



Energy Community Regulatory Board

Electricity Balancing Models in the Energy Community

- An Assessment Report -

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1. EXECUTIVE SUMMARY

Balancing of electricity flows is of core relevance for the functioning of electricity transmission systems and – beyond that – develops towards becoming one of the pivotal points for network development and regional market integration: linking the national markets to a regional and more dynamic market will develop strong impact on the load flow situation and might also affect grid stability. The envisaged integration of renewable energy sources – especially the integration of wind energy – additionally creates challenge for system operators.

The present report provides an **overview about the development status of national electricity markets** in the Energy Community Contracting Parties, selected neighboring European Member States and Turkey and Georgia as Observer country to the Energy Community.

The analysis shows that the approaches for balancing as well as the stage of development of functional and transparent balancing markets in real terms **vary** within the 8th Region. To a large extent the results align to the overall development state of the electricity market.

The report finally concludes on a number of **recommendations** for measures to be set in the Energy Community related to electricity balancing.

2. INTRODUCTION

2.1 The Energy Community

The Energy Community extends the European Union's (EU) internal energy market to South East Europe (SEE). By signing the Energy Community Treaty¹ the signatory parties² agreed to implement the *acquis communautaire* on electricity, gas, environment, competition and renewables³ with a view to realize the objectives of the Treaty and to create a regional gas and electricity market within South East Europe (SEE) capable of attracting investment.

Given the small size of the national markets it is commonly understood that a **harmonised regional approach** for the energy market of the Energy Community remains a key requirement for the promotion of investments in the Region.

The Energy Community Regulatory Board (ECRB)⁴ operates based on Article 58 of the Energy Community Treaty. As an institution of the Energy Community the ECRB advises the Energy Community Ministerial Council and Permanent High Level Group on details of statutory, technical and regulatory rules.

2.2 Scope

Electricity transmission systems – as a consequence of fluctuating load patterns - have to provide for base load and peak load capability with predefined safety as well as fault tolerance margins. Given that transmission systems typically do not know buffering capacities and electricity has to be consumed immediately once produced, grid balancing is an important tool for guaranteeing grid safety.

Linking the national markets to a regional and more dynamic market has a strong impact on the load flow situation and, under a worst case scenario, also on the grid stability. The envisaged integration of renewable energy sources - especially the integration of wind energy – additionally creates challenge for system operators.

¹ The Energy Community has been established by the Treaty establishing Energy Union, signed in October 2005 in Athens and entering into force on 1 July 2006. Treaty establishing the Energy Community (hereinafter "The Treaty"). The Treaty was signed in October 2005 in Athens, Greece and entered into force on 1 July 2006. Details on the Energy Community and ECRB see www.energy-community.org;

² The **Parties** to the Treaty are the European Community, on the one hand, and nine **Contracting Parties**, namely, Albania, Bosnia & Herzegovina, Croatia, former Yugoslav Republic of Macedonia, Moldova, Montenegro, Serbia, UNMIK and Ukraine. As of March 2009, 15 European Union Member States have the status of **Participants**. Armenia, Georgia, Norway and Turkey take part as **Observers**.

³ For details of the relevant *acquis* see: http://www.energy-community.org/portal/page/portal/ENC_HOME/ENERGY_COMMUNITY/Legal/Treaty

⁴ For details see www.ecrb.eu.

Having in mind the relevance of the topic, the ECRB in February 2011 published a report on the **existing balancing models⁵ in the jurisdictions of the 8th Region⁶** describing the main characteristics, and the regulatory framework, identifying the main obstacles and an outlook for improvements.

The present update of the 2011 report provides newest data on these areas.

2.3 Methodology

The assessment and information provided in the present report is based on the information collected from the regulatory authorities of the Contracting Parties and Observers to the Energy Community and other members of the 8th Region.

Where data for countries is missing this is due lack of information provided by the relevant regulatory authority - on particular questions or in general⁷.

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⁵ ECRB, Electricity Balancing Models in the Energy Community (Feb 2011), http://www.ecrb.eu/portal/page/portal/ECRB_HOME/ECRB_DOCUMENTS/PUBLICATIONS/ELECTRICITY/2010/Balancing%20report_approved%2016th%20ECRB.pdf.

⁶ The so-called "8th Region for Capacity Allocation and Congestion Management" goes partly beyond the geographic scope of the Energy Community Contracting Parties. For details see: http://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/ELECTRICITY/Regional_Market/8th_Region.

⁷ Armenia has not been addressed for the purpose of this assessment. At the time of collecting updated information on the 2011 report's results, Armenia did not yet have the status of an Observer to the Energy Community.

3. BALANCING SCHEMES IN THE ENERGY COMMUNITY CONTRACTING PARTIES

This section brings the main characteristics of provision of balancing services and describes the main characteristics of existing balancing schemes in the Contracting Parties of the Energy Community.

3.1 BALANCING SERVICES IN THE CONTRACTING PARTIES OF THE ENERGY COMMUNITY

3.1.1 Definition of balancing energy

Lack of harmonization related to balancing could be in a first step easily demonstrated by a comparison of the various definitions for balancing energy in the 8th Region. In particular the different approaches for counting activation of reserve as balancing energy makes it difficult to compare the regimes.

The table below shows the various definitions for balancing energy used in the Energy Community.

Table 1: Definition of Balancing Energy

		AL	BiH	HR	FYRoM	MD	MN	SRB	UNMIK	UA	TR	SI	RO
Energy purchased or sold by the TSO to balance the whole system				X			X	X					X
Imbalances of individual market participants			X	X	X	X			-	X	X	X	
Activation of reserve is treated as balancing energy	1ary		X		X				-				
	2ndary		X		X			X	X				X
	3ary		X		X		X	X	X	X	X	X ⁸	X

3.1.2 Rules for the provision of balancing energy

The provision of balancing energy for primary reserve is in all jurisdictions mandatory. For the other time horizons (secondary, tertiary) various approaches are used. Some countries are using a mandatory approach also for secondary and tertiary reserve while others are using public tendering or a bilateral market approach. A concrete methodology for the provision of balancing energy has so far not been adopted in FYR of Macedonia, UNMIK, Montenegro, Serbia and Slovenia.

⁸ The TSO can, until a balancing market is established, buy energy on the market or activate tertiary reserve depending on availability and prices.

The following table illustrates the methodologies for providing balancing energy.

