



Electricity Balancing Mechanisms in the Energy Community

- REPORT -

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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 Community¹ the 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.

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 as well as sharing regulatory knowledge and experience.

2. Scope

The present report explores on balancing mechanism existing in the Energy Community. The report also tackles retail market opening and liberalisation of electricity production, in particular the influence of balancing mechanisms in this context. As the case for earlier ECRB reports on electricity balancing², the present report also reflects on flexibility requirements stemming from intermittent renewable energy integration and, thus, provides an overview of the current renewable energy integration level (current installed power) and anticipates the potential of their further integration (integration limit and price for selling electricity).

The analysis proves that increase of social welfare can be gained from cross border sharing of balancing products, provided availability of sufficient cross border capacities. Centralized coordination and work on Energy Community level remains essential for this purpose. In this context, the report builds on the hypothesis that cooperation including more than two countries on market based grounds delivers the highest output. The already existing regional coordination of cross border capacity allocations by the Coordination Auction Office South East Europe is a first positive development in this direction; further development of cross border exchange of balancing products will further contribute to to integration of electricity markets in the Energy Community and increase of efficiency and liquidity. The present report also discusses the impact of transparency and possible improvements in this area.

¹ www.energy-community.org. The Energy Community comprises the EU and Albania, Bosnia and Herzegovina, Macedonia, Kosovo*, Moldova, Montenegro, Serbia and Ukraine. Georgia signed the Energy Community Treaty in October 2016. 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 and the ICJ Opinion on the Kosovo declaration of independence*].

² Available at: https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCUMENTS?library.category=714.

2.1. Background

Balancing is in the analytical focus of ECRB since 2011³, the current report being the fifth. Every balancing report since 2011 has made additional contributions to the knowledge basis and the developments in the Contracting Parties including data as well as information on the functioning of existing balancing models. The last balancing report recognised inefficiencies concerning balancing models including lack of load profiles for end-consumers that do not have measurements for their load curves, non-cost reflective imbalance settlement prices, lack of balancing responsibility, lack of data concerning balancing products, inefficiencies related to procurement of balancing services as well as market concentration of balancing product providers.

2.2. Starting point

The bullets listed below are strongly linked to balancing, and should be seen as starting points for the purpose of this report.

- I. Making electricity exchanges operational and establish market coupling supports the efficiency of balancing models, and vice versa.
- II. Provided the availability of sufficient cross border capacity, market based cross-border procurement of balancing energy and reserves deserve a special focus.
- III. In the Contracting Parties balancing is usually linked to market opening. One example of the relation between balancing and market opening would be imbalance settlement costs.
- IV. Concerning bullet III it is assumed that further retail and wholesale market opening will increase the social welfare in the Energy Community, as opposed to the alternative.
- V. Transparency and data availability is needed so that new or existing market participants can obtain more confidence in the balancing market and market models in general. Data availability in a timely manner for consumption or production forecast is one example.
- VI. If new generation facilities would be necessary for security of supply, for the development of market competition on the balancing side, it should be beneficial if such facilities would be built by independent investors. A clear and sustainable regulatory framework that guarantees trust of new market entrants is a core pre-condition for such development. New entrants could motivate incumbent companies to perform more efficiently, being exposed to competition.
- VII. If intermittent renewable energy sources are to be implemented in the future, provision of increased flexibility – provided via market based balancing – has to be investigated in a timely manner.
- VIII. Concerning bullet VII, the assumption is that the increased implementation of intermittent renewable energy sources demands more flexibility.

³ Cf www.energy-community.org – documents – ECRB documents.

- IX. Concerning bullet VII, the present report does not consider the effects of renewable energy integration on the price of electricity for the consumers and the effects on the market.
- X. It should be noted that a measure implemented in country A, does not necessarily have the same impact on social welfare in country B. It is thus evident that countries A and B do not necessarily focus on all or the same issues at the same time. However, at least one issue at the time should be resolved.
- XI. Changes may create unpopular/popular effects for end consumers and consequently for politicians and regulators. An example would be changing the values in the structure of the price for the end consumers.
- XII. It is important keeping bullet points X and XI in mind in order to understand the behavior of participants in Contracting Parties and to prepare strategies.

Without censorship, insufficiencies would be given in this report in order for them to be recognized, tackled and eventually resolved.

3. Methodology

The present report bases on the so-called "*Investigate, Disclose and Propose Methodology*" or "*IDP Methodology*" that was specifically designed for this report and comprises following steps:

- I. Investigation of aspects and topics concerning balancing that could have greater impact on social welfare.
- II. Creating questions in order to investigate identified aspects and topics from bullet I (cf the original questionnaires listed in ANNEX I of this report).
- III. Sending to the participants questions from bullet II.
- IV. Receiving the answers from bullet III.
- V. Analyzing answers from bullet IV.
- VI. Analyzing relevant Energy Community publications.
- VII. Analyzing balancing processes in the Energy Community.
- VIII. Without censorship, disclose findings and conclusions in the report.
- IX. Providing recommendations for further work of national energy regulators and ECRB.

4. Acknowledgements

Creation of this report would not have been possible without the effort provided by national regulatory agencies as well as transmission and distribution system operators of the analysed markets. Special acknowledgements go to the team in charge for developing the present analysis composed of the members of the ECRB Electricity Working Group and led by Mr Igor Malidzan (RAE, Montenegro).

