



Transmission and distribution system coordination in the Energy Community

- A Status Review -

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INTRODUCTION

1. About ECRB

The Energy Community Regulatory Board (ECRB) operates based on the Energy Community Treaty. As an institution of the Energy Community ECRB advises the Energy Community Ministerial Council and Permanent High Level Group on details of statutory, technical and regulatory rules and makes recommendations in the case of cross-border disputes between regulators.¹ ECRB is the independent regional voice of energy regulators in the Energy Community. ECRB's mission builds on three pillars: providing coordinated regulatory positions to energy policy debates, harmonizing regulatory rules across borders and sharing regulatory knowledge and experience.

2. Background

There are significant changes happening at distribution level in the gas sector and traditionally rather passive role of distribution system operators (DSO) is no longer the case. The process of market opening and new regulations introduces new roles for DSOs. DSOs are also looking to enter into new activity areas and regulators need to understand those areas and consider where regulation might be necessary. Regulators have a central role in ensuring that cooperation between DSOs and Transmission System Operators (TSOs) evolves in a beneficial way for energy markets and, ultimately, for consumers.

The ECRB Work Program 2019 foresees development of an analytical paper on common topics of transmission and distribution network codes, reviewing practices in the Energy Community (EnC) countries with regard to aspects that enable coordination of adjacent operators' work. With the progress of market opening, especially on distribution level, this topic gains significance. With the introduction of the necessity for system operators to obtain regulatory approval of their development plans, the role of regulatory bodies also lies in the fact that in some regimes such obligations are not imposed on distribution system operators, while integrated and coordinated network development is a necessity. This also raises the questions of data exchange between DSOs and TSOs for interoperability reasons but also for balancing purposes. Gas quality issues and maintenance works on transmission and distribution networks and their coordination in order to minimize any possible interruption of gas delivery are also a prerequisite to provide reliable and safe supply.

¹ www.energy-community.org. The Energy Community comprises the EU and Albania, Bosnia and Herzegovina, North Macedonia, Georgia, Kosovo*, Moldova, Montenegro, Serbia and Ukraine. Armenia, Turkey and Norway are Observer Countries. Throughout this document the symbol * refers to the following statement: This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Advisory Opinion on the Kosovo declaration of independence.

The regulatory framework and specific considerations for DSOs' activities such as data management and unbundling should incentivize DSOs to introduce innovations. Finally, there is a need for a forward-looking view to understand new services and associated activities that regulators will need to take into account.

It is worth mentioning that the Network Code Regulations applicable in both EU Member States and Energy Community Contracting Parties refer to TSOs, thus providing for uniform rules and a level playing field, whereas for DSOs there is no legislation in place obliging them to apply harmonized rules.

In the light of this, ECRB decided to investigate the practices of TSO-DSO interaction and coordination in the Contracting Parties, identifying the differences and possible improvements in these relations.

3. Scope and methodology

The present report covers those Contracting Parties where a gas market is operational, namely Albania, Bosnia and Herzegovina (data refers to Republika Srpska only), North Macedonia, Georgia, Moldova, Serbia and Ukraine. In addition to the Contracting Parties, the report includes also information from observer countries, namely Armenia and Turkey.

Data presented in this report refers to the **status quo in 2018**.

Data and analyses shown in the present report are based on information provided by the relevant national regulatory authorities ('NRAs'; 'regulators').

FINDINGS

1. Principle observations- TSOs' and DSOs' information and relationship

Gas market development, the number and scope of work of DSOs and TSOs as well as the related regulatory framework differ widely among the analyzed countries. In most of the countries there is only one (Albania, Georgia, North Macedonia, Ukraine, Turkey, Armenia) or two transmission system operators (Bosnia and Herzegovina, Moldova, Serbia). The number of distribution system operators varies a lot in the observed countries - from one DSO in Albania and Armenia, two in Bosnia and Herzegovina and three in North Macedonia, to the countries with a larger number of DSOs like Moldova (25), Georgia (26), Serbia (33), Ukraine (46) and Turkey (72).

