Electricity Balancing Mechanisms in the Energy Community Survey

March 2016

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INTRODUCTION

1. Background and scope of analysis

The Energy Community's Contracting Parties' balancing mechanisms are largely not market-based and lack functioning imbalance settlement procedures. The cross-border procurement of balancing energy and reserves is only about to begin.

The present survey focuses on identifying the balancing mechanisms applied in the Contracting Parties in order to identify the need for reform, harmonisation and integration. This is a prerequisite and a starting point for a normal functioning of the balancing market from the regional point of view.

The soon expected adoption of the Network Codes on Load Frequency Control and Reserves and the Electricity Balancing on EU level describe the target model for reform of balancing mechanisms in the Contracting Parties. In order to achieve the Target Model, it is necessary to understand the current state of play in particular countries in the Energy Community.

The present survey provides an overview of the status quo along with the recommendations for further work.

2. Methodology

The present report is based on data provided by national regulators of the analysed markets and the result of the thorough work of participants providing responses to the respective survey(s), along with additional comments where necessary. A detailed description of the applied methodology is available in Annex 1.

RESULTS

The tables hereinafter show the results of survey, correlating with the underlying questionnaires.

1. Unit prices for balance responsible parties

Table 1 Unit prices for balance responsible parties[1]

Question	BA	HR	GE	KO	ME	MK	RS	AL
Put 'YES' if the unit price in the imbalance settlement is calculated based on the day ahead price	No	Yes	No	No	No	Yes	No	No
Put 'YES' if the unit price in the imbalance settlement is dependent on the balance responsible party's imbalance volume in the particular hour (imbalance settlement period).	No	Yes	No	No	Yes	Yes	No	No
Put 'YES' if the unit price in the imbalance settlement is dependent on the system imbalance.	No	No	No	No	No	No	No	No
Put 'YES' if the unit price in the imbalance settlement is dependent on the system cost.	No	No	No	No	No	No	No	No

[1] Codes for countries are used according to ISO 3166, BA - Bosnia and Herzegovina, MD - Moldova, RS - Serbia, HR - Croatia, KO - Kosovo, UA - Ukraine etc.

Question	BA	HR	GE	KO	ME	MK	RS	AL
Put 'YES' if the unit price in the imbalance settlement is dependent on the price of the activated energy for balancing.	Yes	No	Yes	No	Yes	No	No	No

2. Commercial schedules

Table 2 Making commercial schedules

Question	BA	HR	GE	KO	ME	MK	RS	AL
Put 'YES' if the suppliers have to pay for the difference between hourly commercial schedule and the hourly realized/calculated load profile.	No	YES	NO	Not applicable	YES	YES	YES	YES
Approximately how many end consumers are equipped with the measurement of the hourly load profile (eq. 0-5% in number of consumer, 30-40% in energy delivered)	11% - 12% in number of consumers	ca. 44% in energy delivered	1% in number, 18% in consumption	Around 38% of customers. For Energy delivered- no information	100% of end consumers connected to HV transmission system, distribution is treated as a end consumer connected to HV grid.	0,036% in number, 27,45% in consuption	N/A	All consumers connected to the transmission system are equipped with measurement of hourly load profile.

Question	BA	HR	GE	KO	ME	MK	RS	AL
What kind of method is used to calculate hourly load profile for the end consumers that don't have hourly load profile measurement (eg. synthetic, analytic, combination of synthetic and analytic...)	Not applicable	Analytic	Not applicable	Not applicable	n/a	Analytic (standard daily load curves for different type of consumers	N/A	N/A
Who makes commercial schedules for small eligible producers? (eg. transmission system operator, market operator, small producer)	Not applicable	Market operator	Not applicable	Public supplier	n/a	their supplier (regulated or unregulated)	BRP	Eligible producers send the commercial schedule to OST. While small producers send it to the Wholesale public supplier
Is the imbalance of small eligible producers calculated?	No	YES	yes	No	n/a	YES	NO	no
Who makes hourly commercial schedules for small eligible producers?	Not applicable	Market operator	Not applicable	Public supplier	n/a	their supplier (regulated or unregulated)	BRP	Eligible producers send the commercial schedule to OST. While small producers send it to the Wholesale public supplier

3. Overview - balancing service providers, (cross-border) services, et al

From Table 3 it can be seen that in three countries there is more than one balance service provider. The balancing market with regulator supervision could make sense only in these countries. In other countries, where there is no cross border balancing, this matter should probably be regulated.

