a key influence on transmission network development are primarily those relating to the formal planning process. In this context, construction permit shall be required for the vast majority of construction projects (i.e. extension/ rehabilitation or a new high-pressure gas pipeline). Key stakeholders may include:

- **Architects and engineers**: the commissioning of almost all kind of constructions including of a gas pipeline requires elaboration of investment drawings/designs. Such designs can be prepared only by architects and engineers with the respective capacity and admitted as members of the respective professional chambers (i.e. Construction Chamber);
- **National Constructions Supervision Directorate**: from its very beginning the construction process shall be supervised by a construction supervision company which shall be duly registered with the National Construction Supervision Directorate;
- **Minister of Regional Development and Public Works:** the construction permit for a gas pipeline, which is passing through more than one regions (which is the standard case), shall be issued by the Minister of Regional Development and Public Works. The minsters shall as well be the authority competent to approve the investment drawings related to the planned construction;
- **Mayors/ Regional Governor(-s)**: easement rights necessary for the development of the intended construction shall be issued by the Mayor of the respective municipality or by the Regional Governor, as the case may be;
- **Minister for Environment and Waters**: the development of any construction in BG shall require prior approval of the investment intention subject to authorization by the environmental authorities. The Minister of the Environment and Waters shall approve the development of gas pipeline, which is passing through more than one regions (which is the standard case). The positive statement issued by the said Minister shall be considered as a condition precedent for issuance of the construction permit for the construction;
- **Minister for Agriculture, Foods and Forests**: in case the planned pipeline is passing through land plots which are agricultural land or are included in the forestry fund (which is almost inevitable in constructing of such a wide project as gas pipeline) the preapproval of the trace of the pipeline by the Minister of Agriculture, Foods and Forests shall be required and shall as well be considered as a condition precedent for issuance of the construction permit for the construction;
- **Other stakeholders**: the approval of the route/ trace of the intended pipeline by the respective utility companies and the fire safety department should also be required prior to issuance of the construction permit for the site;
- **Ministry of Culture**: Ministry of Culture through its directorates should also confirm the route/ trace of the pipeline prior issuance of the construction permit related to it;
- **The Director of the National Construction Supervision Directorate** issues operational permits for commissioned pipeline projects.

Compulsory acquisition powers: in the absence of voluntary agreement (or where voluntary agreement is not possible) transmission licence holders are able to use compulsory purchase powers of the state which obtains ownership over the land or rights in land necessary to develop the respective energy-related project. The compulsory purchase process in the BG is relatively complex and any compulsory purchase requires the consent of the relevant minister.

3.1.3. Mechanism for financing of investment projects

EWRC's primary mechanism to ensure the delivery of appropriate investment in the transmission network is through price controls for transmission (i.e. access to gas network, shipping and transportation). The price controls for access to network and natural gas transmission/ transportation sets the limits on what Bulgartransgaz can charge for development and operation of the transmission network. Secondary regulations prescribe the applicable methods, terms and procedure for price regulation.[63]

Transmission related tariffs are determined by incentive-based regulation (cap revenue) for a regulatory period of 2 to 5 years. Efficiency and quality indicators, baseline criteria and various other benchmarks are employed in tariff setting as well. The general price control equation is formed as Annual Revenue = Annual Costs + (Regulated Asset Base x Rate of Return). The prices must ensure an economically justified rate of capital return.

[63] Ordinance № 2 of 19 March 2013 on Price Regulations for Natural Gas.

EWRC has adopted a special methodology for tariff setting for access and transmission.[64] The methodology lays down in detail the entry-exit model for price setting of access to the transmission network, tariff structure, formation of pricing elements and procedure. According to this methodology, the approved annual revenue covers operating expenses, conduct of business under the applicable safety and reliability standards, maintenance and development of the transmission network (subject to cap on revenue).