Table 2: Provision of Balancing Energy in the 8th Region

	AL	BiH	HR	FYROM	MD	MN	SRB	UNMIK	UA	TR	SI	RO
Primary Reserve		mandatory	mandatory	mandatory	mandatory	Mandatory/bilateral	Mandatory/bilateral	mandatory	mandatory	mandatory	mandatory	mandatory
Secondary reserve		mandatory	mandatory	mandatory	mandatory	Mandatory/bilateral	Mandatory/bilateral	bilateral	Secondary reserve is provided by on HPP company	auction	auction	Bilateral/auction
Tertiary Reserve		mandatory	mandatory	Mandatory/public tender	mandatory	Mandatory/bilateral	Mandatory/bilateral	bilateral	Organized market	Organized market	auction	Bilateral/auction

3.1.3 Timeframes for providing reserve

Different from the general principles for providing balancing energy, which are not harmonized, the time horizons for provided reserve are more streamlined. The time horizon for provided reserve for all Contracting Parties - except for Moldova, Ukraine and UNMIK – is one year. Turkey is using one hour timeslots for providing reserve energy.

The following table provides an overview about the time frames in use.

Table 3: Timeframes for providing reserve energy

	AL	BiH	HR	FYROM	MD	MN	SRB	UNMIK	UA	TR	SI	RO
Primary Reserve		year	year	year	week	year	year	Mandatory continuously	continuously	hourly	Mandatory continuously	Mandatory continuously
Secondary Reserve		year	year	year	week	year	year	year	year	hourly	2 years	Several days to months
Tertiary Reserve		year	year	year tender	week	year	year	year	day	hourly	auction	Several days to months

3.1.4 Suppliers of reserve capacity

In theory there are several options for supplying balancing energy. It is obvious that generators in all countries play a key role when it comes to the supply with balancing energy. However also other options are possible and used in the 8th region. In this respect some Contracting Parties foresee a supply function also for large consumers and trading companies.

Table 4: Suppliers of reserve capacity

	AL	BiH	HR	FYROM	MD	MN	SRB	UNMIK	UA	TR	SI	RO
Generators		X		X	X	X	X	X	X	X	X	X
Incumbent generator			X				X					
Large Consumers						X				X	X	X
Electricity Trading Companies											X	
Others							X	TSO of Serbia	Load shedding in emergency cases			

3.1.5 Payment for reserve activation

The methodologies for the payment for activation of reserve energy are directly linked to the regimes for providing balancing energy. In this respect there is, in cases where the provision of balancing energy is mandatory, also no remuneration for the activation of balancing energy but related costs are included in the electricity price. In countries with a more or less developed market for balancing energy the price is set by auctions or via a tender procedure.

The table below shows the methodologies for payment in case of reserve activation

Table 5: Payment for reserve activation

		AL	BiH	HR	FYROM	MD	MN	SRB	UNMIK	UA	TR	SI	RO
1ary reserve	No remuneration		X		X	No separate remuneration but all the costs are included in the price of electricity	X		X			X	X
	Regulated price			X				X		X	X		
	Bilaterally agreed												
	Pay as bid												
	Marginal price												
2ndary reserve	No remuneration				X	No separate remuneration but all the costs are included in the price of electricity							
	Regulated price		X	X			X	X		X			
	Bilaterally agreed								X				
	Pay as bid										X		
	Marginal price											X	X
Tertiary reserve	No remuneration				X	No separate remuneration but all the costs are included in the price of electricity			X				
	Regulated price		X	X			X	X					
	Bilaterally agreed												
	Pay as bid									X			
	Marginal price										X	X	X

Another topic to be carefully looked at is the coverage of payments for reserve activation. Some Contracting Parties cover these payments via the transmission tariff, while others use a special tariff for this purpose. Also, there are differences as regards the target group for these tariffs.

Table 6: Coverage of payments for reserve activation via transmission tariff

	AL	BiH	HR	FYROM	MD	MN	SRB	UNMIK	UA	TR	SI	RO
Payment for reserve IS included in transmission tariff			X	X		For all users	X	All generators and public supplier are charged	X		For consumers ⁹	X
Payment for reserve IS NOT included in transmission tariff		Separate tariff for ancillary services for eligible customers connected directly to the transmission grid			X					X		Separate tariff applied to suppliers proportioned with each supplier consumption corresponding to all kinds of customers.

3.1.6 Role of regulators

In most of the investigated cases regulators play an important role when it comes to the definition of the framework for balancing. Thus in all jurisdictions, except for Slovenia, the law foresees the responsibility of the regulator to define the methodology for the provision of balancing services. In Slovenia, as the only exception, this responsibility is with the market operator.

⁹ The NRA plans to impose these charges also to generators. This would, however, require adjustments to the Energy Act.

Table 7: Regulatory responsibility in balancing matters

	AL	BiH	HR	FYROM	MD	MN	SRB	UNMIK	UA	TR	SI	RO
Law imposes responsibility of NRA to prescribe methodology for provision of balancing services		X	X	X	X	X	X ¹⁰	TSO prepare rules for balancing NRA approve		X		X
Law does not impose responsibility of NRA to prescribe methodology for provision of balancing services									X		Responsibility is with the market operator	

In order to ensure the proper functioning of the balancing market, regulators are in many jurisdictions tasked to monitor the market. In several cases, also the network operators have a monitoring function related to balancing.

Table 8: Monitoring of reserve capacity availability

				AL	BiH	HR	FYROM	MD	MN	SRB	UNMIK	UA	TR	SI	RO
Obligation to monitor reserve capacity availability imposed by law	NO					X		X				X			
	YES	Who performs monitoring			NRA		NRA	TSO	TSO, NRA	TSO, NRA	NRA		TSO, NRA, Market Operator	TSO	TSO
		Are the findings of the monitoring body publicly available?	Y			X		X		X	X	X		X	X
		N													

3.1.7 Penalties for providers not maintaining reserve capacity

Penalties for providers not maintaining reserve capacity are foreseen only in Montenegro, Turkey, Slovenia and Romania.

¹⁰ Methodology will be part of the market rules (to be developed by the TSO and approved by the regulator)

3.1.8 Balancing for Renewable Energy Sources (RES)

In principle, all Contracting Parties - except for Moldova - implemented mechanisms to cover the imbalances costs caused by RES. In most of the Contracting Parties producers of RES do not have balance responsibility but the balance responsibility lies with other participants, such as the incumbent suppliers. In Turkey producers of RES can choose, whether they want to be entitled for receiving a higher RES tariff but act as balance responsible party or prefer to deliver at a standard feed in tariff without balance responsibility.