Context

1. Flexibility

In context with balancing, flexibility will continue to be an important factor for the Energy Community Contracting Parties when increasingly integrating intermitted renewable energy sources (RES).

The following quotes and charts, along with conclusions, are borrowed from a document prepared by the European Network of Transmission System Operators for Electricity (hereinafter 'ENTSO-E')⁴. They show how intermittent renewable energy sources are related to demand for flexibility as well as the interdependence of imbalance prices, balance responsible parties' behaviours and the demand for reserves.

In the System Operation and Adequacy Forecast 2015, a statistical analysis of ramps was performed. It is shown that the trend of increased RES penetration results in an increasing tails of the right hand side of distribution below (left figure).

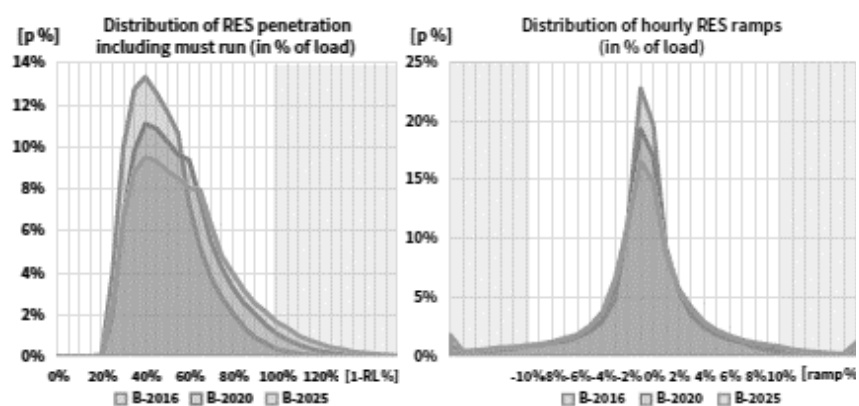


Figure 1 The distribution of ramps

The conclusion is that ENTSO-E analysis highlights the challenging conditions that TSOs face to keep the system in balance with increasing shares of variable RES. The need for flexibility, in fact, is strictly correlated with the volume of RES ramps observed.

⁴ENTSO-E, "Introduction to the flexibility challenge" at: Florence Forum, High level conference on a new energy market design, 8. October 2015.

It is fundamental that market design and price signals in particular enhance system flexibility via new investments and market actor's behaviours. Introducing balancing responsibility for all RES generators, as well as designing cost-reflective imbalance prices would be a decisive market factor to stimulate flexibility in a cost efficient manner. Generators, including RES, would be incentivised to adjust their position in day-ahead and intraday markets, therefore reducing the need for greater TSOs reserves to deal with imbalances and uncertainty.

2. Intermittency

Intermittent renewable energy integration has an effect on balancing and, in particular, on demand for system flexibility (cf chapter 1). Also, renewable energy integration that is not intermittent could make the procurement of flexibility more challenging, depending on the way it is integrated in the market model (feed in, premium, with or without balancing responsibilities etc).

Table 1 shows that Energy Community Contracting Parties, so far, have only poorly integrated renewable energy sources (wind 3 MW, solar 18 MW, biomass 9 MW), except for Ukraine (wind 426 MW, solar 431 MW, biomass /biogas 52 MW), and fYR of Macedonia (wind 37 MW, solar 17 MW, biomass 7 MW).

It is assumed that there will be an increased pressure on introducing environmental friendly, sustainable and affordable electricity production, and also, that the investment cost of integrating intermittent renewable electricity facilities would continue to fall. Due to these assumptions, it is expected that the integration of intermittent renewable electricity production would grow in the Contracting Parties.

More information about support schemes for renewable energy can be found in the 2016 Annual Implementation Report of the Energy Community Secretariat⁵.

⁵ www.energy-community.org – documents – Implementation Reports.

Table 1 Renewable sources: economic and technical characteristics (September 2016)⁶

		BA	ME	KO*	RS	MD	GE	AL	RA	MK
wind	installed, MW	0,3	0	1	1	1	0	0	2,91	37
	price, €/MWh	80-100	80-110	80-110	-	-	-	regulated by NRA	87,69	80 - 110
	limit, MW	350	0	35	-	-	-	-	*	50
solar	installed, MW	8	0	0	9	1	0	0	0	17
	price, €/MWh	110-160	110-160	110-160	-	-	-	regulated by NRA	87,69 For electricity generation licencees operating solar plants up to 1 MW	110 - 160
	limit, MW	-	-	3	-	-	-	-	*	1
biomass /biogas	installed, MW	1	0	-	5	3	0	0	0,835	7
	price, €/MWh	110-inf.	110-160	60-80	-	-	-	regulated by NRA	87,69	110 - inf
	limit, MW	-	-	14	-	-	-	-	*	3
small hydro	installed, MW	96	18	17	40	16	48	363	332,33	119
	price, €/MWh	-	-	-	-	-	-	regulated by NRA	**	-
	limit, MW	-	-	10	-	-	-	-	*	10
must run CHP	installed, MW	-	-	-	-	-	-	0	-	0
	price, €/MWh	-	-	-	-	-	-	regulated by NRA	-	-
	limit, MW	-	-	-	-	-	-	-	-	0

[*]According to article 59 of Energy Law after entering into force the commission's first resolution about setting tariffs for Licensees holding electricity (capacity) generation licenses, all electricity generated from small HPP within the next 15 years and all electricity generated from other renewable sources (wind, solar, geothermal and biomass) within the next 20 years shall be purchased pursuant to the Market Rules.