Table 3 Overview

Question	BA	HR	GE	KO	ME	MK	RS	AL
Put 'YES' if the balancing energy and balancing reserves are procured separately	No	NO	NO	NO	NO	NO	YES	NO
Put 'YES' if for some balancing products (energy or reserves) there is more than one provider in your country/bidding zone	Yes	NO	YES	NO	YES	YES	NO	NO
Put 'YES' if some of the balancing services (energy or reserves) is procured form aboard	No	NO	NO	NO	YES	YES	YES	NO
Put 'YES' if the balancing service products realization (non-financial) is measured and monitored on the hourly basis by the TSO.	Yes	YES	NO	YES	YES	YES	YES	YES
Put 'YES' if the balancing service products realization (non-financial) is monitored on the hourly basis by the regulator.	No	YES	NO	YES	NO	NO	YES	NO

Question	BA	HR	GE	KO	ME	MK	RS	AL
Put 'YES' if the balancing service price determination is being done by the TSO (without regulator). If you could in the comments table below give more precise explanations.	No	YES	NO	NO	YES	NO	NO	NO
Put 'YES' if for the some of the balancing services price determination is being done by the market based procurement (system with more than one provider). Please if you could in the comments table below give more precise explanations.	No	NO	NO	NO	NO	YES/NO	YES/NO	NO
What types of generation units provide balancing services (e.g. hydro, gas, coal...). Please if you could in the comments table below give more precise explanations.	Hydro	Hydro, Coal	Gas	Coal	Hydro and coal	Hydro and Coal	Hydro and Coal	HYDRO
Put 'YES' if the demand response is used in your country as a resource for balancing the system	No	NO	NO	YES/NO	NO	NO	YES	NO
Put 'YES' if the wind power plants, or other small eligible producers receive financial compensation in case of the curtailment (put 'NA' if there are no wind power plants in your country). If you could in the comments table below give more precise explanations.	NA	NO	NO	NA	n/a	NO	NO	N/A

4. Analysis of findings

Based on the collected data four areas require particular additional analysis:

Part 1 For some of the questions related to the implemented market model, answers were surprising. A better understanding of the existing market models is necessary to obtain a clearer picture and possibly try to harmonize models, if necessary. Having in place a non-discriminatory overall market model allowing for fair competition is in general considered a necessary prerequisite and NRAs' understanding of the implemented market models and their respective shortcomings is a necessary prerequisite for implementing a satisfying balancing mechanism.

Part 2 Regarding market based solutions for procuring of balancing services, in three countries there are two balancing service providers. Additionally in one country with only one balance service provider, a market based solution is applied. The current or possible market based solutions in countries with more than one balancing service providers should be further investigated.

Part 3 In two countries the imbalance price is linked to the day-ahead market, and in one of them it is related with day a head price on HUPX. It should be investigated if imbalance settlement mechanisms applied are designed in order to incentivise balance responsible parties to be in balance. That part of the topic could be further investigated.

Part 4 Data shows that on some borders no intraday cross border capacity allocation is implemented. The current status of cross border capacity allocation mechanisms applied on these borders should be looked into. It could be found necessary for the balance responsible parties to balance their position with market participant in the country with which there is no intraday cross border capacity allocation.

The present **report focuses its further analysis hereinafter on part 1** having in mind that thorough understanding of the market models must be considered a priority for creating sufficient balancing mechanisms. Analysis related to parts 2-4 may be performed as future ECRB activities.

5. Market models

The figures hereinafter show that a variety of used terms exists but clear and unified definitions are missing. Therefore, it is difficult to have clear understanding. More information on the existing market models is available in table 4 from which it can be seen that in most of the countries the balance responsibility is recognized.