Regarding the size of DSOs in terms of quantities delivered on a yearly basis, for the largest DSO (out of largest five according to the number of customers connected), they also vary from 5.9 bcm in Turkey, 2.5 bcm in Ukraine, 1.9 bcm in Armenia, 1.1 bcm in Serbia, 642 mcm in Moldova, 606 mcm in Georgia, 4.7 mcm in North Macedonia, 3.4 mcm in Bosnia and Herzegovina, 3.1 mcm in Albania.

The number of end consumers connected to distribution systems also differs a lot. The distribution companies with the largest quantities delivered are not necessarily the companies with the highest number of end consumers connected. The numbers for the Contracting Parties are presented in the table below.

Table 1 Numbers of customers connected to the distribution systems among the five biggest DSOs

Country	The highest number of customers connected	The lowest number of customers connected
Albania	2	2
Bosnia and Herzegovina	4,483	521
North Macedonia	263	10
Georgia	455,440	17,005
Moldova	311,200	32,500
Serbia	91,838	12,646

Country	The highest number of customers connected	The lowest number of customers connected
Ukraine	829,150	608,440
Armenia	714,000	714,000
Turkey	5,099,760	346,833

Based on the number of customers connected to the distribution system and requirements of the Gas Directive 2009/73/EC² (hereinafter ‘the Gas Directive’) related to the DSO unbundling, it can be concluded that there are distribution companies with this obligation in the observed markets.

Articles 26, 30 and 31 of the Gas Directive 2009/73/EC define key requirements for unbundling of DSOs aimed to ensure their independence in a vertically integrated undertaking from the supply branch and to prevent market distortion through cross-subsidization and discrimination of other supply companies. Ministerial Council Decision 2011/02/MC-EnC³ requires implementation of these legal provisions by 1 January 2015. A Commission’s Interpretative Note on unbundling dated 22 January 2010 (hereinafter ‘the Interpretative Note’)⁴ explains requirements in more detail.

The rules stated in the Gas Directive are minimum requirements- national legislation may define more strict requirements, depending on the organization of the sector.

It is of outmost importance to properly transpose obligations related to DSO unbundling, thus enabling DSOs to perform their role of a fair market facilitator.

The Gas Directive does not leave room for flexibility- DSOs should have a separate legal form. An exception exists for DSOs serving less than 100.000 customers or closed distribution systems. The threshold of 100.000 customers is not limited to a single legal entity of a vertically integrated undertaking but must refer to the whole customer base of the integrated undertaking. Contracting Parties may opt to not allow any exemption or to decrease the threshold. The existing legislation in most of the analyzed markets, either in force or in draft include the 100.000 customer threshold and the possibility to operate closed distribution systems.

The obligation to unbundle exists for 41 among 46 licensees in Ukraine, in Moldova all 25 DSOs have this obligation, while there is no obligation to unbundle in Turkey, Armenia, North Macedonia, Bosnia and Herzegovina, Serbia and Albania.

² https://www.energy-community.org/dam/jcr:004b3ca7-fa52-4633-875e-8ac1b2cea021/Directive_2009_73_GAS.pdf.

³ https://www.energy-community.org/dam/jcr:a3205108-28f6-41aa-9e71-b62ede376cfa/Decision_2011_02_MC_3PA.pdf.

⁴ https://ec.europa.eu/energy/sites/ener/files/documents/2010_01_21_the_unbundling_regime.pdf.

Table 2 Unbundling obligation

Country	Obligation to unbundle	Number of DSOs with this obligation
Albania	X	NA ⁵
Bosnia and Herzegovina	X	NA
North Macedonia	X	NA
Georgia	X	NA
Moldova	√	25
Serbia	X	NA
Ukraine	√	41
Armenia	X	NA
Turkey	X	NA

In Georgia there are distribution companies with more than 100,000 customers connected, but requirements of the Gas Directive are to be fulfilled only after 2021. This requirement is still not included in Georgian legislation.

Structure and technical solutions regarding connection of transmission and distribution systems are also very different. In Albania, Armenia, North Macedonia and Turkey, distribution systems are connected to the transmission systems. In Bosnia and Herzegovina there is one connection of DSO to TSO, but also one connection of DSO to DSO and this type of connection exists also in Moldova. In Georgia, Serbia and Ukraine, there are distribution networks connected to transmission networks, to distribution networks, but there are also systems that have connections to both transmission and distribution.