Furthermore, EWRC has adopted another methodology and assessment criteria for risk mitigation arising out from the regulatory framework and specific investment risks for significant projects/ Project of Common Interest (PCIs). This methodology applies with respect to the commissioning of new infrastructure or significant increase of existing infrastructure, the project implementation of which may require certain exemptions from price regulations and/ or certification requirements, or other appropriate incentives. This methodology is adopted on grounds of Article 13 (6) of Regulation № 347/ 2013/ EU.[65]

In terms of procedure, Bulgartransgaz submits an application prior to the regulatory period and EWRC determines price components for the respective period (which can be from 2 to 5 years) by decision.

Based on the approved price components, Bulgartransgaz adopts a pricing decision specifying the tariff structure and the exact amounts of applicable tariffs (subject to public consultation). The currently applicable prices for access and transmission, storage, balancing, and tariff calculator and archived data may be found here.

Unlike access and transmission, gas storage prices/ tariffs are currently determined by previous separate EWRC Decision (2005).[66]

Mechanisms to foster innovation

More details on the specific mechanisms and how they incentivize innovative approaches are described in more details above. Furthermore, we have not identified financing mechanisms, which have the effect of limiting investments.

Measures to establish a balance between investing in new or innovative network infrastructure to meet the needs of current and future users in a timely manner and avoiding investment in stranded assets

EWRC seeks to find such balance through the general price controls regulation, as well as the issuance of secondary regulations (ordinances, methodologies), pricing and other regulatory decisions including review and approval of the 10-year plan for development of the network:

- First, the general principles which EWRC needs to follow upon discharge of its powers and obligations include both securing balance between the interest of the licensed undertakings and the clients, and the creation of incentives for effective development of secure, reliable and effective networks in accordance with the interests of the clients, providing incentives for investment in infrastructure in a non-discriminatory manner; and
- Second, the procedure for approval of the 10-year plan for development of the transmission network also aims to ensure such balance. It is required that the draft plan includes an assessment over the necessary investments. Moreover, EWRC investigates whether the plan includes all necessary investments. Prior to approval, EWRC also presents to third party interested parties the opportunity to submit statements. Stranded assets are not likely to meet the criteria for approval under the 10-year plan. Hence, TSOs have an inherent incentive to avoid investment in such assets;

64 Methodology for Determination of Prices for Access and Transmission of Natural Gas by Gas Transmission Systems owned by Bulgartransgaz, issued by EWRC and promulgated in State Gazette № 72 of 29 August 2014, as amended from time to time.

65 Methodology and Assessment Criteria for Investments in Infrastructure Projects for Transmission of Electricity and Natural Gas, adopted on grounds of Article 13 (6) of Regulation № 347/ 2013/ EU, EWRC adopted the methodology by Protocol decision № 47 of 15 March 2016.

66 EWRC Decision № Ц-001 of 10 February 2005 – please note that the decision was taken prior to the adoption of the Methodology for Determination of Prices for Access and Transmission of Natural Gas by Gas Transmission Systems owned by Bulgartransgaz, issued by EWRC and promulgated in State Gazette № 72 of 29 August 2014 and it does not reflect the current regulatory approach. Nevertheless, the tariffs set by Decision № Ц-001 of 10 February 2005 are still applicable.

- Third, insofar as the rationale behind regulation is based on outputs, the deliverables to meet the required outputs may in fact be of an innovative nature, if they can be justified in terms of the TSO's duties to develop and maintain an efficient, coordinated and economical system of transmission.

3.1.4. Regulatory rules with respect to innovation

Specific duties of the TSO aimed at encouraging innovation

Duties, including those applicable to innovation, are more generally described at Sections 3.1.1, 3.1.3 and 3.1.5. TSOs also has a role in delivering/ participating in mechanisms, which support the development of innovation. These mechanisms, and the TSOs role in them, are more generally explained in these sections.

Specific duties of the NRA aimed at encouraging innovation

EWRC's duty to encourage innovation is implicit in the more general duties to ensure that it secures the efficient and economic execution of activities by licensees as well as defining the transmission and access prices. As a result, many of the mechanisms, outlined above at Section 3.1.3, are aimed at promoting innovation as well.