3.2 ALBANIA

The following table provides an overview on the balancing status and model in Albania.

Table 9: Overview of balancing market in Albania

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	N/A ¹¹	100.000	110.000	
Responsible for preparing legal framework	Regulator			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	TSO			
Responsible for Market Monitoring	Regulator			

3.2.1 Legal Basis

The Albanian Energy Law defines the general market model and stipulates that detailed balancing rules have to be set by the regulatory authority (ERE) after consultation with the Transmission System Operator (OST).

¹¹ For the purpose of this report "N/A" shall mean "not available". Non-availability of data is to a prevailing extent reasoned by a balancing market not existing in the specific jurisdiction.

3.2.2 Balancing Model

Following the latest amendments in the Power Sector Law - which created the possibility of market opening for the subjects connected to the transmission grid 110 kV and above, as well as for big customers with an annual consumption above 50 million kWh – the Albanian Energy Regulator on February 24th 2012 amended the Market Rules on Electricity for the imbalances created from the participants in this market.

Based on these amendments the authority in charge for securing the imbalances shall be the Public Generation Company KESH Sh.a., having in mind the low generation cost from hydro resources.

The rules foresee the calculation of balancing energy in both directions (positive and negative) and the limits for imbalances allowed for exchange that shall be in the value +/- 5%.

To calculate the negative imbalances it is foreseen that the price exceeding the allowed limit shall be calculated in the value 10% above the import price, while for positive imbalances the price calculation shall be the equal to the sale price for the Wholesale Public Supplier.

These rules have a 6 months deadline which shall serve as a testing period for the functioning of the balancing market.

3.2.3 Treatment of renewables

The regulator is authorized to grant the status of **privileged producers** to producers generating electric power using renewable energy sources with an installed capacity of less than 25 MW and in case of using a hydroelectric energy source up to 10 MW. These privileged producers enjoy a prioritized treatment by the TSO when dispatching the generated electric power. KESH – Gen can become a Balance Responsible Party for such privileged producers by overtaking financial responsibility for the net imbalance of any market participant.

3.2.4 Monitoring

In theory compliance with the balancing rules is monitored by the regulatory authority. The TSO is responsible for the collection of required data. However, the process of monitoring will in praxis only start, once a balancing market has been established.

3.3 BOSNIA AND HERZEGOVINA

The following table provides an overview on the balancing status and model in Bosnia and Herzegovina.

Table 10: Overview of balancing market in Bosnia and Herzegovina

Requested Balancing Energy [MWh]	2007	2008	2009	2010
Responsible for preparing legal framework	N/A	N/A	N/A	N/A
Responsible for Balancing	ISO			
Responsible for Balancing Market Operation	ISO			
Responsible for Market Monitoring	Regulator			

3.3.1 Legal Basis

In Bosnia and Herzegovina the Energy Law only defines a general market model and stipulates that the detailed balancing rules have to be set by the Independent System Operator (ISO) and approved by the regulatory authority.

3.3.2 Balancing Model

The Balancing Model is based on **Balance Responsible Parties** acting on a common balancing market which is operated by the ISO. According to the market rules, a Balance Responsible Party is a market participant that overtakes financial responsibility for the net imbalance (balancing generation, consumption and exchange) or for the net imbalance of a group of market participants, including balancing of its own activities. At the present stage of market opening, the only Balance Responsible Parties are the incumbent power utilities.

Balancing energy is exclusively provided by the three incumbent power utilities. According to the grid code, there is an obligation for power generators to provide balancing energy. Ancillary service and balancing energy providers are pre- defined on annual basis by decision of the regulator.

The ISO is entitled to use balancing energy from domestic production as well as energy from **abroad**. When using balancing energy from abroad, an explicit allocation for cross border capacity based on clearing price approach takes place. In addition it is possible to use residual capacity for balancing purposes or to use capacity within the Transmission Reliability Margin.

3.3.3 Treatment of renewables

There are no special regulations concerning balancing of renewable energy sources.

3.3.4 Monitoring

Compliance with the balancing rules is monitored by the regulatory authority. The ISO is responsible for the collection of required data (monthly reports).

3.4 CROATIA

The following table provides an overview on the balancing status and model in Croatia.

Table 11: Overview of balancing market in Croatia

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	N/A	N/A	N/A	N/A
Responsible for preparing legal framework	Market Operator/TSO/NRA			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	Market Operator			
Responsible for Market Monitoring	Market Operator/NRA			

3.4.1 Legal Basis

Croatian legislation does not define a balancing model but requires secondary legislation on balancing to be developed. More precisely, legislation requires that

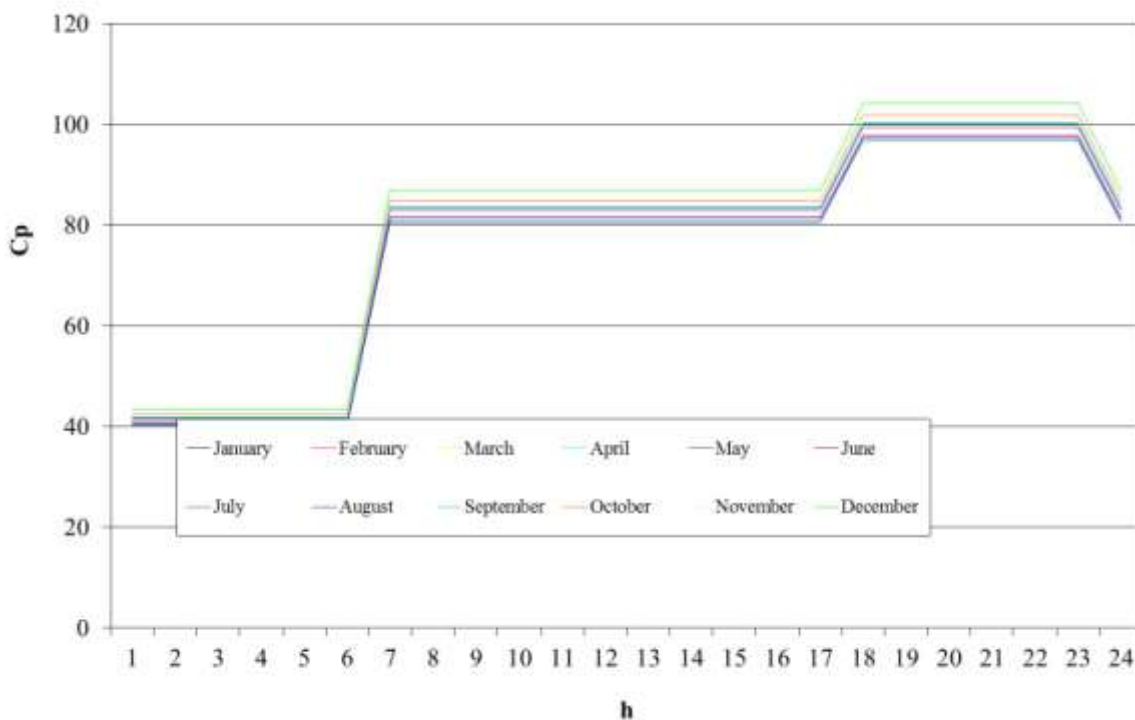
- electricity market rules
- rules on balancing the electric power system
- rules on the methodology on providing balancing energy services

have to be **elaborated by the Market Operator**, HEP-OPS and **approved by the regulator** (HERA).