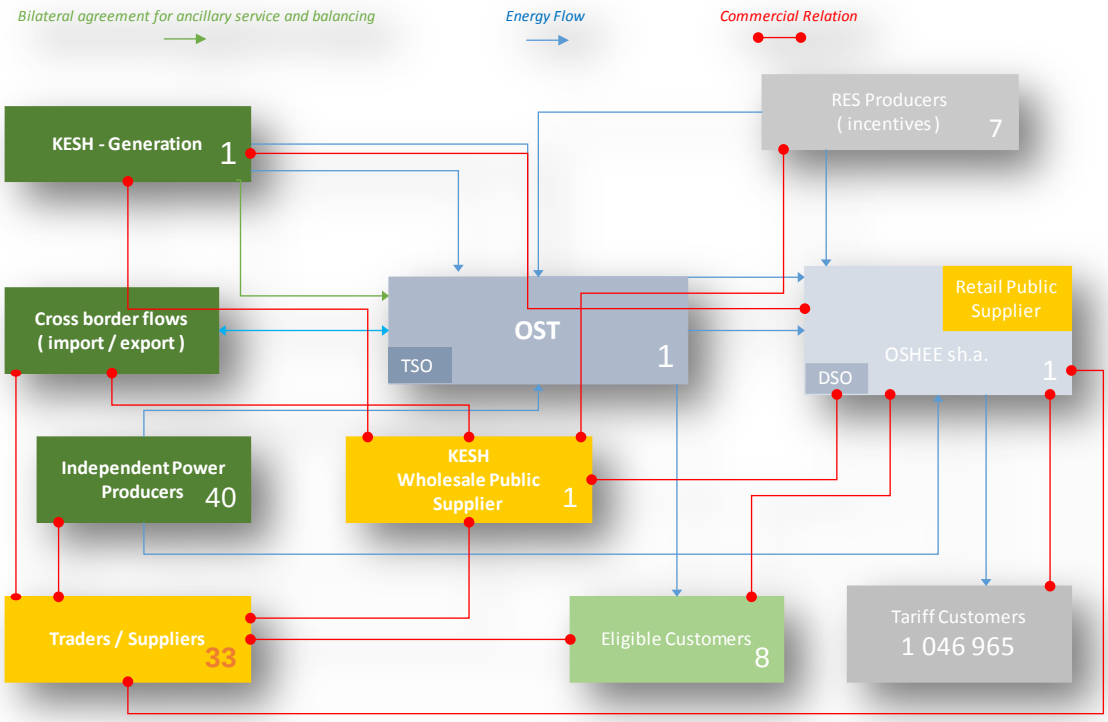

Figure 1: Scheme for Albania

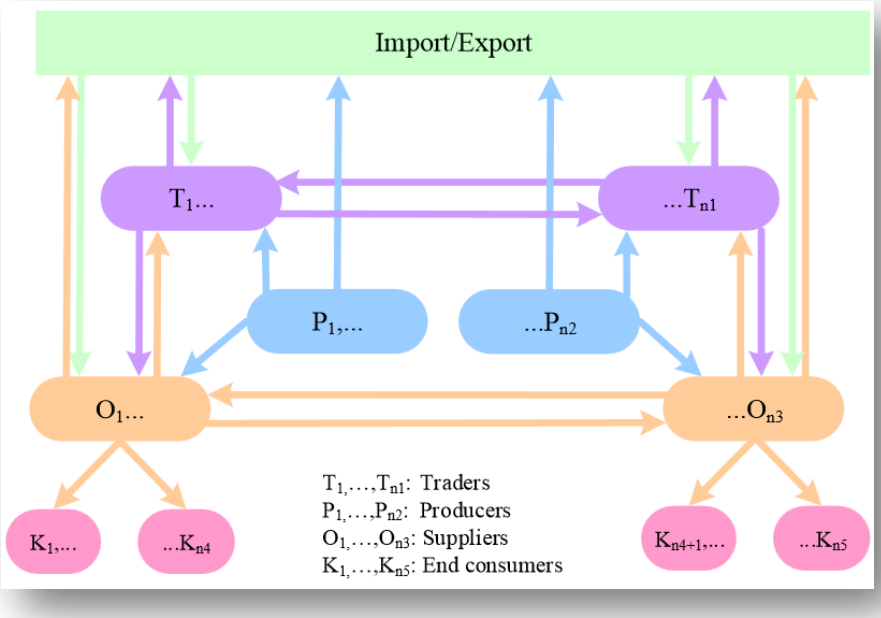

Figure 2 Scheme for Croatia[2]

[2] Annual Report, HERA 2013.

