



Establishing the institutional set-up for organized day-ahead market in Bosnia and Herzegovina

SEEC Ltd. and MRC Consultants and Transaction Advisers

March 2018

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Establishing the Institutional Set-up for Organized Day-ahead market in Bosnia and Herzegovina

TECHNICAL REPORT

Prepared for



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TABLE OF ACRONYMS

Acronym	Definition
BiH	Bosnia and Herzegovina
BRP	Balance Responsible Parties
CACM	Capacity Allocation and Congestion Management
CROPEX	Croatian Power Exchange
DTF	Disposizioni Tecniche di Funzionamento (GME technical rules)
EC	European Commission
EnC	Energy Community
ECC	European Commodity Clearing
ENTSO-E	European Network of Transmission System Operators for Electricity
EPBiH	Elektroprivreda Bosne i Hercegovine
EPHZHB	Elektroprivreda Hrvatske Zajednice Herceg Bosne
EPRS	Elektroprivreda Republike Srpske
ESS	ENTSO-E Scheduling System
EU	European Union
GME	Gestore Mercati Energetici (Italian Market Operator and PX)
GW	Gigawatt
HPP	Hydro Power Plant
HUPX	Hungarian Power Exchange
IPP	Independent Power Producer
ISO	Independent System Operator
MoU	Memorandum of Understanding
MOFTER	The Ministry of Foreign Trade and Economic Relations of BiH
MRC	Multi-Regional Coupling
MW	Megawatt

Acronym	Definition
OKTE	Slovakian short-term electricity Market Operator
PP	Public Procurement
PX	Power Exchange
SEE CAO	South-East Europe Coordinated Auction Office
SEPEX	South East European Power Exchange
SERC	State Electricity Regulatory Commission
TPP	Thermal Power Plant
TSO	Transmission System Operator
TWh	Terawatt hours
WB6	Western Balkan 6 Countries
4MMC	4M Market Coupling (Czech, Slovak, Hungarian and Romanian markets)

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1. INTRODUCTION AND EXECUTIVE SUMMARY

This Report has been developed following the procurement launched within the framework of the Project “Technical Assistance to Connectivity in the Western Balkans, Component 2: Regional Energy Market, implemented by the Energy Community Secretariat. The present technical assistance relates to Implementation of Regional Day-ahead Market and Institutional Set-up for Organized Day-ahead Markets, identified in the Work Programme for the implementation of the Grant Contract as TA Project Number 6.

The main objective of this assignment is the provision to the relevant stakeholders of Bosnia and Herzegovina of draft solutions for governance, structures and institutional arrangements for the national day-ahead electricity market, fit to coupling with neighboring markets in an optimal way. This should be realized according to solutions which have been established at European level in order to reach the establishment of a single market¹.

In this Report we provide answers to the following questions:

1. Are there any legal obstacles for the creation of the PX in BiH or more generally to setting up an organized market for spot electricity products with delivery in BiH? [Task 1 of the Project].
2. Are there any obstacles in the current market arrangements for the creation of an organized spot electricity market in BiH? [Task 1 of the Project].
3. What options are available to BiH to set-up an organized spot electricity market? What are the pros and cons of each option? [Task 2 of the Project].
4. What is the draft proposal of the institutional setup for an organized electricity day-ahead market? [Task 3 of the Project].

The main findings of our analysis can be summarized as follows:

- The BiH market is a) relatively small, b) concentrated c) and highly interconnected with the neighboring countries. For this reason, integration with neighboring markets is crucial to the development of a competitive market in BiH.
- The existing dispatch and balancing rules, and in particular the imbalance settlement system, are adequate to support market-based electricity transactions. For this reason, they are broadly compatible with the establishment of an organized electricity spot market.
- Our reading of the current legal framework is that it is not adequate to support the creation and (later) governing an organized spot market. In particular, a primary legislation acts are necessary in order to assign responsibility for the creation of an organized electricity day-ahead market in BiH.
- Besides providing a primary-law foundation to the establishment and operation of organized electricity day-ahead market, other necessary improvements of the legal and regulatory framework to support the organized day-ahead market operation are:
 - The licensing framework should be improved to enable the participation of foreign legal entities in the wholesale electricity market in BiH, abolishing the local seat requirement for the licensing of the wholesale supply by the Energy Regulators in BiH. It should be also defined how the traders coming

¹ As per the Directive 2009/72/EC concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.