3.4.2 Balancing model

The Croatian TSO (HEP-OPS) is responsible for balancing. Balancing energy is **exclusively provided** by the incumbent generator (HEP GENERATION). This exclusivity is defined in the *Rules On Balancing The Electric Power System* and the *Methodology On Providing Balancing Energy Services In The Electric Power System*.

Table 12: Prices for balancing energy(price for positive imbalances) in 2010 in Croatia (EUR/MW)



3.4.3 Treatment of renewables

Legislation foresees **special treatment** for balancing energy produced from renewable energy sources together with a special tariff for electricity produced from renewables. The TSO has the obligation to act as Balance Responsible Party for renewable energy.

3.4.4 Monitoring

Compliance with the balancing rules is monitored by the Market Operator (HROTE).

3.5 FORMER YUGOSLAV REPUBLIC OF MACEDONIA

The following table provides an overview on the balancing status and model in the Former Yugoslav Republic of Macedonia.

Table 13: Overview of balancing market in FYR of Macedonia

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	N/A	75.912	29.858	
Responsible for preparing legal framework	Market Operator and Regulator			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	Market Operator			
Responsible for Market Monitoring	Regulator			

3.5.1 Legal basis

The Energy Law defines a general market model and provides that detailed balancing rules have to be **defined in the Electricity Market Code**. The Electricity Market Code has to be adopted by the regulator in cooperation with the Electricity Market Operator.

ERC held a public debate regarding the draft version of the Electricity Market Code on 16 December 2011. The Code is expected to be adopted in the first half of 2012.

3.5.2 Balancing model

The TSO (MEPSO) is responsible for balancing the electricity. According to the law, balancing energy is **exclusively provided** by the regulated generation company until 31 December 2014. There is no obligation for other generators to provide balancing energy. As of 1 January 2015, the TSO will – according to the Electricity Market Code - have to purchase ancillary services and relevant operational reserves under market based conditions and in a transparent, non-discriminatory and competitive way.

The timeframe for **imbalance settlement** is 1 week. The **price** for balancing energy in 2009 added up to 67,5 €/MWh, in 2010 added up to 56,2€/MWh.

The balancing market is operated by the Electricity Market Operator. The balancing market organization is based on balancing groups. Such balancing groups can be formed either by a number of or a single

electricity market participant. Appropriate metering as well as financial guarantees for each member of the balancing group are required.

It is not foreseen to use balancing energy from **abroad**, although It is allowed by legislation, but it is not practiced.

3.5.3 Treatment of renewables

Legislation includes **special rules** concerning balancing for renewable energy sources. Generators that use renewable energy sources with an installed capacity below 1MW are not allowed to act as Balancing Responsible Parties. Suppliers of tariff consumers are obliged to act as Balancing Responsible Party for renewable energy sources.

3.5.4 Monitoring

Compliance with the balancing rules is monitored by the **regulatory authority** on monthly basis.

3.6 MOLDOVA

The following table provides an overview on the balancing status and model in Moldova.

Table 14: Overview of balancing market in Moldova

	2007	2008	2009	2010
Requested Balancing Energy [MWh]	N/A	N/A	21.94	53.83
Responsible for preparing legal framework	Regulator			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	TSO			
Responsible for Market Monitoring	Regulator			

3.6.1 Legal basis

In Moldova the **Electricity Act** defines the general market model and stipulates that detailed balancing rules have to be set by the regulator after consultation with the TSO.

3.6.2 Balancing model

According to the market rules, distribution network operators and eligible customers have to sign **contracts** for procurement of balancing electricity after bilateral negotiations.

The producer or supplier of electricity is chosen from those entities that have possibility to provide balancing electricity after reaching an agreement about the price for balancing electricity. In principle, it is possible to use balancing energy from abroad. The duration of the contract depends on negotiations.

3.6.3 Monitoring

Compliance with the balancing rules is monitored by the **regulatory authority**. The TSO is responsible for the collection of required data.

3.7 SERBIA

The following table provides an overview on the balancing status and model in Serbia.

Table 15: Overview of balancing market in Serbia

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	N/A	N/A	N/A	N/A
Responsible for preparing legal framework	TSO and Regulator			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	TSO			
Responsible for Market Monitoring	Regulator			

3.7.1 Legal basis

In Serbia the **Electricity Act** defines the balancing market as the market organized and administrated by the TSO, on which the TSO purchases and sells energy from market participants in order to balance and ensure the safe operation of the system. The detailed balancing rules will be part of market rules set by the TSO and approved by the regulator¹².

3.7.2 Balancing Model

The Serbian TSO (PE EMS) is performing all balancing services and activates tertiary reserve using a merit order list, defined by PE EPS in advance. In emergency cases it is possible to use balancing energy from neighbouring TSOs by using “residual” capacity. The activation of tertiary reserve is executed per minute, but the timeframe for imbalance settlement is 1 hour.

All generators are obliged to offer (upon request of the TSO and at a regulated price) all available capacity for balancing according to technical parameters and conditions set in the **Electricity Act and Grid Code**.

¹² The TSO has the obligation to submit the draft Market Rules to the Regulator by May 2012.

Balancing energy is purchased by **advance contract after bilateral negotiations**. The incumbent (PE EPS) is hereby contracting in the name and for the account of the five generating companies that are part of PE EPS's company holding. It is worth noting that the relevant contract is related to the provision of balancing reserve but not to the provision of balancing energy. Contracts are negotiated for the duration of 1 year.

Balancing energy prices shall be regulated as defined in market rules. Prices for system services (primary and secondary regulation, tertiary reserve) are determined by the regulator¹³.