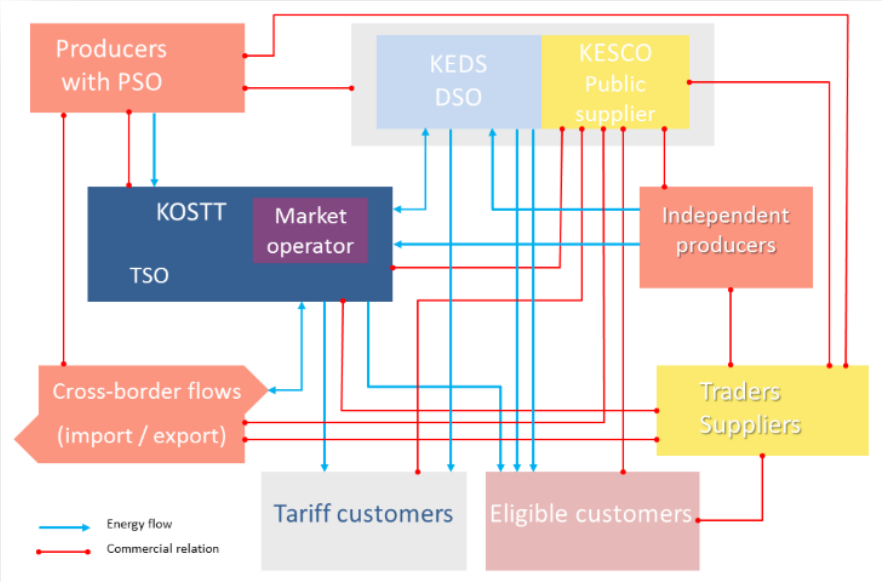

Figure 3: Scheme for Kosovo*

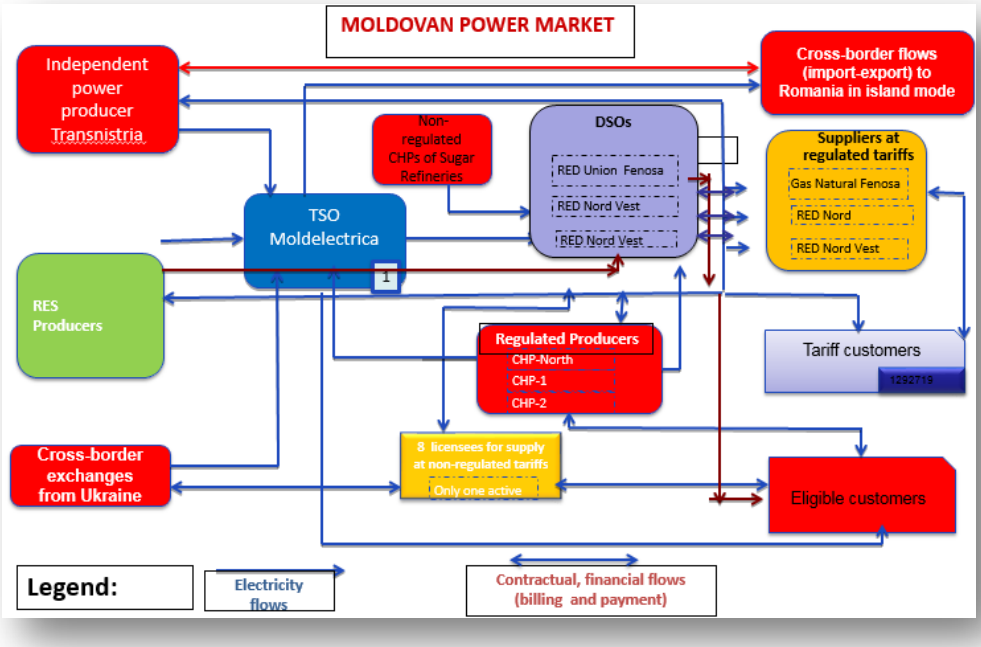

Figure 4: Scheme for Moldova

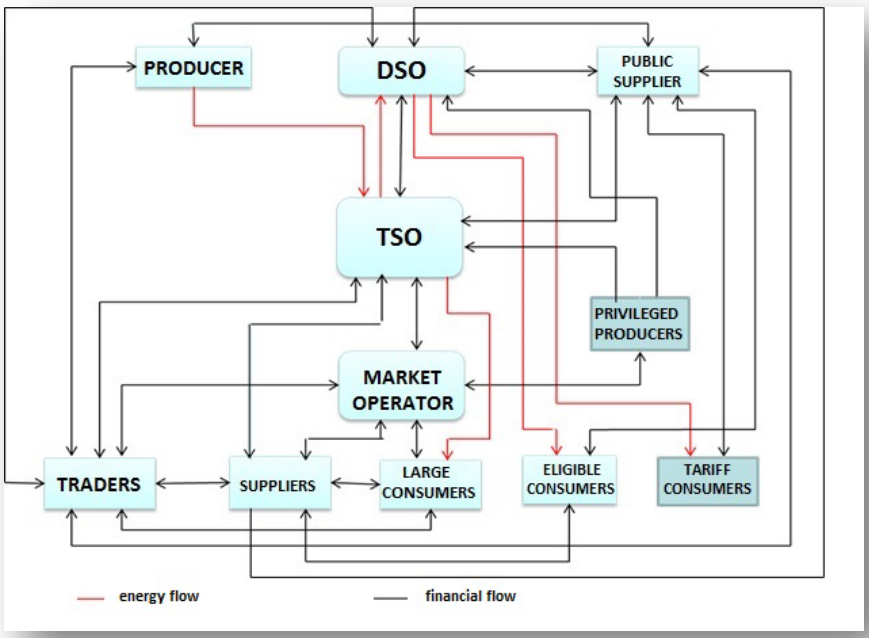

Figure 5: Scheme for Montenegro [3]