⁵ Throughout this report 'NA' stands for 'not applicable'.

Analyzing the size of markets, it can be concluded that the larger the markets are, the more complex infrastructure and their relations are in place.

Gas market complexity influences also the relationship among end consumers, network operators and suppliers. In Ukraine, end consumers connected to transmission or distribution systems have to have contracts with both system operator and supplier. In Turkey, on transmission level, suppliers sign the contract for system use, on distribution level there are trilateral contracts between system operator, supplier and consumer, while for households system operators perform the function of a supplier and there is only one contract with households.

In Moldova, suppliers conclude transmission and distribution contracts with the TSO and DSO on behalf of its customers in order to assure the delivery of gas. Customers do not conclude direct contracts with the TSOs and /or DSOs. The same practice is applied in Bosnia and Herzegovina, Armenia and Albania.

In Georgia, end consumers connected to the transmission network have the right to sign a transportation (transmission) contract with the TSO. However, very few of them use this right and their respective suppliers have transportation contract and deliver gas to the point of consumption. Final customers connected to the distribution network are not allowed to sign a distribution contract. Having an agreement with a DSO, supplier delivers gas to the point of consumption.

In Serbia and North Macedonia, customers connected to both transmission and distribution system have the right to conclude contract with respective network operators for system use, but this in practice rarely happens.

2. Network planning

Ten- year network development plans ('TYNDPs') are prepared and approved by NRAs in all observed countries, except Armenia, while in Georgia it is envisaged by the Network Code but procedure is still not applied.

Although not required by Energy Community law, development plans of DSOs are also prepared. The time frame however varies between the analyzed countries. In some cases these plans also target ten years similar to transmission development plans (Ukraine, Bosnia and Herzegovina), while in other cases the plans are targeting only five years (Turkey, Serbia, North Macedonia, Albania, Georgia in future) or three years as the case in in Moldova. DSOs plans are not necessarily approved by the regulator such as the case in Serbia.

Table 3 **Network development plans**

Country	Time-framework TSO/DSO	TYNDP approved by the regulator
Albania	10/5	YES
Bosnia and Herzegovina	10/10	YES
North Macedonia	10/5	YES
Georgia⁶	10/5	YES
Moldova	10/3	YES
Serbia	10/5	YES
Ukraine	10/10	YES
Armenia	NA	NA
Turkey	10/5	YES

⁶ Envisaged in network code but still not applied.

2.1. Coordination in network planning

Coordination in network planning is envisaged in legislation in the Contracting Parties. Most of them that report coordinated planning refer to an energy strategy or energy legislation (usually network codes) as documents that urge network operators to plan development of their systems in a coordinated manner.

Network planning is not coordinated in Turkey, while there is coordination in network planning in Albania, Ukraine, Bosnia and Herzegovina, Georgia, North Macedonia, Moldova and Serbia.

Submission of development plans is envisaged to be done simultaneously with request for tariff approval in Albania and Turkey, in order to take into account the relevant investments when calculating and/or approving tariffs.

The procedure for submission and approval of development plans is defined as NRA document in Albania and Moldova, Ukraine.

In Georgia, submission of development plans is envisaged in the Natural Gas Network Rules, the procedures for submitting an investment plan, its examining and agreeing, and also requirements for amending the investment plan and monitoring its implementation and reporting is defined in the Investment Appraisal Rules.

2.2. Content, time for submission, public availability

Content and time periods of development plans are defined in different pieces of legislation throughout the analyzed countries. They are defined in transmission and distribution network codes in Ukraine, Turkey and Georgia (but not applied in practice yet), while prescribed in the relevant laws in Bosnia and Herzegovina, Serbia, North Macedonia and Moldova.

Deadlines for preparation and submission of network development plans for TSOs and DSOs are different: sometimes they coincide, but sometimes are consecutive thus disabling network planning in coordinated manner (deadlines vary from end of May to end of October).

Public consultation on the proposed network development plans is performed by NRAs in Albania, Bosnia and Herzegovina and Serbia.