3.7.3 Treatment of Renewables

There are two governmental decrees dealing with renewable Energy Sources and Balancing:

- Decree On Conditions For Obtaining The Status Of Privileged Generator And Criteria For Assessing The Fulfilment Of These Conditions¹⁴
- Decree On Incentive Measures For Generation From RES And Combined Heat And Power Generation¹⁵

However, there is no special tariff for balancing energy for renewable energy sources. The public supplier¹⁶ is the balancing responsible party for renewable energy generators.

3.7.4 Monitoring

Compliance with the balancing rules is monitored by the regulatory authority. The TSO is responsible for the collection of required data on continuous basis.

¹³ The new prices for system services in accordance with the new Energy Act, have to be passed by August 2012.

¹⁴ Official Gazette of the Republic of Serbia" No. 72/2009.

¹⁵ Official Gazette of the Republic of Serbia" No. 99/2009.

¹⁶ The public supplier shall be designated by October 1st, 2012 the latest.

3.8 UKRAINE

The following table provides an overview on the balancing status and model in the Ukraine.

Table 16: Overview of balancing market in the Ukraine

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	N/A	N/A	N/A	N/A
Responsible for preparing legal framework	Ministry of Energy and Coal Industry, National electricity regulatory commission of Ukraine (NERC), SE NEC “Ukrenergo”, SE “Energorynok”			
Responsible for Balancing	SE NEC “Ukrenergo” (physical balancing)			
Responsible for Balancing Market Operation	SE NEC “Ukrenergo” (physical balancing), SE “Energorynok” (financial settlement)			
Responsible for Market Monitoring	NERC SE “Energorynok”			

3.8.1 Legal basis

Balancing is legally covered by the

- Ukrainian Electricity Law
- Wholesale electricity market rules¹⁷

The Ukrainian Electricity Law foresees the development of wholesale electricity market rules (WEM rules). The WEM rules were to be developed by market participants and approved by the regulatory authority (NERC), the Antimonopoly Committee and the Ministry of Energy and Coal Industry. Balancing rules are part of the WEM rules.

3.8.2 Balancing model

The Ukrainian wholesale electricity market is organized as a mandatory electricity pool (single buyer model). SE “Energorynok” operates as Market Operator and single buyer and executes scheduling for all generation companies on a day ahead basis.

¹⁷ Annex to the Agreement between the members of the Wholesale Electricity Market of Ukraine.

Those electricity producers selling electricity to SE "Energorynok" at the tariffs established by the regulator (i.e. NPPs, HPPs and most of the CHPs), submit planned schedules for their generation units. The schedules need to be fully included in the system schedule to the extent there are no technological restrictions.

Those electricity producers bidding on the market, submit information regarding operating capacity of their generation units and relative bid prices. Units with the lowest average weighed price of production for the relevant day are included in the system schedule.

Hydroelectric power stations submit to SE "Energorynok" only information about their operating capacity. NEC "Ukrenergo" (system operator) provides to SE "Energorynok" daily volumes of water utilization and daily volumes of electricity generated from hydroelectric power stations. SE "Energorynok" allocates these quantities within the time hours according to the principle cheaper for whole power system.

NEC "Ukrenergo" submits to SE "Energorynok" requirements on operational conditions for certain generating units.

NEC "Ukrenergo" ensures fulfilment of the schedule calculated by SE "Energorynok". Unplanned deviation from the approved schedule (accidental disconnection of equipment or a change in consumption of electricity) are compensated according to the merit order of units for start-up, list of units for up-load and down-load regulation, which are made up in advance by the relevant command of dispatchers at NEC "Ukrenergo".

According to the Ukrainian legislation, NEC "Ukrenergo" does not have the right of trading electricity – thus it does not trade balancing energy.

SE "Energorynok" calculates the payments for overproduction and underproduction one day after end of supply. These payments compensate the additional costs of generation companies arising as a result of deviation from the schedule by a command of dispatcher.

3.8.3 Treatment of renewables

Producers from RES are responsible for scheduling their supplies but are not responsible for deviations from planned schedules. Payments are calculated based on the producers actual electricity production from RES.

3.8.4 Monitoring

Market monitoring is carrying out by NERC and SE "Energorynok". Energorynok calculates the control bid price and monitors prices

3.9 UNMIK

The following table provides an overview on the balancing status and model in UNMIK.

Table 17: Overview of balancing market in UNMIK

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	N/A	N/A	N/A	N/A
Responsible for preparing legal framework	Prepared by the TSO and approved by the regulatory authority			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	TSO			
Responsible for Market Monitoring	Energy Regulatory Office, Competition Authority			

3.9.1 Legal basis

The balancing rules have to be defined by secondary legislation: balancing rules should be prepared by the TSO and approved by the regulator.

3.9.2 Balancing model

According to the Grid Code and market rules, the TSO is responsible for balancing. Balancing energy is exclusively provided by the TSO. Currently KEK JSC, as the only active supplier, is responsible for balancing following the instructions of the TSO. Due to the lack of generation and import, KEK JSC applies load shedding. The exclusive provider is defined in the transitional market rules. There is no legal obligation for generation companies to provide balancing energy.

Given that a balancing market in practices is not operational, penalties and imbalance charges are not in place yet. However, the introduction of penalties in the market rules is under discussion.

Legally, there is no limitation for using balancing energy from abroad.

3.9.3 Treatment of renewables

Rules related to renewable energy sources are approved. These rules determine the responsibilities regarding the balancing.

3.9.4 Monitoring

In theory¹⁸ compliance with the balancing rules is monitored by the **regulatory authority**. The TSO is responsible for data collection.

4. BALANCING SCHEMES IN SELECTED ENERGY COMMUNITY PARTICIPANT COUNTRIES

This section summarizes the state of play regarding balancing schemes in the neighboring Participant Countries of the Energy Community: Greece, Hungary, Italy and Romania.

4.1 GREECE

The following table provides an overview on the balancing status and model in Greece.

Table 18: Overview of balancing market in Greece

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	N/A	N/A	N/A	249.784 MWh ¹⁹
Responsible for preparing legal framework	Prepared by the TSO and approved by the regulator			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	TSO			
Responsible for Market Monitoring	TSO, Regulator			

¹⁸ A balancing market in praxi is not operational.

¹⁹ Equal to the sum of the generation and import imbalance energy. Referring to the period October – December 2010.