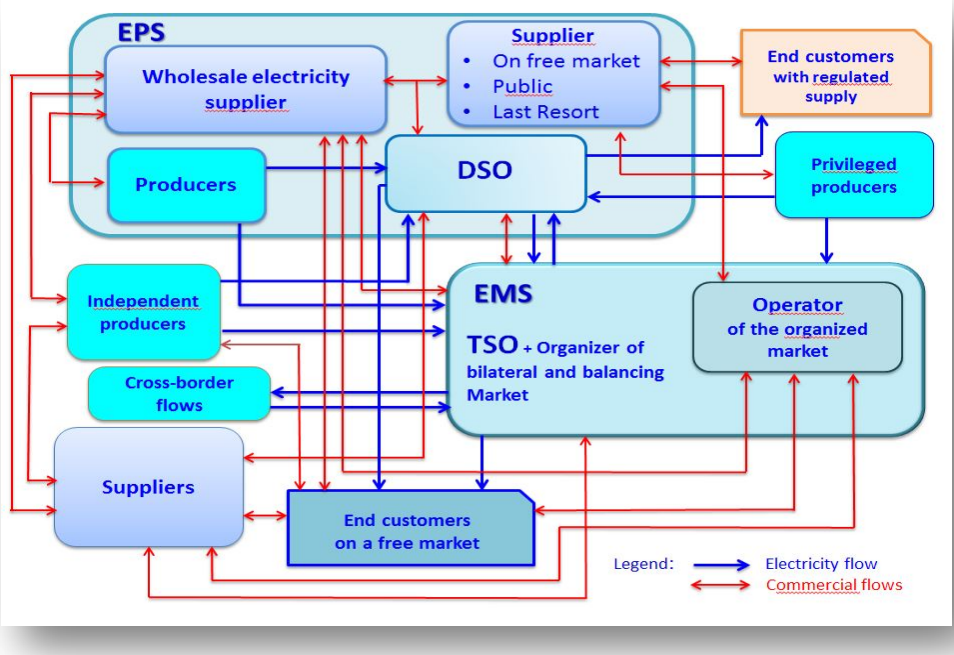

Figure 6: Scheme for Serbia

[3] Annual Report, RAE 2014.