[**]Small HPPs are considered HPPs that have installed capacity up to 30 MW. Tariffs of electricity supplied by small HPPs are categorized into calculated and fixed. Fixed tariffs entered into force in July 1, 2016 and till July 1, 2017 are as follows: 48,84 US \$/MWh for electricity supplied from small HPPs constructed on natural flow; 32,55 US \$/MWh for electricity supplied from small HPPs constructed on irrigation water system; 21,7 US \$/MWh for electricity supplied from small HPPs constructed on potable water pipeline.

⁶ For the purpose of this report country codes for Contracting Parties are used according to ISO 3166.

Data on installed generation capacities for Ukraine (2016) is shown in the table below:

Table 2: installed generation capacities Ukraine (2016)

	MW	%
TTPs	24565	47,6
NPPs	13835	26,8
HPPs	4711	9,1
Pumped storage PP	1509,5	2,9
CHPs	5946,8	11,4
Wind	437,8	0,8
Solar	530,9	1,0
Biomass / biogas	59,1	0,1

3. Procurement

This chapter assesses procurement models related to reserves for balancing in the Energy Community, as one aspect of flexibility. The state of play for some basic economic, technical and legislation facts about reserve capacity and reserve activation is summarized in Table 2 based on the results of the underlying questionnaire (cf Annex).

In Bosnia and Herzegovina, Georgia, FYR of Macedonia, Moldova and Ukraine prices (€/MW/h) of reserves do not exist for 2015. In addition, in Albania, Georgia, Moldova and Ukraine balancing energy prices (€/MWh) for 2015 are not available. Similar finding have been identified regarding measurement and registration of activation of balancing reserves (MW/h) and balancing energy (MWh).

More work concerning procurement models is needed, since it is shown that most of the regulators do not have data and information, or data is not available as such.

It should be noted that Bosnia and Herzegovina has implemented a balancing market, which makes Bosnia and Herzegovina the pioneer of market based procurement of balancing products in the Energy Community. The model is later described in this report in more detail.

Table 3 Summary on reserve capacity for balancing⁷

Qan	Question	BA	ME	KO*	RS	UA	MD	RA	GE
Qa1	Is there technical specification for reserve products (balancing products) in your country?	YES	YES	NO	YES	YES	NO	YES	YES
Qa2	Are these technical specifications publicly available?	YES	YES	YES/NO	YES	YES	NO	NO	NO
Qa3	Given link for the technical specification if it is available	YES	YES	-	YES	YES	NO	NO	NO
Qa4	Is TSO determining required reserve for every type of the reserve (plan)?	YES	YES	Partially	YES	YES	NO	Electricity system operator	YES
Qa5	What is the convention for balancing?	additional production (+)	additional production (+)	additional production (+)	additional production (+)	additional production (+)	additional production (+)	additional production (+)	additional production (+)
Qa6	Determined planned volumes for reserve available to NRA	YES (FRRa, FRRm)	YES (FRRa, FRRm, RR)	YES (FRRa, RR)	YES (FRRa, FRRm)	YES (FRRa, FRRm, RR)	NO	NO	YES (FRRa, FRRm, RR)
Qa7	Is TSO able to determine realization for some or all types of the reserve?	YES	YES	NO	YES	YES (FRRa)	NO	NO	YES
Qa8	Determined realized volumes for reserve available	YES (FRRa, FRRm)	YES (FRRa, FRRm)	-	YES (FRRa, FRRm)	YES (RRa, FRRm, RR)	NO	Primary, secondary, tertiary	YES (RRa, FRRm, RR)
Qa9	Is TSO able to determine activation for some or all types of the reserve?	YES	YES	NO	YES	YES (FRRa)	NO	Electricity system operator	Partially
Qa10	What would you state about prices for the balancing reserve	price is determined by at least two parties competing	price is determined by some form of methodology, price is determined by negotiation between TSO and balance service provider	price is determined by negotiation between TSO and balance service provider)	Regulated price determined by methodology defined by Regulatory Agency	price is determined by some form of methodology	-	NO	Part of tariff calculation methodology. No English version is available
Qa11	Methodology for determining the prices of reserves available?	NO	NO	Balancing mechanism and imbalance settlement methodology is defined in Market Rules but is not implemented in practice. There are no balancing capacities.	YES	YES	NO	NO	YES
Qa12	Prices of reserves available to NRA	YES	YES (FRRa, FRRm)		YES (FRRa, FRRm)	NO	NO	NO	NO
Qa13	What would you state about prices for the activation of balancing reserve?	price is determined by at least two parties competing	price is determined by some form of methodology price is determined by negotiation between TSO and balance service provider		Regulated price determined by methodology defined by Regulatory Agency	price is determined by some form of methodology	-	NO	price is determined by some form of methodology set in the Market rules TSO is not dealing with this since there is not Balancing market
Qa14	Prices of the activation of reserves available to NRA	YES	YES (FRRa, FRRm, RR)		YES	YES	NO	NO	NO
Qa15	What is the current status in your country concerning balancing?	focus is high	focus is high		Future developments defined in Energy Law and Market Code – no changes envisaged	Balancing Market should be launched since 1 July 2019	legislation is changing or should be changing	legislation is changing or should be changing	legislation is changing or should be changing

⁷ Last update: 30th September 2016.