4.1.1 Legal basis

The Energy Law defines the general market model and stipulates that detailed balancing rules have to be set in the Grid and Market Operation Code, prepared by the TSO and approved by the regulator. In this respect, the law refers to a balancing settlement mechanism where imbalance payments are based on common rules for all market participants in a way that incentivizes generators to be available and follow the dispatch instructions of the TSO. Imbalance charges should follow the “causer pays” principle.

4.1.2 Balancing model²⁰

The Greek **TSO** (HTSO / DESMIE) is responsible for balancing. Balancing is not performed through a separate balancing market, but as an extension of the day ahead market²¹ through the Imbalance Settlement Mechanism, according to the following rules:

- All imbalances – referring to the differences between the day-ahead schedule and the real production or withdrawal of electricity – are settled through the Imbalance Settlement Mechanism.
- The timeframe for the imbalance settlement is 1 hour.
- During real-time operation, balancing energy is provided by the responsible body following a market based approach that is based on the economic merit order of offers submitted by committed units on the day-ahead market.
- As soon as the relevant meter measurements are available, the imbalances are settled according to the following rule: each imbalanced party pays or receives an amount, depending on whether it injected or withdrew energy from the system, equal to the product of the ex-post clearing price and its imbalance quantity.
- The ex-post clearing price results from the re-run of the day-ahead scheduling algorithm under the realized values of the stochastic variables and corresponds to the “Market Clearing Price” (i.e. uniform price).
- Moreover, a cost recovery mechanism has been included, aiming to ensure that generators will receive at least their marginal cost whenever they operate. The aim of the imbalance mechanism methodology is to minimize the total cost of system operation by giving the proper incentives for “proper behavior” to the market participants.

The Balancing Settlement is **performed by the TSO**. Under certain circumstances (emergency cases) it is possible to use balancing energy from abroad by using the residual capacity of interconnectors.

²⁰ As of 30 September 2010.

²¹ Participation at the wholesale market is mandatory and thus all energy injected to and withdrawn from the system by market participants – producers (for each of their units), suppliers, importers, exporters - must be traded on the day ahead market.

4.1.3 Treatment of renewables

There are no special regulations concerning balancing for renewable energy sources.

4.1.4 Monitoring

Compliance with the balancing rules is monitored by the Regulatory Authority. The TSO is responsible for the collection of the required data and the operation of the market according to the Code.

4.2 HUNGARY

The following table provides an overview on the balancing status and model in Hungary.

Table 19: Overview of balancing market in Hungary

	2007	2008	2009	2010
Requested Balancing Energy [MWh]	N/A	N/A	N/A	N/A
Responsible for preparing legal framework	TSO			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	TSO			
Responsible for Market Monitoring	Regulator			

4.2.1 Legal basis

The Hungarian Energy Law defines the general market model and stipulates that detailed balancing rules have to be set by the TSO and approved by the regulator.

4.2.2 Balancing model

The Hungarian **TSO** (MAVIR) is responsible for balancing and operates also the balancing market. The balancing market is based on a **balancing group model**. The establishment of a balancing group requires a contract with the TSO. Leader of a balancing group could be any market participant. The Electricity Act foresees an obligation for generators to provide balancing energy.

The timeframe for imbalance settlement is 1/4h hour. The prices for balancing energy differ for each timeframe and they are calculated following a cost based approach.

Balancing energy is purchased via auctions²² and advance contract²³, whereby advance contracts are only used for short term demand. It is also possible to use balancing energy from abroad provided that the necessary transmission capacity has been allocated via an auction²⁴ or by capacity reservation in advance.

4.2.3 Monitoring

Compliance with the balancing rules is monitored by the **regulatory authority**. The ISO is responsible for the collection of required data (monthly reports).

4.3 ITALY

The following table provides an overview on the balancing status and model in Italy.

Table 20: Overview of balancing market in Italy

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	1.000.000	1.000.000	1.000.000	
Responsible for preparing legal framework	Ministry of Energy			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	Market Operator (GME)			
Responsible for Market Monitoring	Regulator			

4.3.1 Legal basis

The Italian Law defines the general market model and stipulates that detailed balancing rules have to be set by the TSO and approved by the regulator.

²² The "Pay as Bid" methodology is used for price determination.

²³ Following a tender procedure a contract with a third party is concluded in advance for exclusive provision of balancing energy for one calendar year.

²⁴ The "Pay as Bid" methodology is used for price determination.

4.3.2 Balancing model

The **TSO** (TERNA) is responsible for balancing and acquires the balancing energy on the balancing market (*Mercato di Bilanciamento*) that is managed by GME as Market Operator.

- The allocation of balancing energy takes place based on auctions²⁵ or advance contract²⁶, whereby advance contracts are only used for short time demand.
- The balancing market concept is based on balancing groups consisting of small generators (<10 MVA) per market zone and customers per market zone.
- The timeframe for imbalance settlement is 1 hour. Penalties for not fulfilling schedules exist.
- It is also possible to use balancing energy from abroad by using the Transmission Reliability Margin (TRM).

4.3.3 Treatment of renewables

In Italy there is a special tariff for balancing energy from renewable energy sources. Furthermore it is possible that RES generators decide that GSE acts as their balancing responsible party.

4.3.4 Monitoring

The compliance with the balancing rules is monitored by the regulatory authority. The TSO is responsible for the collection of required data.

²⁵ The “Pay as Bid” methodology is used for price determination.

²⁶ A contract with a third party is concluded in advance on monthly or yearly basis for exclusive provision of balancing energy.

4.4 ROMANIA

The following table provides an overview on the balancing status and model in Romania.

Table 21: Overview of balancing market in Romania

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	3.492.000	3.546.000	3.206.000	2.965.000
Responsible for preparing legal framework	Regulatory Authority (ANRE)			
Responsible for Balancing	TSO (Transelectrica SA)			
Responsible for Balancing Market Operation	TSO (Transelectrica SA) and Market Operator OPCOM SA for BM settlement			
Responsible for Market Monitoring	TSO (Transelectrica SA) & Regulatory Authority (ANRE)			

4.4.1 Legal basis

In Romania, the Energy Law does not define the balancing market model; therefore it requires secondary legislation in order to set the balancing rules which are done in the so-called *Commercial Code* (approved in 2004 by the Regulatory Authority – ANRE).

4.4.2 Balancing model

According to the Commercial Code²⁷ the **TSO is responsible** for balancing. The TSO also acts as Balancing Market Operator, responsible for the registration of balancing market participants, for collecting and verification of offers and for calculating the quantities necessary for the settlement of transaction afferent to the balancing market.

Balancing energy is provided via auctions and the price determination is balancing marginal price for secondary regulation and pay-as-bid for fast and slow tertiary regulation.