Mutual TSO/DSO relations to urban planning bodies⁷ exist in Albania, Turkey, Bosnia and Herzegovina and Moldova, so as to provide a coordination in preparation of urban plans.

Development plans are publicly available in all observed countries except Armenia. In Georgia, this will be the case when draft legislation is applicable in practice.

⁷ TSOs and DSOs coordinate their development plans to be included in spatial plans.

3. Gas quality

The definition of who is responsible for delivery of gas of adequate quality is governed by the fact whether in some of the observed countries indigenous production or storage exist.

The responsibility for gas quality is defined for both TSOs and DSOs in Moldova, Serbia, Macedonia, Ukraine, Bosnia and Herzegovina, Armenia and Albania. Responsibility for gas quality is imposed only on the TSO in Georgia and Turkey.

Production of natural gas that might influence natural gas quality exists and it is connected to distribution system in Moldova, to transmission system in Georgia and Turkey and both to the transmission and distribution system in Serbia, Ukraine and Albania.

Storage of natural gas that might also be influencing the quality of gas delivered to the system exists and it is connected to transmission system in Serbia, Ukraine, Turkey and Armenia.

National legislation envisages connection of biogas producers in Moldova, Serbia and Bosnia and Herzegovina, Ukraine, but they are actually only connected in Moldova.

4. Maintenance

An obligation to make public an announcement about the envisaged period of scheduled maintenance by system operators exists in all of the observed countries, except Armenia.

A request for consent of involved parties (i.e. neighboring system operator or large end consumers) about the proposed maintenance period is only needed in Moldova and Serbia.

This obligation does not exist in Albania, Georgia, North Macedonia, Bosnia and Herzegovina, Armenia, Turkey and Ukraine. It can be observed that there is a relatively high level of independence of system operators in deciding when to perform maintenance works.

In situation that there is no mutual agreement of the neighboring system operator on the proposed maintenance period, there is a regulation that deals with this situation in Albania while in Armenia it is defined in the contract, or secondary legislation in Turkey.

The procedure for changing an envisaged maintenance programme is defined differently in different countries. In case there is a need to change envisaged maintenance programme, procedure for these changes is defined in regulation in Albania, in the system operators` agreement in Moldova and in the network code in Serbia and Ukraine.

Information about the start of maintenance works is provided to customers, other system operators or suppliers by system operator in all observed countries except Armenia, where this information is given by supplier.

This information is provided in direct communication with large customers in Albania, on website in Moldova, by e-mail and website in Serbia, by web site and by sms to all customers in Georgia, by website and directly with large customers in Bosnia and Herzegovina and just by website in Armenia, Ukraine, North Macedonia, by website and media in Turkey.

5. Determination of daily quantities for system users

In order to determine daily quantities delivered from transmission and distribution systems, proper and adequate metering devices should be in place. All exit points from transmission system are equipped with daily meters in Ukraine, Turkey, Bosnia and Herzegovina, Georgia, Moldova, Albania, but not in North Macedonia and Serbia.

The responsible party for allocating quantities delivered from transmission system is the TSO in all of the analyzed countries and the DSO is the forecasting party for customers connected to distribution system in Ukraine, North Macedonia and Serbia.

In some countries there is a procedure for confirmation of allocated quantities (Bosnia and Herzegovina, Serbia, Georgia, North Macedonia, Moldova), in some, on the other side, not (Ukraine, Albania).

Allocated quantities should be used for imbalance calculation, but in the analyzed countries this is rarely the case. The reason is that in most of the analyzed countries daily balancing is still not in place (except Ukraine). Application of allocated quantities for the purpose of imbalance determination was reported only for Ukraine and Turkey.

In case one customer has more suppliers for one delivery point from the transmission system, quantities are allocated by the TSO in most of the countries, but in different way: according to specific agreements in Ukraine, Georgia and Turkey and according to metered and nominated quantities in Serbia. In Ukraine, this agreement is signed between the customer and suppliers. In some of the analyzed countries this situation is not recognized (Albania, Bosnia and Herzegovina).