3.1. Case study: balancing model Bosnia and Herzegovina

The present chapter provides an insight on the historical development of market based procurement of ancillary services and balancing energy in Bosnia and Herzegovina. It describes the development of the balancing market by the State Electricity Regulatory Commission, SERC, as well as an overview of development steps and a description of final results.

A New Method of Providing Ancillary Services and Balancing of the BIH Power System

During the past three years, being aware of the importance of ancillary services and balancing of the power system, the State Electricity Regulatory Commission (SERC) in cooperation with the Independent System Operator (ISO BIH) and other power utilities conducted a range of activities which resulted in a new method of providing ancillary services and balancing of the BIH power system.

The joint activities of SERC and ISO BIH and by using documents developed under the USAID Regulatory and Energy Assistance Project (REAP) in March 2014 resulted in defining the concept of ancillary services for the balancing of the power system of Bosnia and Herzegovina (hereinafter: 'the Concept of Ancillary Services' or 'the Concept'). Solutions as defined by the Concept ensure stable and reliable operation of the power system and the fulfilment of BIH's international obligations, primarily under the Treaty establishing the Energy Community and towards the European Network of Transmission System Operators for Electricity (ENTSO-E) and its Regional Group of Continental Europe, that is, the so-called SHB Control Block (Slovenia – Croatia – Bosnia and Herzegovina).

The Concept of Ancillary Services with illustrations of a considerable number of procedures which had to be developed paved the way for further trends in completion of the existing regulatory framework for the provision of ancillary services for balancing of the power system of Bosnia and Herzegovina and the commencement of its operational functioning. The basic solutions of the Concept were transformed through further elaboration into rules applicable in practice which regulate this issue on new grounds.

In July 2014, SERC amended the Tariff Pricing Methodology for services of electricity transmission, operation of ISO and ancillary services. SERC expected that ISO BIH would harmonize the existing Market Rules and Grid Code pursuant to the SERC Conclusions from March 2014 and make them compatible with the solutions provided in the Concept, together with additional procedures required to implement the rules. Due to considerable delays in dynamics of those activities, SERC regulated the method of providing ancillary services and balancing of the BIH power system on a temporary basis by Decision of 18 November 2014.

By the Decision on a dry-run period for application of implementing rules and procedures for the provision of ancillary services and balancing of the power system of Bosnia and Herzegovina, in December 2014 SERC accepted the proposal of ISO BIH and other power entities to define 1 June 2015 as the deadline for the commencement of effective application

of rules and procedures. However, as the new Market Rules were defined only on 24 April 2015, when approving them in May 2015 SERC decided that the application thereof would commence on 1 January 2016, until when the dry-run period was prolonged.

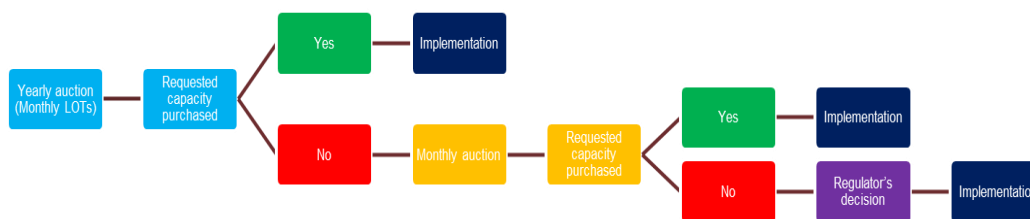
In 2015 SERC adopted a decision defining coefficients and price caps for capacity and energy of secondary and tertiary control as well as coefficients with the price of positive and negative imbalances, while the price cap for downward tertiary control capacity was set in amendments to the decision. In this manner, the input parameters were defined for procurement of ancillary services on the market which was conducted by ISO BIH as the entity procuring ancillary services and providing the system service in Bosnia and Herzegovina.

At the end of 2015, ISO BIH defined the final versions of documents accompanying the new Market Rules:

- Rules of daily balancing energy market for tertiary control;
- Ancillary service procedures and Procedures for data exchange between the ISO BIH and distribution system operator;
- Standard forms of balance responsibility agreement and ancillary services agreement;
- Balance group participation form, balance responsible party registration form, reserve object registration form, market participant registration form; and
- Application for EIC codes; and
- Concrete injection and withdrawal points and Instructions for daily schedule nominations.

By a separate SERC decision which was adopted as part of the tariff proceedings, a tariff for system services was determined thus completing a set of rules and decisions which enabled the introduction of market principles into the previously fully regulated method of providing ancillary services and balancing of the BIH power system as of 1 January 2016. In this manner, the functionality of open wholesale and retail electricity markets was enhanced and one of the measures required under the so-called Western Balkan 6 process was implemented.

Purchase procedures can be seen from the below figure.



4. Development

In a situation where there is willingness to efficiently foster retail and wholesale market opening, the pressure on having a clear, transparent and efficient regulation is more intense. Also, an increase of the market share of new market entrants over time contributes positively to such development. Against this background, the present chapter evaluates the degree of market opening in the analysed markets.