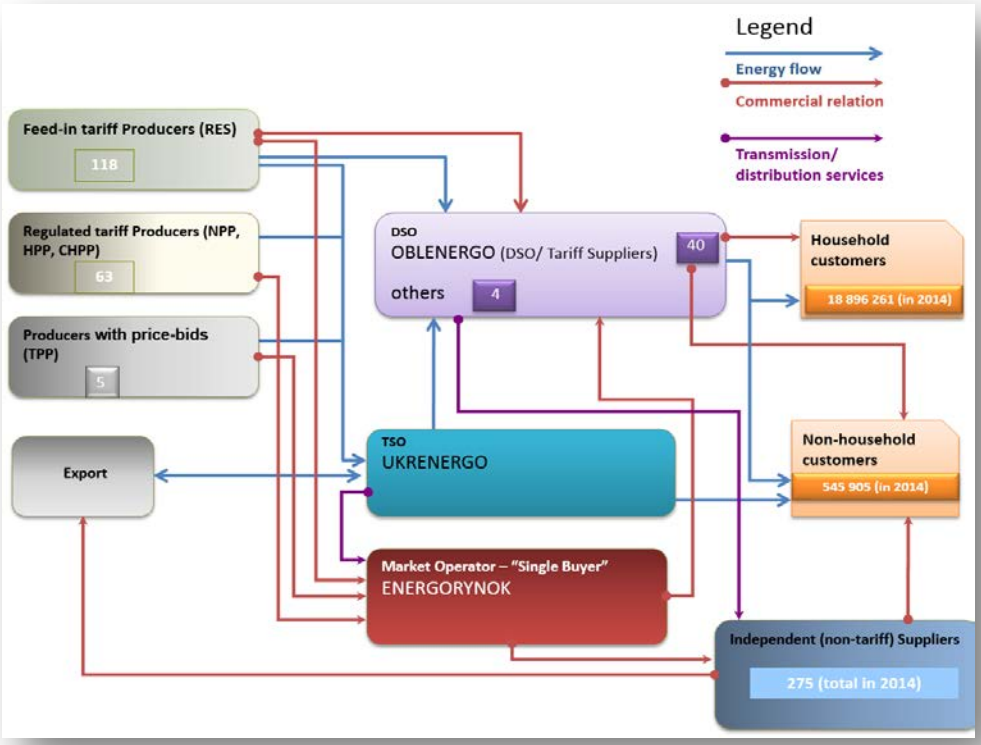

Figure 7: Scheme for Ukraine

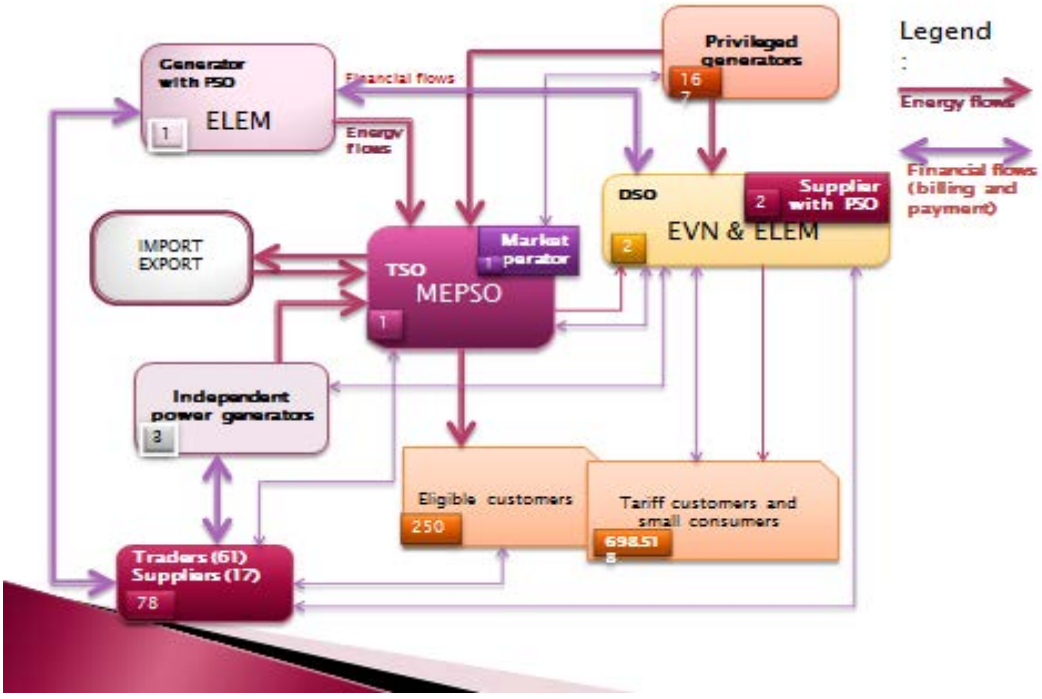

Figure 8: Scheme for FYR of Macedonia

Table 4 Written answers

	(A) Describe what kind of balance responsible parties exist in your country (producers with power plants, suppliers of end consumers, market operator, system operators for losses, wholesale traders,..)
BA	There are 3 incumbent companies (generation + supply) acting as balance responsible parties, as well as, approximately 20 wholesale traders acting as balance responsible parties for the 'pure' trade transactions (no end user supply or generation source within the country).
MD	Producers with power plants, suppliers of end consumers, eligible customers, TSO, DNO
RS	Balance responsible party is a participant in the electric energy market which is balance responsible for deviations of one balance group in the market area of Serbia and who has concluded the agreement on balance responsibility with a transmission system operator. For one Balance group, only one participant in the market can be BRP. This market participant shall be registered as BRP. BRP can become any market participant. Based on the proper application data, the transmission system operator will, for the purpose of the nomination of daily schedules, award to the applicant one or more of the following roles: a) the responsible party for reporting electricity generation (only if within the balance group it has a point of withdrawal of electricity from a producer); b) the responsible party for reporting electricity consumption (only if within the balance group, it has as a withdrawal/injection point, the place of delivery of electricity to the end user or the aggregate point for electricity delivery to the transmission and distribution system operator to cover energy losses in the transmission and distribution systems); c) the responsible party for reporting blocks of electricity exchange (awards to all applicants).
HR	Cf scheme
KO	According to the Market design the balance responsible parties is prescribed: all licensed parties, and other parties that choose to voluntarily accede to the Market Rules, should be individually identified as participants in this market. As such, each participant will form its own balancing group by default. This does not preclude arrangements whereby a Balance Responsible Party (BRP) is appointed for a group of suppliers or group of generators but the Market Rules will not initially facilitate this; subsequent amendment of the rules to enable BRPs to be registered can be incorporated without fundamental change to the design if that is a wish of market participants.
UA	There are no explicit balance responsible parties in Ukraine