3.1.5. Regulatory rules with respect to security of supply

Specific duties of the TSO aiming at safeguarding security of supply

Duties, including those applicable to security of supply, are more generally described in Section 3.1.1. In particular, under the Energy Act the TSO shall ensure:

- Integrated management of the natural gas transmission network with a view to its reliable, safe and efficient operation;
- Maintenance of the facilities and installations of the natural gas transmission network in accordance with technical requirements and with safe operation requirements;
- Coordinated development and operating compatibility of the gas transmission network with interconnected gas transport systems;
- Sufficient information be provided to ensure that transmission and storage are carried out in a manner consistent with the secure and efficient operation of interconnected networks and facilities (i.e. with respect to natural gas storage facilities and/or operators of liquefied natural gas facilities and/or operators of gas distribution networks);
- Sufficient cross-border capacity with a view to integration of the European gas transmission infrastructure while meeting all economically reasonable and technically feasible requests for capacity and with a view to meeting the requirements for security of gas supply;
- Operation, maintenance and development of a secure, efficient and economical gas transmission network with a view to guaranteeing an open market and environmental protection;
- Investment planning to ensure that the long-term capacity of the network would reasonably meet demand and to guarantee security of supply.

Secondary (Delegated) Regulations also impose specific duties on the TSO with respect to secure, reliable and un-interruptible supply:

- Carrying out of preventive measures and activities – inspections of transmission infrastructure; regular cleaning; repair and stress tests;
- Maintenance and calibration of fire-safety systems;
- Drafting a timetable for planned outages and maintenance/ repair – the timetable is made public by 20 September each year (i.e. timetable for the following year);
- Drafting and approving procedures for natural disaster, calamities and emergency situations.[67]

[67] Rules on Operation and Management, Technical Rules and Requirements for Transmission Networks – secondary regulations adopted by EWRC (acting on grounds of Energy Act) and promulgated in State Gazette № 77 of 3 September 2013; see in particular Art. 4 and Art. 7 of the Rules.

TSOs will also have role in delivering/ participating in mechanisms, which support security of supply objectives. These specific mechanisms, and the TSOs role in them, are more fully explained in Sections 3.1.1 and 3.1.3.

Specific duties of the NRA aiming at safeguarding security of supply

Please refer to Section 3.1.1, with regard to the legal powers and duties available to EWRC in terms of security of supply. EWRC exercises these duties largely through the mechanisms more widely described in Section 3.1.3.

Other important powers of EWRC in this regard are the licensing regime (issuing of licences to the transmission system operators and certificates to the TSO for compliance with the requirements for independence) and approvals of business plans, and 10-year plans for development of the transmission network, monitoring and supervision of its implementation.

3.2. Regulatory practice

3.2.1. Overview over regulatory practice in Bulgaria

The general regulatory principle can be described as Rate-of-Return combined with cap on revenue. Rationale behind the regulation is based on outputs. If an investment can be justified in terms of developing and maintaining an efficient, coordinated and economical transmission system then likely to be approved.

Main regulatory barriers

We received only limited response from the gas sector. Therefore, the analysis of the regulatory practise might not cover views of all relevant stakeholders.

The legal analysis of the NRF (Section 3.1) identified the possible constraint that there is the risk of statutory duties conflicting with each other and therefore requiring a balance to be struck. The Bulgarian regulation requires the development of the network to meet investment objectives to be balanced with the need to supply energy at lowest cost to consumers.

In practice, this constraint seems not to be manifesting because the interviewees were generally satisfied with the NRF regarding support of security of supply as well as innovative projects. But some interviewees remarked that there are not many innovative projects being implemented presently. Due to this lack of innovative projects, it is hard to predict for the interviewees what kind of innovative projects might encounter what kind of issues during the approval process.

Regarding security of supply, some interviewees name one of the potential regulatory barriers from annex III (Investments in security of supply – projects without commercial benefits) as a possible issue. But at the same time, they stated that in practice this barrier has not turned out to be a problem.

Possible improvement of the NRF

From the interviews, the following improvements to the NRF could be derived:

- Improve support for security of supply investments with no or little commercial benefits;
- Foster application of innovative solutions.