Table 4 shows that on retail level the number of end-consumers outside of the incumbent is low, especially if considering their relative share⁸. On the energy side the picture is different, due to few consumers with high consumption that have changed suppliers in some Contracting Parties, namely: Albania AL 0,6 TWh, Bosnia and Herzegovina 0,9 TWh, fYR of Macedonia 2,2 TWh, Montenegro 0,6 TWh and Ukraine 10,2 TWh. These results could be due to high imbalance settlement costs that should be borne by suppliers or due to other usual entry barriers in the retail market, for example (i) switching procedures, (ii) regulated tariffs below market value of energy and supply service, (iii) market design issues, (iv) unavailability of electricity to suppliers, (v) data availability etc. Further to this, production outside the incumbent is still low, namely: fYR of Macedonia 0,3 TWh, Kosovo* 0,0 TWh, Montenegro 0,0 TWh and Serbia 0,3 TWh.

Table 4 Overview of market opening data (last update enabled at 30th September 2016)

	BA	ME	GE	KO*	MD	RS	RA	UA	AL	MK
Number of retail suppliers of end-consumers outside of the incumbent	8-inf.	1	0	0	8-inf	7	0*	8-inf.	8-inf.	4-inf
Number of consumers	1.517.161	374.121	-	-	1.342.704	3.618.218	1.037.408	17.068.426	1.200.000	698.518
Number of end-consumers supplied outside of incumbent	2	1	-	-	-	7.751	-	1.435	11	250
consumption of end-consumers	12,6 TWh	2,9 TWh	-	5,6 TWh	3,7 TWh	28,5 TWh	5,328 TWh	117,1 TWh	6,1 TWh	6,9 TWh
consumption supplied outside of incumbent	0,9 TWh	0,6 TWh	-	-	-	0,2 TWh	-	10,2 TWh	0,6 TWh	2,2 TWh
Number of producers outside of incumbnet	8-inf.	4-8	8-inf.	4-8	8-inf	8	-	8-inf.	8-inf.	8-inf.
Production in the country	14,4 TWh	2,9 TWh	10,8 TWh	5,5 TWh	0,8 TWh	36,9 TWh	7,315 TWh**	144,1 TWh	5,5 TWh	5,3 TWh
Production outside of incumbent	0,3 TWh	0,0 TWh	NA	0,0 TWh	0,2 TWh	0,3 TWh	-	-	1,0 TWh	0,5 TWh

⁸ See also: ECRB, Market Monitoring Report 2015.

[*]Though the exclusive right of electricity supply of "Armenian Electricity Network" CJSC that is the only distribution company in the whole territory of the Republic of Armenia, was revoked by the Commission's resolution N 20-A of February 10, 2016 and transitional rules for the provision of right of access to the electric power transmission and distribution network for the eligible consumers and qualified suppliers in the electric power market were established by the Commission's decree N 241-N of August 31, 2016, no other suppliers exist yet.

[**]The 6,988 TWh out of 7,315 TWh is the useful supply. The difference between useful supply and consumption of end consumers is almost wholly exported to the Iranian Islamic Republic (1,176 TWh) according to gas delivery and electricity counter-delivery agreements between Yerevan TPP CJSC and Iranian NIGEC (National Iranian gas export company).

Conclusions

Social welfare is typically negatively influenced by an insufficient level of development of balancing models which consequently makes market models less efficient.

The general guidelines for development, conclusions and the proposed applicable tools for fostering development are presented below.

1. Mechanisms related to **procurement of balancing services**, in particular measurement and registration of actual use of balancing services per different products, along with payment for services based on actual performance and prices (€/MWh, €/MW/h) should be implemented in each Contracting Party. This is also one of the prerequisites for cross border exchange of balancing services.

It is proposed that the transmission system operators within the Contracting Parties in a timely manner create a common view on the necessary steps to achieve sharing of balancing services between them on market based grounds⁹. This would bring better mutual understanding between transmission system operators and regulators as well as between transmission system operators and provide a vehicle for transmission system operators to propose solutions able to address the obstacles identified in this report.

2. Other steps that could foster development of **balancing services procurement on market based approach from abroad**, are:
 - making price signals regarding balancing reserves and energy products transparent,
 - reducing procurement time frames (eq. one month ahead on hourly basis),
 - making demand for these services publicly available,
 - ensuring clear technical requirements for providing these services,
 - opening continuous communication between concerning transmission system operators about the idea of cross border procurement of balancing services in practice,
 - assessing the sufficient availability of cross border capacity.
3. The **cross-border procurement of balancing energy and reserves** is likely to set the prices of these services in a way to reflect their value within relevant market.
4. Creating power exchanges and **coupling electricity markets** would foster further development of balancing mechanisms, and vice-versa. Hourly reference wholesale prices could be used for imbalance settlement.
5. Providing **imbalance settlement rules** in market models is a prerequisite for the beginning (or continuation) of retail and wholesale market opening. Inadequate balancing rules present an obstacle to market opening, along with other possible obstacles. The

⁹ See as well the related targets of the Western Balkan 6 process and the there under established Memorandum of Understanding (ref https://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/WB6).

percentage of the end-consumers that change suppliers relies on effective retail market opening. It is expected that market participants would wait for the right opportunity to enter retail market which depends on good regulations (balancing included) and sufficient price differences between wholesale and retail prices.