	(A) Describe what kind of balance responsible parties exist in your country (producers with power plants, suppliers of end consumers, market operator, system operators for losses, wholesale traders,..)
ME	In this moment, there are two suppliers: incumbent company EPCG, which is generator and supplier and another supplier which is supplying aluminium plant. There are 29 traders but only 7 of them are having balancing responsibility. All customers are eligible but customers connected to transmission network are not under incumbent suppliers umbrella. If they decide to be self supplied, they have to form their own balancing responsible group.
AL	OST ensures the needed balancing energy to cover disbalances that arise from the market participants with a contract between KESH and OST. Currently OST has signed a 6 month agreement valid until June 2016 for the provision of balancing service and ancillary service with KESH(Albania Power Corporation), based on the Market model, Market Rules. The price of the balancing energy is calculated based on the market rules approved from NRA. Whereas: 1. The price for balancing energy will be calculated for each month based on the maximal import price of KESH in the deregulated market plus 10% of this price, or in the absence of the import from KESH the price is calculated based on the price that Wholesale Public Supplier is buying from IPP, concessionary HPP, approved by NRA plus 20% of this price for negative imbalance. 2. The price for positive imbalance is the regulated price for generation. The calculation is done as a arithmetical sum of 24 hour on a hourly basis (positive/negative).
MK	Producers with power plants, suppliers of end consumers, traders, eligible customers, TSO and DSO

	(B) Describe to which entity balance responsible parties report their commercial schedules
BA	Independent System Operator (operates transmission network) is in charge for daily schedules
MD	TSO
RS	BRP performs the nomination of a daily schedule for each balance group as defined in the Grid Code: Submission of balance group daily schedule shall be done only by its balance responsible party. Balance responsible party shall submit to TSO its daily schedule for day D in day D-1 between 00:00 and 14:00 each day. PE EMS may specially request the balance responsible party to submit its daily schedule for several days if circumstances so require, notifying the balance responsible parties at least two days in advance.
HR	Market operator and TSO
KO	See response in (A).
UA	There are no explicit balance responsible parties in Ukraine
ME	BRP are reporting their commercial schedules to the TSO on the daily basis. TSO sends commercial schedules to Market Operator for a approval
AL	OST (Transmission System Operator) and Market Operator
MK	BRP are reporting their commercial schedules to the Market Operator on the daily basis. MO sends commercial schedules to Market Operator for approval.

(C) Describe market model in your country (who could sell or buy electricity from which party)	
BA	There is no organized day-ahead market in BiH (no market operator neither PX). Wholesale trading is performed on bilateral basis. Wholesale market participants are 3 incumbent companies plus approximately 20 traders and several big consumers. 3 customers connected to the transmission network are using the ability to buy electricity on the free market. Retail market is formally opened, but steel all customers are supplied by incumbent suppliers (default suppliers = supply + distribution function legally not unbundled).
MD	Cf scheme. Legal relations between producers, suppliers and customers in electricity market established by the Agency as competitive are regulated via contracts concluded between these parties, observing laws and regulations in the field.
RS	Both electricity purchase and sales are organised on the bilateral market directly between market players, while on the wholesale bilateral market, the players traded in electricity at open market prices, while on the retail bilateral market, supply was organised at open market prices and regulated prices due to the fact that according to the Energy Law from December 2014, all customers except for households and small customers were obliged to purchase electricity in the open market, however also households and small customer can choose their supplier at the open market and decide not to buy electricity at the regulated prices. Majority of households and small customers are supplied at regulated prices by public supplier. Wholesale electricity market in 2014 was based on trade between suppliers since there are almost no independent electricity producers at all.
HR	Cf scheme
KO	Kosovo Electricity Market is based on the bilateral market between market players. According to legislation, which is in process of amending, all existing producers with installed capacity exceeding 5MW, shall provide the public supplier with the electricity generated, at regulated tariffs, should the public supplier need such electricity to fulfil its obligations as a public supplier. According to legislation all customers have right to choose their supplier at the open market and decide not to buy electricity at the regulated prices. Actually all customers are supplied from public supplier at regulated prices.
UA	The wholesale market operator Energorynok is a state enterprise established in 2000. It functions as a single buyer of all electricity from generators (it means that bilateral agreements are forbidden) and a wholesale supplier to the retail suppliers at the regulated and non-regulated tariffs (including suppliers of electricity for exports). Energorynok is also responsible for day-ahead generation schedules, commercial balancing and financial settlement. Balancing and contracting of reserve capacity are implicit mechanisms incorporated into the Wholesale market rules. The nuclear and large hydro generators (along with the CHPPs and renewable sources) sell the electricity to Energorynok at regulated prices, while thermal power plants sell through a competitive bidding platform which determines marginal system price – price for electricity produced by thermal power plants. The wholesale price of electricity supplied by Energorynok is calculated as weighted average of the tariffs for HPPs, NPPs, CHPPs and marginal system price for TPPs (competitive) with adjustments for: • costs of transmission services; • costs of SE Energorynok services;• costs required to cover incentives for renewables („feed-in-tariffs“);• cross-subsidies for households and other groups of consumers. All regulated tariffs are approved by the regulator.