3.2.2. Regulatory practice related to innovation

According to the analysed legal fundamentals, the TSO has no explicit duties aimed at encouraging innovation. Also, the NRA has got no explicit statutory power to encourage innovation. A duty to encourage innovation considered to be more implicit in its general statutory functions. The general statutory functions include performing assessments regarding introducing smart meter systems.

Innovative projects and adequacy of the NRF relating to its support for these projects

In general, the interviewees don't regard any of their projects as innovative. SCADA and software for hydraulic calculation for example are in operation but these are not regarded as innovative solutions by the interviewees. Also, the interviewees make the remark that reasons for the application of innovative solutions are relatively rare in the transmission system (e.g. no infeed of biogas etc.).

In the interviewees' view, the NRF is generally adequate to support innovative projects. But interviewees tell that they are unable to predict any obstacles when it comes to the approval of innovative projects.

As we could not did not detect any obvious improvements by analysing of the legal framework itself, potential improvements can hardly be identified from the analysis of the regulatory practice due to the lack of experience. The lack of innovative projects could therefore be interpreted as a need for a more explicit statutory reference to innovation.

3.2.3. Regulatory practice related to security of supply

Security of supply projects and adequacy of the NRF relating to its support for these projects

The regulation regarding security of supply is seen as adequate to generally guarantee sustainable continuity of security of supply. Several projects have been accomplished related to security of supply, e.g.:

- Provision of the technical capability of reverse natural gas supply from Greece to Bulgaria;
- Construction of interconnections between neighbouring countries for diversification purposes of gas sources and supply routes as well as integration of gas markets;
- extension of a gas storage facility (doubling working gas volume and injection and withdrawal rates).

But the interviewees also see potential issues for security of supply investments with no or little commercial benefits. In case the need for an investment cannot be shown commercially and can only be demonstrated for security of supply reasons discussions during the approval process could arise. For example, the EU regulation 994 requests to establish reverse flows on interconnectors but the market only requests flows in one direction on the interconnector from Bulgaria to Greece. In that particular case the investment was approved, so in practice the barrier has not turned out as an issue, but this is unsure for other cases.

3.2.4. 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 practice.

Projects under the International Decommissioning Fund Kozlodui (IDFK)

A. Agreement for Grant № 041B between EBRD and Bulgartransgaz – Construction of High Pressure Gas Pipeline and Automated Gas Regulating Station in Silistra, Kozlodiu and Oryahovo (to increase security of supply and market integration)

   Beneficiary: Bulgartransgaz;
   Total value of financing: EUR 27,44 million (EUR 20 million provided by IDFK).

B. Agreement for Grant № 047 between EBRD and Bulgartransgaz – Construction of Three High Pressure Gas Pipelines and Automated Gas Regulating Stations (to increase security of supply and market integration)

   Beneficiary: Bulgartransgaz;
   Total value of financing: EUR 21,8 million (EUR 11 million provided by IDFK).

Market Potential and Future Perspectives under the 10-Year Network Development Plan (Bulgartransgaz)

A. Interconnectors Capacity (to increase security of supply and market integration) Bulgartransgaz expects the number of entry points to the transmission network to increase in relation to the development of the interconnectors with Greece, Turkey, Serbia and the recently put-into-operation interconnector with Romania.

   1) Greece – Agreement for Intersystem Interconnection Capacity was signed in June 2016 between Bulgatransgaz and Desfa S.A (Greek transmission operator). This agreement provides for an alternative for natural gas imports through reverse deliveries on commercial basis (backhaul and reverse flow). The alternative has been

put into operation as a result of reverse connectivity and modernization of Compressor Station 'Petrich';
2) Turkey – there has been a notable increase in natural gas consumption in the North-West region of Turkey (Istanbul and vicinity). In March 2014, a Memorandum of Understanding was signed between Bulgaria and Turkey for extension of inter-system interconnector capacity by 3 billion cubic meters per year;
3) Serbia – In January 2017, a Memorandum of Understanding was signed between Bulgaria and Serbia for the construction of inter-system interconnector capacity (IBS). EU funds will be employed for financing of this project. It is estimated that construction works will be completed, and the project will be fully operational by 2020;
4) Romania – a new inter-system interconnector was put into operation at the end of 2016 Rousse-Gyurgevo Interconnector. It has been completely operational since January 2017.