All generators have the obligation to participate in the central balancing market²⁸ that includes all Balancing Responsible Parties consisting of dispatchable units of producers and suppliers of consumers. Balancing Responsible Parties may form a balancing group if the forecast of annual production does not

²⁷ Commercial Code, Section 10

²⁸ Commercial Code, chapter 3.4.

exceed 30% of net injected electricity of the previous and/ or if the forecast for annual consumption does not exceeds 30% of net consumption of the previous year²⁹.

4.4.3 Treatment of renewables

Currently there is no special regulation concerning balancing for renewable energy sources.

4.4.4 Monitoring

The compliance with the balancing rules is monitored by TSO. The monitoring unit organized within TSO is responsible for the collection of required data while the Regulatory Authority supervises the monitoring activity of TSO on balancing market.

4.5 SLOVENIA

The following table provides an overview on the balancing status and model in Slovenia.

Table 22: Overview of balancing market in Slovenia

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	142.883	171.646	163.879	
Responsible for preparing legal framework	Market Operator			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	Market Operator			
Responsible for Market Monitoring	Regulator			

²⁹ ANRE order no. 36/2005.

4.5.1 Legal balancing

Slovenian legislation does not define the balancing model but requires them to be developed by secondary legislation that foresees that the *Rules on Balancing Market* have to be developed by the Market Operator after consultation with the TSO and are finally approved by the regulator.

The Grid Code defines that the TSO has to provide balancing energy by:

- purchase or sale at the balancing market once established;
- purchase or sale of electricity in Slovenian or foreign markets until the balancing market has been established; or
- activation of contracted reserve for tertiary control.

In praxis balancing rules have **not been proposed yet**. Therefore, for the time being only the second and the third option apply. Due to the relatively small Slovenian market and only two active players, implementation of balancing market on national level is difficult. A solution might be broader regional balancing market.

4.5.2 Balancing model

According to Slovenian legislation the TSO (ELES) is responsible for balancing. It is envisaged that the Market Operator will operate the Balancing Market once established.

- The market organization is based on balancing groups. For the establishment of a balancing group the submission of an application to the Market Operator and fulfilment of all required conditions is mandatory. Anybody who fulfils the criteria published at the Market Operator's homepage³⁰ could lead a balancing group. The leader of a balancing group also acts as Balancing Responsible Party of this group.
- No Slovenian license or branch office registered in Slovenia is needed.
- There is no legal obligation for generators to provide balancing energy, except the participation of units larger than 10 MW in primary frequency control.

According to the market rules a balancing party failing to fulfil the schedules pays additional costs for the imbalanced energy, or receives lower payment for the energy supplied above the schedules. The Market Operator is responsible for calculation of these payments – on the basis of data supplied by the TSO – as well as for the whole settlement procedures in this process.

Deviations from the schedules are calculated on a 15-minute basis but are penalised on hourly basis since the schedules are also given on the hourly basis.

³⁰ www.borzen.si.

Balancing energy is paid by the TSO on the basis of various arrangements, as described in chapter 3.5.1. Prices are not publicly known.

Balancing energy is provided by advance contract concluded on a basis of a tender for tertiary reserve from the sources outside and inside Slovenia.

- There are three tertiary reserve products. For the first product only potential providers with balancing sources inside Slovenia can compete, while for the other two both Slovenian and foreign providers can compete. The final provider is selected by an auction for the period of one year and there are separate auctions for all three products.
- The three tertiary reserve products – apart from the location of source in the case of the first product - deviate as regards the number of activations and the duration of each activation. The total capacity of all three products equals to the capacity of the largest generation unit in the Slovenian power system, which is half of the installed capacity of the Krško Nuclear Power Plant³¹. This is in line with the requirements of ENTSO-E Operation Handbook.

Balance groups can use balancing energy **abroad** by using capacity allocated via auctions. Reserving of capacity in advance for balancing purposes is in principle not possible. Only the TSO can use the reliability margin for using the balancing energy contracted via auctions for tertiary reserve outside the Slovenian power system.

4.5.3 Treatment of renewables

The only relevant provision regarding the treatment of renewables in the Energy Act is that the TSO has to give **priority** to energy produced from renewable energy sources and high efficient CHP facilities in dispatching. This may also include balancing, although such generation units are in principle not very suitable to be used for balancing purposes.

The Market Operator who is responsible for purchasing all energy produced from renewable energy sources and CHP produced in the national feed-in scheme. It is also Balancing Responsible Party for electricity produced in the national feed-in scheme. In practice this means that the Market Operator must accurately forecast hourly production of all power plants in the feed-in system, otherwise it is penalised for imbalances, as any other Balancing Responsible Party.

4.5.4 Monitoring

The compliance with the balancing rules is monitored by the **regulatory authority**. The Market Operator is responsible for the collection of required data upon request from the regulator.

³¹ The second half is provided by Croatia.

5. BALANCING SCHEMES IN THE ENERGY COMMUNITY OBSERVER COUNTRIES

This section describes the balancing scheme of Georgia, the only observer country that provided input to the present survey.

5.1 GEORGIA

The following table provides an overview on the balancing status and model in Georgia.

Table 23: Overview of balancing market in Georgia

Requested Balancing Energy [MWh]	2007	2008	2009	2010
	1.383.710	1.385.610	1.202.277	
Responsible for preparing legal framework	Ministry of Energy			
Responsible for Balancing	TSO			
Responsible for Balancing Market Operation	N/A			
Responsible for Market Monitoring	N/A			

5.1.1 Legal basis

Legislation foresees that balancing rules have to be defined by secondary legislation. Based on this, the Ministry of Energy has to develop rules for the electricity market.

5.1.2 Balancing model

The TSO and the Commercial System Operator are responsible for balancing. Balancing energy is purchased by **advance contract** following bilateral negotiations. Penalties for imbalance are in principle foreseen and determined according to the contract. There is also an obligation for generators to provide balancing energy.

According to the Law on Electricity and Natural Gas the System Commercial Operator is entitled to sale and purchase balancing electricity on monthly basis.

According to the legislation it is also possible to use balancing energy from **abroad**.



5.1.3 Monitoring

So far there is no procedure for monitoring.

6. SUMMARY

The analysis of the balancing regimes in the Energy Community Contracting Parties, (selected) Participant Countries and Observer Countries shows that the approaches for balancing as well as the stage of development of really functional and transparent balancing markets **vary** within the 8th Region and are in most cases linked to the overall state of development of the electricity market.