(C) Describe market model in your country (who could sell or buy electricity from which party)	
ME	There is Market Operator in Montenegro but no PX. Trading is based on bilateral contracts only. MO is administrating and registering market participants and is responsible for the imbalance settlement. All BRP are reporting their commercial schedules in D-1 to TSO which is sent to MO for a final revision and approval. Depending on the imbalances, BRP are charged for the ''damage'' they caused. All households are eligible from the January 1st 2015, but till today, no new ''household type'' supplier appeared.
AL	provided in the next sheet
MK	Trading is based on bilateral contracts only. MO is administrating and registering market participants and is responsible for the imbalance settlement. All BRP are reporting their commercial schedules in D-1 to MO which is sent to TSO for a final revision and approval. Depending on the imbalances, BRP are charged for the ''damage'' they caused

	BA	MD	RS	HR	KO	UA	ME	AL	MK
(D) Provide information of existing active balance responsible parties outside of the incumbent company.	Approximately 20 wholesale traders acting as balance responsible parties for the 'pure' trade transactions (no end user supply or generation source within the country).	1 Supplier at non regulated tariffs who provides balancing electricity for all the balancing responsible parties.	There are 47 BRP in total registered in JP EMS Register of BRPs at the moment. One of them is JP EPS as the incumbent company. There are 38 BRPs which are active since January 2015 and approx. 33 BRPs are active frequently on daily basis	9 active suppliers, 17 traders one producer	See response in A).	There are no explicit balance responsible parties in Ukraine	There are 7 wholesale traders and one supplier who are BRP, besides the incumbent company.	N/A	Situation in 2015: 1- prodicer, 1 consumer, 5 suppliers, 27 traders.

6. Conclusion and way forward

Work on assessing the electricity balancing models of the Contracting Parties should continue since there are various elements that merit further investigation but cannot be considered clarified yet. Some of the Contracting Parties already implemented the Third Energy Package in their Energy Laws, others are in the process of doing so; consequently there is a need for further investigations and updates of existing surveys – also having in mind the obligations in relation to market based and regional balancing stemming from the Third Energy Package and the "Berlin – Process".

A commonly agreed terminology, harmonized with the Network Codes on Forward Capacity Allocation and Balancing, should be created in order to make the communication flow more swiftly.

The survey showed that **competitive markets with sufficient market participants** – both, balancing responsible parties and balancing service providers - **still do not exist in the countries surveyed** and that market trading is predominantly done through bilateral contracts.

As a strong heritage of the past period, **incumbent companies are still dominant market participants** collecting significant market power. The only reasonable solution represents the **establishment of a regional balancing market**. Following the current state of play in most countries assessed, many steps have to be taken on a national basis in order to allow for the integration into a regional one.

ANNEX 1

The methodology that was applied for preparation of the present paper is called "Multiple Iteration Methodology" and it contains the following steps:

I. Designing the survey that covers particular topics in general. Go to step II.
II. Sending the survey to participants with the request to fulfil the survey. Go to step III.
III. Presentation of the results. If there is no time for further iterations go to the step VII., otherwise go to step IV.
IV. Based on the received answers identify which four parts of the topic should be further investigated, if possible. If no other topic should be further investigated go to step VIII., otherwise go to step V.
V. Creating additional questions to investigate chosen part of the topic. Go to step VI.
VI. Sending the additional questions. After receiving answers in go to step III.
VII. Conclusion. When possible return to step IV.