B. Development of Transmission Infrastructure in the Period 2017 - 2026

The planned investments for the period 2017 – 2026 aim at increasing technical security, safety and reliability, diversification of gas sources as well as security of supply:

1) Reconstruction, rehabilitation of transmission network elements (compressor stations, linear infrastructure, metering stations and storage capacity);
2) Constructions of new elements of transmission infrastructure;
3) Investments in auxiliary infrastructure – optical cable network and electronic management systems;
4) Interconnection of the natural gas extraction infrastructure to transmission grid.

Investments, which have been authorized and planned for the period 2017-2019, are listed on pages 45-47 of the 10-Year Network Development Plan – available for download from here. Investments which have not yet been authorized are listed in the same document on pages 48-49– available for download from here.

C. Construction of New Pipeline Branches (to increase security of supply and market integration):
1) Gas pipeline branch Razlog – Bansko (pipeline length - 40 km, maximum flow rate 32 000 m3/h and diameter DN 250; working pressure of PN 54 bar). The project is financed with a grant under the Kozloduy International Decommissioning Fund and co-financed by Bulgartransgaz;
2) Gas pipeline branch Panagiurishte – Pirdop (pipeline length - 62 km; maximum capacity 25 000 m3/h; diameter DN 250; operating pressure of PN 54 bar). The project is financed with a grant under the Kozloduy International Decommissioning Fund and co-financed by Bulgartransgaz;
3) Gas pipeline branch to the town of Svishtov (pipeline length - 39 km; diameter DN 200; working pressure PN 54 bar). The project is financed with a grant under the Kozloduy International Decommissioning Fund and co-financed by Bulgartransgaz;
4) Gas pipeline branch with AGRS to the towns of Sopot and Hisarya (pipeline branch diameter of DN 200 mm and 32 km DN 150.

For more detailed information, you may refer to pages 61-63 of the 10-Year Network Development Plan – available for download from here.

Projects of Common Interest (PCIs)

On 18 November 2015, the European Commission adopted and published the second list of 195 key energy infrastructure projects, which will contribute to the accomplishment of the European objectives in the area of energy and climate. Bulgartransgaz projects, included in the second PCI list, are part of two of the gas transmission corridors of priority to Europe aiming at increasing security of supply, market integration and diversification of gas sources:

A. North-South Gas Interconnections in Central Eastern and South Eastern Europe ('NSI East Gas'), covering the projects:

1) Rehabilitation, modernization and expansion of the existing gas transmission system (PCI 6.8.2);
2) Capacity expansion of Chiren UGS (PCI 6.20.2);

3) Construction of Balkan gas hub in Bulgaria (PCI 6.25.4);
4) The project Eastring - Bulgaria (PCI 6.25.1);
5) Project for the construction of a gas pipeline (s) aiming at expansion of the capacity on the interconnection of the Northern semi - ring of Bulgartransgaz national gas transmission network and Transgaz S.A., Romania gas transmission network (PCI 6.8.4).

B. Southern Gas Corridor ('SGC'), including the Interconnection Bulgaria-Turkey (PCI 7.4.2.).

A table summary of the PCIs may be reviewed on page 72 of the 10-Year Network Development Plan – available for download from here.

The Balkan Gas Hub (also a PCI, see above)

The Balkan Gas Hub is the main priority of the Bulgarian Government, which is aimed at strengthening the security of energy supply in the region, South-East Europe. On 15 March 2018, Bulgartransgaz and a consortium[68] signed an agreement for feasibility study for the Balkan Gas Hub. The parties acted under the auspices of the Minister for Energy. In 2017, the European Commission approved the funding for the feasibility study in the amount of EUR 920,500 under the Connecting Europe Facility.

The feasibility study will assess in detail the commercial and technical viability of the project. It will determine the business model for project implementation and required amendments to the regulatory framework and structure for its financing. The study will analyse the target markets, the demand and supply of natural gas.