6. Contracting Parties should prepare to cope with **flexibility challenges** resulting from further integration of intermittent renewable energy sources and depending on the way the intermittent renewable energy producers are integrated in the market model. Ukraine and the fYR of Macedonia have already mildly integrated intermittent renewables, others have done less. Growth of intermittent renewable sources is expected.
7. When setting goals which should be achieved by Contracting Parties concerning balancing, the impact of the **participants in decision making** in any particular Contracting Party should be transparent in order to be able to identify the relevant decision makers (government, regulator, transmission system operator, distribution system operator etc).
8. Data and information collected for this survey shows **shortcomings on balancing related data availability**. It must, thus, be assumed that related data is also not available to market participants. To the extent related data or information is not confidential no excuse is seen for lack of publication. Publishing relevant data and information will increase confidence in the market by new market entrants and end-consumers.
9. A positive example of cooperation is the cooperation for replacement reserves in control blocks of "Croatia - Bosnia and Herzegovina - Slovenia" and "Serbia - Montenegro – fYR of Macedonia".

Proposal for next steps

- 1) Contracting Parties should without further delay implement rules on balancing.
- 2) Instead of preparing new balancing reports in 2017 and 2018 it is proposed to prepare an overview of implementation plans for all Contracting Parties to the extent adequate balancing mechanisms are not in place yet. It is important that in that form, all legislation acts are comprised, legislation acts that are and that should be issued, with the sufficient description of the elements that should be regulated in each act.
- 3) If such system would be implemented, it would be easier to see in which direction the balancing systems of the Contracting Parties are expected to develop. This would also increase transparency in terms of alignment of mechanisms across borders.
- 4) In this context it would be also useful to continue enhancing cooperation of transmission system operators to develop common views on procurement of balancing products from abroad.

Annex I – questionnaire

Balancing products (answers should be provided by TSO and checked and sent by regulator)

Is transparent standard characteristics (technical specifications)¹⁰ and demand for reserve, along with transparent prices important for development?

Q _{an}	Condition	Question	Admissible answers (please answer in more details if necessary)				
Q _{a1}	-	Is there technical specification for reserve products (balancing products) in your country?	YES/NO				
Q _{a2}	if Q _{a1} =YES	Are these technical specifications publicly available?	YES/NO				
Q _{a3}	if Q _{a2} =YES	Please provide link on where these technical specifications are available.	(link or provide in attachment in the email)				
Q _{a4}	-	Is TSO ¹¹ determining required reserve for every type of the reserve (plan)?	YES/NO/partially				
Q _{a5}	-	What is the convention for balancing?	(+ means reserve for additional production/lowering consumption)/(- means reserve for lowering production/increasing consumption)				
Q _{a5}	if Q _{a4} =YES or Q _{a4} =partially	Please fulfil the determined reserve per type (plan) in 2015. ¹²	FRRa Reserves	+ value	MW	- value	MW
			FRRm Reserves	+ value	MW	- value	MW
			RR Reserves	+ value	MW	- value	MW
Q _{a6}	-	Is TSO able to determine realization for some or all types of the reserve?	YES/NO				
Q _{a7}	if Q _{a6} =YES	Please fulfil the determined reserve per type (realization) in 2015. ¹³	FRRa Reserves	+ value	MW	- value	MW
			FRRm Reserves	+ value	MW	- value	MW
			RR Reserves	+ value	MW	- value	MW
Q _{a8}	-	Is TSO able to determine activation of reserves?	YES/NO/partially				
Q _{a9}	if Q _{a8} =YES or Q _{a8} =partially	Please fulfil	FRRa Energy	+ value	MWh	- value	MWh
			FRRm Energy	+ value	MWh	- value	MWh
			RR Energy	+ value	MWh	- value	MWh
Q _{a10}	-	What would you state about prices for the balancing reserve	(price is determined by some form of methodology)/(price is determined by at least two parties competing)/(price is determined by some form of methodology and by at least two parties competing)/(price is determined by negotiation between TSO and balance service provider)/(balancing reserves are paid in a fix amount, there are no prices per type of the reserve)				
Q _{a11}	if there is methodology	Please provide the link for the methodology if there is one, or provide the document in the attachment	(link or provide in attachment in the email)				
Q _{a11}	there are prices or amounts for types of reserves	Please fulfil the prices (give average value, or fixed value) if there is fixed value merge cells and indicate value	FRRa Reserves	(+ direction)	(€/MW)/(€)	(- direction)	(€/MW)/(€)
			FRRm Reserves	(+ direction)	(€/MW)/(€)	(- direction)	(€/MW)/(€)
			RR Reserves	(+ direction)	(€/MW)/(€)	(- direction)	(€/MW)/(€)
Q _{a12}	-	What would you state about prices for the balancing energy (reserve activation)	(price is determined by some form of methodology)/(price is determined by at least two parties competing)/(price is determined by some form of methodology and by at least two parties competing)/(price is determined by negotiation between TSO and balance service provider)/(balancing reserves are paid in a fix amount, there are no prices per type of the reserve)				
Q _{a13}	there are prices for types for reserves-	Please fulfil the prices (give an average value, or fixed annual value). If there is fixed annual value merge cells and indicate value	FRRa Energy	(+ direction)	(€/MWh)/(€)	(- direction)	(€/MWh)/(€)
			FRRm Energy	(+ direction)	(€/MWh)/(€)	(- direction)	(€/MWh)/(€)
			RR Energy	(+ direction)	(€/MWh)/(€)	(- direction)	(€/MWh)/(€)

Flexibility challenge (answers should be provided by regulator)

Please read following short publication: https://www.entsoe.eu/Documents/SDC%20documents/System%20Adequacy/flexibility_v03.pdf.