The responsibility for allocation of quantities on an entry point to distribution system is also very different in the analyzed countries. It is a responsibility of the TSO in Ukraine, according to a TSO-DSO allocation protocol in Turkey, according to rules defined in network code in Serbia (by DSO) and Bosnia and Herzegovina and pro rata in Georgia.

There are also delivery points on distribution system level that are equipped with daily metering in most of the countries (except in Albania and Armenia), but they are not numerous and cannot be considered as basis for imbalance setting except Ukraine.

For non-daily metered delivery points on distribution system, the DSO makes forecast in some countries (Bosnia and Herzegovina, Serbia and Ukraine).

6. Coordinated system operation

The obligation for the conclusion and content of interconnection agreements is defined in Regulation 703/2015 establishing a network code on interoperability and data exchange rules.⁸ This network code is obligatory for implementation in the Energy Community as of October 2018 for interconnection points.⁹

Signing interconnection agreements (technical) between TSO and DSO is envisaged in network codes in Ukraine, Serbia, Georgia, Bosnia and Herzegovina, Moldova (draft) and Turkey- but not in Albania, North Macedonia and Armenia.

Such an agreement is already signed just in Ukraine, Bosnia and Herzegovina, Turkey and Georgia.

The information provision to potential gas consumers of available connection capacity, (in order to facilitate connections and to indicate easier/cheaper locations to connect) either to transmission or distribution system, is not publicly available in Ukraine, Albania, Serbia, Moldova, Macedonia, Georgia, Armenia.

There is a threshold defined for connection of users to the transmission system¹⁰ in Ukraine, Bosnia and Herzegovina, but not in Serbia, Albania, Moldova, North Macedonia, Georgia, Armenia and Turkey.

There is no intensive power production from gas that would influence variability of gas flows in any of the systems in the observed countries, except in Georgia and Turkey.

⁸ https://www.energy-community.org/dam/jcr:3212c2b3-5bd6-4473-86f4-f06fbcca3735/Regulation_2015_703_GAS.pdf.

⁹ The status of implementation of this network code by the transmission system operators of the Energy Community Contracting Parties was analyzed by the Energy Community Secretariat earlier this year and the report may be found here: https://www.energy-community.org/dam/jcr:04711851-c813-451d-b5ed-70a8475549e5/EnC_Implementation_703_2015_032019.pdf.

¹⁰ sometimes system users connect to transmission system in order to avoid distribution network charges.

CONCLUSIONS

From the information gathered about coordination in network planning it can be concluded that there is a need to intensify coordinated network planning not just by legislation (Strategy or Energy Law) but by more active engagement of TSO and DSO in terms of deadlines for submission that provide coordinated planning, demand scenario preparation, participation in public hearing and provision of consent and procedure for solving the situation in case consent does not exist (very often this procedure is not defined). Provision of information in the process of maintenance periods planning should be assured, consent of neighboring system operators should be provided, communication with system users should be improved. Procedure for maintenance programme changes exists only in some countries.

Communication and data exchange obligation regarding gas quality should be established or improved- in case the TSO has information about gas quality it should be obliged to forward it to the DSO.

Gas balancing regimes are not introduced in most of the Energy Community countries (Ukraine is an exception). Therefore no further analysis was possible on the impact of algorithms for data exchange and allocation of quantities and consequences for imbalance determination. This topic could be further exploited in the future for the benefit of the system users and system operators.

Entry-exit tariff system is not in place in most of the analyzed markets (Serbia and Ukraine are exception) and consequently there is still no observation about its` impact on distribution tariffs and subsequent need for changes of pricing on distribution level, but in some countries the need for compliant regulatory regimes for transmission and distribution systems is observed. This makes a potential for challenging regulation in place- whether control of revenue recovery should incentivize system as a whole and not separately for TSOs and DSOs.

General principles related to future DSO and TSO relationship could be further exploited, but significant differences related to the size and infrastructure development and structure of the DSOs should be observed when defining general principles in order to achieve certain results.

Roles and responsibilities of all stakeholders should be clearly allocated (NRA, TSO, DSO), and the whole system approach that analyzes transmission and distribution systems as a whole could be further exploited at every level of responsibility in terms of cooperation and efficiency in all the analyzed topics of mutual interest for TSO and DSO.