Conceptually, the Balkan Gas Hub consists of the following key elements:
1) New sources of natural gas;
2) Optimal utilization of existing transmission networks and storage capacity at Chiren;
3) Modernization and extension of existing infrastructure;
4) Commissioning of new infrastructure.

Focus on EASTRING (also a PCI, see above)

Eastring is a project for construction of a transmission corridor through the territories of Slovakia, Hungary, Romania, Bulgaria, providing an opportunity for bi-directional natural gas supplies from alternatives sources. The project is envisaged to be realized between IP Velke Kapušany / Veke Zlievce on the territory of Slovakia and an IP with an outer EU border on the territory of Bulgaria, as the project comprises of construction of a new gas infrastructure by optimizing the existing one in the countries along the route of the corridor.

Different route options have been considered within the framework of project. Eastring is provided for two-staged implementation – the first one to be commissioned in 2023 ensuring 570 GWh/d capacity, and the second one in 2028 reaching a capacity of 1140 GWh/d. Bulgartransgaz EAD is the company that is involved in the realization of the Bulgarian section of the Eastring. For the Bulgarian territory for stage 1 of the project development (570 GWh/d capacity) a gas pipeline with DN 1400 and about 257 km length is envisaged to be constructed from a new entry/exit point on the Bulgarian-Romanian border to a new entry/exit point on an outer EU border on the territory of Bulgaria as well as the construction of new compressor capacities 88-90 MW. For stage 2 of the project development (1140 GWh/d capacity) additional construction of two new compressor capacities have been envisaged. A possibility to connect Eastring with the networks of Bulgartransgaz EAD with entry/exit capacity of 200 GWh/d has been envisaged.

To realize the project Bulgartransgaz EAD and Eustream signed in June 2016 a Memorandum of Understanding, stating that the two Parties will cooperate and analyze the prospects for development of the gas markets to identify the expected demand for capacity of the Eastring gas pipeline. In July 2016, a MoU on the Eastring project was signed in Bratislava between the Bulgarian Ministry of Energy and the Slovak Ministry of Economy. The two Parties to the

[68] A Bulgarian-Swiss Consortium DZZD AF-EMG Consult has been selected as a contractor for the feasibility study.

document support the project in line with the EU acquis and acknowledge the need of coordinated work for the realization of the project.

At Eustream's initiative – the party coordinating the process – the preparation of documents to apply for the feasibility study for the project started in September 2016 under the CEF. The Action, entitled „Feasibility Study for the Eastring project" has been approved for funding in 2017, and the awarded financial aid totals to EUR 1 000 000. In 2017 Eustream signed a contract for the feasibility study, which is ongoing. When the study is finalized it will be reviewed internally and undergo approval procedures. Generally, interviewees note that this project is not treated differently from other investments. But due to its early stage they tell that it can hardly be determined whether the project will face any regulatory barriers. Moreover, interviewees add that Up to now they haven't faced regulatory barriers when implementing projects of common interest.

3.3. Options for improvement

3.3.1. Options to change regulatory practice

The above discussion shows that only a small number of potential improvement needs could be identified. The lack of innovative solutions could be regarded as worthy for improvement. Furthermore, uncertainties regarding the support for security of supply investments with no or little commercial benefits could be removed.

(i) Statutory reference to innovation

There are no statutory powers or duties aiming at encouraging innovation. If it is deemed desirable to strengthen the incentives for the TSO to adopt new technologies, even when they do not directly reduce TSO costs but have wider benefits, a statutory reference to innovation could be included into the regulatory framework.

(ii) Social cost benefit analysis

The stakeholders seek certainty regarding the support for security of supply investments with no or little commercial benefits, on which the regulation is said to be more focussed on. A first step in this direction would be introducing the requirement to conduct a Social CBA. This could be done on multiple levels: on the level of the national plan and on project level for larger or cross-border projects. On project level, the SCBA could be a requirement before approval of the final investment decision or before approval of the cost recovery.