¹⁰ Article 14 of the draft of the network code for balancing: "The standard Balancing Reserve and Energy products shall consist of at least the following standard characteristics: (a) Full Activation Time; (b) minimum and maximum quantity; (c) Deactivation Time; (d) Price of the bid; (e) divisibility; (f) delivery period; and (g) Mode of Activation" https://www.entsoe.eu/fileadmin/user_upload/library/resources/BAL/130221_NetworkCode_EB_Draft_V1_14_PartII_Stakeholders.pdf

¹¹ Transmission system operator.

¹² Types in Annex I.

¹³ Types in Annex I.

Focus on technical balancing in particular country depends on the *flexibility* needs and scarcity? Having that thought in mind, please fulfil the following table.

Q _{bn}	Condition	Question	Admissible answers (please answer in more details if necessary)		
Q _{b1}	-	Is the distributed generation ¹⁴ "must run generation" in your system?	YES/NO/(only solar)/(only solar and wind)/...		
Q _{b2}	-	Please describe is legislation in your country recognizing the responsible entity for planning distributed generation?	YES/NO/(system operator is responsible)/(market operator is responsible)/...		
Q _{b3}	-	What is the current integration of the distributed and must run generation (installed capacity)	wind		MW
			solar		MW
			biomass		MW
			small hydro		MW
			other must run generation		MW
Q _{b4}	-	Is there the administrative or technical limit for the distributed or must run generation (installed capacity)?	YES/NO		
Q _{b5}	if Q _{b4} =YES	Please provide administrative or technical limits	wind		MW
			solar		MW
			biomass		MW
			small hydro		MW
			other must run generation		MW
Q _{b5}	-	Is there system with guaranteed price for production from renewables implemented?	YES/NO/(tariff system with fixed prices)/(market based tendering for price with maximum price)/...		
Q _{b5}	if Q _{b5} ≠NO	Please provide the expected price for every type of distributed generation originating from tariff systems or market based tender	wind	a) 50 - 60 b) 60 - 80 c) 80 - 110 d) 110 - ∞	€/MWh
			solar	a) 50-90 b) 90 - 110 c) 110 - 160 d) 160 - ∞	€/MWh
			biomass	a) 50 - 60 b) 60 - 80 c) 80 - 110 d) 110 - ∞	€/MWh

¹⁴ Distributed generation - generation that has eligible access to the network and is for example with capacity less than 50 MW.

New retail suppliers of end-consumers outside the incumbent¹⁵ (answers should be provided by regulator, data from DSO¹⁶ and TSO¹⁷)

Imbalance settlement is directly affecting the new suppliers outside the incumbent? Is the focus on the imbalance settlement in particular contracting party directly related to proportion of suppliers outside the incumbent?

Q _{cn}	Condition	Question	Admissible answers (please answer in more details if necessary)	
Q _{c1}	-	Are there suppliers outside the incumbent?	YES/NO	
Q _{c2}	if Q _{c1} =YES	What was the number of retail suppliers of end-consumers outside the incumbent in 2015?	a) 2 - 3 b) 4 - 8 c) 8 - ∞	
Q _{c3}	if Q _{c1} =YES	What was the number of end consumers in your country in 2015?	cca. (value)	end-consumers
Q _{c4}	if Q _{c1} =YES	What was the number of consumer supplied by retail suppliers of end-consumers outside the incumbent in 2015?	cca. (value)	end-consumers
Q _{c5}	-	What was the consumption of end-consumers in your country in 2015?	cca. (value)	TWh
Q _{c6}	if Q _{c1} =YES	What was the consumption of consumers supplied by retail suppliers of end-consumers outside the incumbent in 2015?	cca. (value)	TWh

New power producers outside the incumbent (answers should be by regulator, data from DSO and TSO)

Q _{dn}	Condition	Question	Admissible answers (please answer in more details if necessary)	
Q _{d1}	-	Are there producers outside the incumbent?	YES/NO	
Q _{d2}	if Q _{d1} =YES	What is the number of producers outside the incumbent?	a) 2 - 3 b) 4 - 8 c) 8 - ∞	
Q _{d5}	-	What was the production in your country in 2015?	cca. (value)	TWh
Q _{d6}	if Q _{d1} =YES	What was the production generated from producers outside the incumbent?	cca. (value)	TWh

¹⁵ Suppliers outside vertically integrated company, supplier is the entity that sells electricity to the end-consumers on the retail market.

¹⁶ Distribution system operator.

¹⁷ Transmission system operator.