Two characteristic groups can be identified:

- Contracting Parties and Observer Countries are all characterized by relatively small size and by existence of dominant incumbent generation companies. Balancing models in these markets are in almost all cases non market based with only one balance service provider (incumbent generation company). Import of balancing energy in the majority of these countries is not allowed.
- Participant Countries that are at the same time EU Member States: some of them have real balancing markets established, while in others auctions are organised where TSOs choose providers of a part of balancing energy. Export of balancing energy in these countries is possible. An important factor also is that – with the exception of Slovenia - these markets are relatively large and have various types of generation facilities.

More in detail the analysis of the **Contracting Parties** shows the following:

- In two Contracting Parties - Serbia and the Former Yugoslav Republic of Macedonia - no legislation on balancing is in place so far at all.
- In all other Contracting Parties legislation on balancing exists and secondary legislation also covers balancing issues. The approaches chosen, however, largely vary – this already starts with the fact that the responsibility for designing balancing rules is allocated to different bodies – be it the regulator, Transmission System Operator (TSO)/Independent System Operator (ISO) or the Market Operator – in the single jurisdictions. This – to some extent – also explains the variety of different balancing mechanisms.
- TSOs or ISOs are in all countries responsible for balancing, as it is one of their core activities. In countries where Market Operators exist, they are as a rule responsible for running balancing market or at least clearing and settlement of imbalances.
- Although most of the Contracting Parties have foreseen already a more or less open balancing scheme - including balancing groups - the market in reality is still dominated by the incumbent generation companies, them being the only players having enough capacity for performing balancing and cross border exchanges in most cases being forbidden or at least limited. In several Contracting Parties this prioritized position of the incumbent has been even fixed within the legal framework.
- Most transactions related to balancing are made according to bilateral contracts between the - in most cases state owned - incumbent Generation Company and the TSO following bilateral negotiations. These bilateral negotiations per se limit transparency, market orientation of prices and create a barrier towards a functioning and open balancing market.

- Suboptimal functioning of the market is also related to the relatively small size of the Contracting Parties compared to other countries in the region like Romania or Italy.
- As renewable energy sources play an important role in the development plans of the Contracting Parties and having in mind their influence on grid balancing, secondary legislation in most several cases foresees special regimes for the prioritized treatment of electricity produced from renewable Energy Sources also as regards balancing. It seems likely that the integration of higher quantities of renewable energy will require stronger integration of balancing regimes.
- Although several Contracting Parties in principle allow the import of balancing energy from abroad - which is a precondition for regional balancing integration - this option is rarely used in reality. An exemption is Moldova which is importing the biggest share of its balancing energy from Ukraine.
- As regards the role of the Regulatory Authorities it is fair to say that they have in most of the Contracting Parties an important role in the process of establishing and monitoring the balancing mechanism. Only in Croatia the Market Operator has the monitoring function concerning balancing.

The picture is different for the **Participant Countries**. The analysis of the received data shows that these countries are as regards balancing mechanisms more advanced than the Contracting Parties. This is, however, also linked to the bigger size of the countries, the larger market size of independent power producers and their capability to provide balancing energy.

Experience from Slovenia shows that there is a close relation between market size and the possibility to implement a market based balancing scheme. Thus it has been suggested that a regional balancing market could be a suitable solution for smaller countries to overcome the problem of limited market liquidity.

It has to be stressed that electricity markets in the EC Contracted Parties are still in the establishing phase and have not yet achieved the final and desired status. This means that in many cases balancing markets are **not the first priority** there, although well designed and successfully operating balancing market is one of the prerequisites for well functioning liberalized wholesale and retail market.

7. CONCLUSIONS AND RECOMMENDATIONS

Balancing markets in the 8th region are still in the development phase. Due to the small sizes of the markets, balancing within their own power system is difficult and more expensive than it could be if balancing markets of these countries are integrated. The small size of these power systems often results in very expensive contracting of necessary reserve capacities (Tertiary Reserve) which - according to the ENTSO-E Operation Handbook - have to cover an outage of the largest generation unit in the national system/control area. If a system is small with at least one large generation unit, the necessary reserve capacities likewise large. Since the cost of providing reserve capacities are covered through network tariffs, electricity in such countries is more expensive for the customers than it could be if balancing markets were integrated with common provision of necessary reserve capacities.

RECOMMENDATION: Considerations on an **adjustment of the ENTSO-E Operation Handbook requirements related to necessary reserve capacities** should be started in close cooperation of regulators, TSOs and ENTSO-E with a view to enable contracting of reserve capacities for tertiary control in wider areas than Control Areas. Control Blocks or larger areas could be an appropriate solution. The proposal will need be further elaborated and discussed before being officially put forward.

In 2009 the European Regulators Group for Electricity and Gas (EREG) published Revised Guidelines of Good Practice (GGP) for Electricity Balancing Markets Integration. This document sets basic principles that should be observed in integrating electricity balancing markets. The document contains 14 Guidelines, i.e. principles to be followed in designing balancing markets.

RECOMMENDATION: It is recommended to **implement the EREG GGP on Electricity Balancing Markets Integration** also in the Energy Community.

For the current situation of market development in the Energy Community especially Guideline 11 is important stating:

"Full harmonization of balancing markets is not a prerequisite for cross-border balancing. Thus, in a step-wise process, cross-border balancing implementation should precede definition and implementation of a standard market design. But increased compatibility would be highly valuable and allow enhanced cross-border balancing exchanges.

Towards harmonizing national balancing markets design it is considered as a first priority to harmonize gate closure and technical characteristics of balancing services."

For the 8th Region this means that – in principle and very generally spoken – balancing markets would not necessarily have to be designed in a full harmonized way from the very beginning. Balancing markets integration could also be started by having different designs of balancing markets, although it should be

noted that very different balancing models in individual countries would make integration of these markets more difficult.

RECOMMENDATION: In a final step it is recommended to **establish a regional balancing scheme** which would definitely increase transparency and decrease costs. In any case the whole process of Regional Balancing Markets integration should be to the highest possible degree done in line with the ERGEG Guidelines of Good Practice.

Before a regional mechanism is established, either throughout whole 8th Region or in parts of it, all the countries that would like to participate in the mechanism, need to **establish national balancing mechanisms**.

Before regional balancing market becomes operational several questions, such as cross border balancing model (TSO-TSO model or TSO-Balancing Service Provider), and a number technical questions need to be solved. BETSEE Platform might serve as an important tool for the operation of Regional Balancing Market.