(iii) Consultation on investment plans

On both the national net development plan and on project level, stakeholder consultations could increase the likelihood that the output will ultimately be beneficial to the consumers, thereby moving towards a more output-focussed regulation. Stakeholder consultation can also be used to help shaping the long-term perspective on innovation of option (i) and to overcome reluctance of security of supply projects with low commercial benefits. 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 delay in implementing an investment project, even though consultations for certain types of infrastructure projects as well as parts of the planning processes already exist. Hence, one needs to think carefully how often and for which purposes one wants to additionally consult stakeholders.

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 amendments to primary legislation by including such a requirement in the Energy Act, as well as secondary legislation – Ordinance № 1 of 14 March 2017 on Regulation of Prices in the Electricity Sector.

Turning to option (ii) (social cost benefit analysis), the suggestion of incorporating a mandatory requirement in legislation for the TSO to conduct a SCBA of the investment portfolio included in the national net development plan and/or the requirement to provide the NRA with a SCBA of an individual project in the process of cost recovery approval, could be implemented by amendments to primary legislation by including such a requirement in the Energy Act, as well as secondary legislation – Ordinance № 1 of 14 March 2017 on Regulation of Prices in the Electricity Sector and Ordinance № 3 of 21 March 2013 on Licensing of Activities in the Energy Sector.

As regards option (iii) (consultation on investment plans), the suggestion of incorporating a mandatory requirement in legislation for the TSO to explain what alternatives have been looked at when developing the national net development plan, could be implemented by amendments to primary legislation by including such a requirement in the Energy Act, as well as secondary legislation – Ordinance № 3 of 21 March 2013 on Licensing of Activities in the Energy Sector. The primary legislative process in Bulgaria will involve sponsorship of a draft bill for amendments (subject to public consultations), its submission to Parliament, assignment and analysis in parliamentary committees, debates and voting in Parliament, adoption and promulgation in Bulgarian State Gazette. The legislative process may span a period of 4 months up to 1 year. The process depends entirely on political interactions in Bulgarian Parliament. There are no specific timelines for considerations and debates in Parliament.

Once the amended primary legislation enters into full force and effect, the secondary legislative process is managed by EWRC and it may take much shorter periods for adoption/ amendments, although 6 months is the normal average period for secondary implementing modifications.

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. For this reason, we do not expect that any of the suggested changes will result in considerable changes to investment levels. Yet, if the perceived risk of innovative projects is lowered and a long-term strategic perspective on innovation could be attained, the share of innovative projects is expected to increase.

Regarding option, (ii) effort and benefit must be weighted strongly against each other. Depending on the implementation a social CBA can results in a highly increased work for the NRA and the TSO. First, unambiguous measurement values must be found for new criteria. Also, when taking qualitative criteria into account, the risk exists that CBA results are influenced by individual assessments and therefore are not clear.

As mentioned in option (iv) and the other options above, stakeholder consultations can contribute to moving to a more output-focussed regulation. Yet, too many consultations will increase the organisational burden of the TSO and/or the NRA and possibly reduce the willingness of stakeholders to participate in the consultation. Moreover, consultations possibly lead to time lags. Therefore, consultations as instrument need to be used wisely.

Except for those projects encountering unbundling issues that cannot solely be solved by changes in the NRFs, we have not encountered any specific examples of projects that have been cancelled due to the regulatory framework. For this reason, we do not expect that any of the suggested changes will result in considerable changes to investment levels. Yet, if the perceived risk of innovative projects is lowered and a long-term strategic perspective on innovation could be attained, the share of innovative projects is expected to increase.

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.

HOW TO OBTAIN EU PUBLICATIONS

Free publications:

- one copy:
  via EU Bookshop (http://bookshop.europa.eu);

- more than one copy or posters/maps:
  from the European Union's representations (http://ec.europa.eu/represent_en.htm);
  from the delegations in non-EU countries
  (http://eeas.europa.eu/delegations/index_en.htm);
  by contacting the Europe Direct service (http://europa.eu/europedirect/index_en.htm)
  or calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

  (*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Priced publications:

- via EU Bookshop (http://bookshop.europa.eu).

Priced subscriptions:

- via one of the sales agents of the Publications Office of the European Union
  (http://publications.europa.eu/others/agents/index_en.htm).

MJ-03-19-366-EN-N

Publications Office

doi: 10.2833/318153