Annex II – Balancing development overview

ALBANIA	<p>The requirements of Article 15 of Directive 2009/72/EC are fully transposed in the law. Balancing market and balance responsibility are outlined in their basic terms in the Market Model adopted by the Cabinet of Ministers on 13 July 2015. Further details are to be specified in the new Transmission Network Code.</p> <p>The conditions for real-time balancing and balance responsibility are neither market-based nor compliant with the acquis.</p> <p>KESh provides OST with balancing energy for the system. Balancing services of OShEE are provided through its contract for regulated wholesale supply. Cost-reflectivity applies only to the balancing services provided to eligible customers who have switched their supplier.</p>
BOSNIA AND HERCEGOVINA	<p>The legal framework for balancing is defined on the state level. Article 15 of Directive 2009/72/EC was transposed by way of secondary legislation. The new Market Rules approved by SERC in May 2015 and the consequent acts of NOS BiH for implementation of operational environment for market-based balancing and ancillary services ensure compliance with the acquis as of 1 January 2016.</p>
KOSOVO*	<p>The new Law on Electricity stipulates an obligation of the transmission system operator to procure balancing services in a transparent, market-based and non-discriminatory procedure in line with the Third Energy Package requirements. A contractual framework and a non-discriminatory approach to balance responsibility of each market participant have been introduced by the new law. In addition, the law defined obligations of the transmission system operator to develop balancing rules, including rules for imbalance settlement, and submit them to the regulator for approval. Until a liquid balancing market is established, production companies are obliged to provide balancing services to the transmission system operator based on the prices regulated by ERO.</p> <p>Having in mind the existing limited balancing possibilities of production units in Kosovo* A and Kosovo* B, regional balancing cooperation is of utmost importance for KOSTT to provide an adequate reserve level and improve quality of frequency regulation. An important step towards that is an agreement between KOST and OST on cross-border procurement of a reserve for secondary regulation, whose implementation depends on the entry into force of the Connection Agreement between KOSTT and ENTSO-E.</p>
FYR of MACEDONIA	<p>Balance responsible parties are registered in 38 balancing groups, out of which six have more than one market participant. Although imbalances are calculated for all balancing groups, the costs are charged only to eligible customers and their respective balancing groups. Undertakings with an obligation to provide public services (including regulated generation, transmission, distribution and supply) are exempted from balancing responsibility.</p> <p>As part of its public service obligation, ELEM is currently the provider of ancillary services. According to the law, MEPSO has to procure ancillary services in a market-based procedure on the balancing market, but the procurement and provision of balancing energy still remains regulated and foreclosed.</p> <p>This poses an obstacle hindering former Yugoslav Republic of Macedonia from participating in any regional initiatives, as required by the Treaty.</p>
MOLDOVA	<p>Moldova is balancing its system mostly through imports from Ukraine or from Cuciurgani-Moldavskaya GRES. The Electricity Law tasks the transmission system operator Moldelectrica with procuring balancing energy and system services to keep the electricity system in balance. The rules on balancing included in the Market Rules have to be revised to comply with the Electricity Law's provisions.</p>
MONTENEGRO	<p>The Market Rules developed by COTEE and approved by RAE define principles for functioning of the balancing market and setting market-based imbalance prices for customers connected to the transmission network. Nine balance responsible parties are registered with COTEE.</p> <p>COTEE is responsible for the calculation of imbalances and ensuring the financial settlements. In principle, this system is compliant with the acquis related to provision of balancing services. According to the 2012 Market Rules currently in force, the provision of balancing services and the prices of imbalances are regulated. Since 2015, CGES and the Serbian EMS implement a mechanism for exchange of balancing energy from tertiary reserve based on a common merit order list.</p> <p>It is the distribution system operator's responsibility to develop load profiles for customers without hourly meter readings. Until these documents are developed and adopted, implementation of the Market Rules and further opening of the market for customers connected to the distribution network are not feasible as their hourly demand cannot be assigned for balancing purposes.</p>
ARMENIA	<p>Electricity system Grid Code of the Republic of Armenia will enter into force from July 15, 2017. The grid Code will clarify the list of balancing service providers and their relationships with system operator. Also, according to the draft Energy Law amendments being circulated now balancing shall be regulated by secondary legislation, including by commercial rules of wholesale electricity market.</p> <p>Currently, balancing is regulated by the export and import transactions, cross-flows, by the instructions of the electricity system operator as well as:</p> <ol style="list-style-type: none"> 1. producer-exporter relationships, when the producer signs a balancing agreement of electricity purchasing with DSO, 2. eligible consumer and qualified suppliers relationships, when trilateral agreement is signed between a qualified consumer, a qualified supplier and DSO, in the cases of imbalance for providing balancing services by DSO.
SERBIA	<p>The rules on balancing and imbalance settlement, which are further elaborated by the Market Rules, are transposed and implemented in line with the directive's requirement for a market based and non-discriminatory approach. EMS is currently in the process of aligning the Market Rules with requirements of the recently launched day-ahead market. The Energy Law defines that prices of reserve capacity needed for secondary and tertiary regulation may be regulated, depending on the assessment of AERS on the need for full or partial regulation, the level of competition, development of the regional market and cross-border capacities. In practice, EMS procures the balancing reserve from EPS based on the price regulated by AERS, which impedes the establishment of a cross-border exchange for balancing services. AERS is obliged to publish the first report on the need for further regulation of this price until 1 May 2017.</p>
UKRAINE	<p>April 13, 2017 the Parliament of Ukraine has adopted the Electricity Market Law (hereafter – the Law) which is fully in compliance with the Third Energy Package and in particular with Article 15 of Directive 2009/72/EC. Basic provisions on balancing market, balance responsibility, imbalance settlement are defined in the Law and will be further detailed in the new Market Rules. The Law currently in the process of entry into force and after the signing it by the President of Ukraine further implementation will be in place.</p> <p>New Market Rules will contain provisions for establishment of a competitive and non-discriminatory balancing mechanism and will replace the existing system. Currently the applied system fails to ensure proper treatment of the costs of imbalance and provision of energy for network losses, which are estimated by Energorynok and implicitly included in the market price. The imbalances of suppliers and generators are netted out. The suppliers are responsible for imbalances above 5% of their nominations in the course of a month. This arrangement does not provide price signals for balancing services, true balance responsibility or incentives for accurate load nominations.</p>