- outside BiH will be treated in reciprocity terms of the license conditions to perform wholesale supply - trade or what to do if the wholesale supply (trade) license in those foreign countries is abolished;
- Harmonization of the VAT (Value Added Tax) Law with the EU directives in this field in order to support coupling with other organized day-ahead markets;
- In designing BiH's organized electricity spot market, the main decisions that BiH has to make are:
 1. *Legal entity with PX functions*: whether to establish a legal entity in BiH with the role of PX or to agree with a foreign PX that some products - entailing electricity delivery and collection in BiH-are being traded on the latter's platform. In the report (section 4.3) we argue in favor of establishing a legal entity in BiH on the basis that the alternative solution would only apparently reduce implementation cost.
 2. *Coupling strategy*: whether to aim at joining MRC-PCR coupling block, 4MMC coupling block or at creating a new Western Balkan block of coupled markets. We argue that the choice of the coupling strategy needs to be developed following consultations with neighboring countries. In case multiple options are available, a thorough analysis of the market fundamentals is necessary to assess the efficiency gains brought by coupling the BiH market with different blocks.
 3. *Implementation of MRC-PCR coupling*: In case BiH PX (as business entity) decides to couple with MRC-PCR, whether to run an instance of the coupling software at the BiH PX or to outsource this activity to one of the PCR PXs. We argue in favor of the second option, on the basis that it is cheaper and quicker to implement than the alternative.
 - Finally, for the implementation of the institutional and organizational set up for a day-ahead market in BiH, we outline the main elements of an action plan to develop and couple a day-ahead market in BiH. The action plan foresees the following activities to be implemented in a tentative and fast implementation time span of 12-14 months.

Activity #	Content / Description
1	Legal framework step 1 / assign responsibility for setting up DAM in BiH
2	Create legal entity BiH power exchange with basic management and staff structure
3	Explore the possibility to implement coupling from the start of DAM
4	Start talks with would-be platform providers to assess cost of stand-alone DAM clearing
5	Decide to develop stand-alone DAM clearing or to wait for coupling before starting organized day-ahead market
6	Selection of and contract with platform provider
7	Market rules (includes consultation and approval by institutions in charge)
8	Selection and contract with clearing house (includes consultation with market participants)
9	Implementation of DAM platform (including testing)
10	Legal framework step 2 / VAT reform
11	Commercial operation of BiH DAM

2. THE CURRENT SITUATION

In this section, we outline the context in which decisions on how to organize a power spot market will be made in BiH.

In section 2.1, we analyze the fundamentals of the current BiH electricity market.

In section 2.2, we present the current state of development of organized power spot markets in the region.

In section 2.3, we present the current status of integration of the European electricity day-ahead markets.

2.1. BOSNIA AND HERZEGOVINA AND ITS REGIONAL ELECTRICITY MARKET

By analyzing the electricity system in Bosnia and Herzegovina, its main features and looking at the regional context, the highlights as outcome of our analysis are:

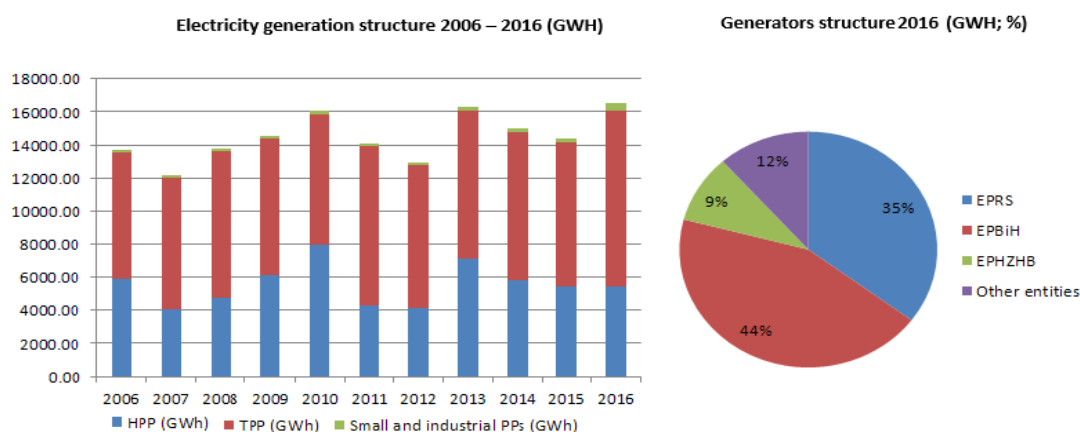
- ❖ The Bosnia and Herzegovina electricity system is small but highly interconnected.
- ❖ The ISO BiH “Market rules”, and in particular the settlement system, are compatible with the establishment of an organized day-ahead electricity market.
- ❖ The regional market is large enough to support effective competition; therefore, coupling with neighboring markets is crucial for the development of an organized day-ahead electricity market to deliver benefits.

2.1.1. BOSNIA AND HERZEGOVINA COUNTRY CONTEXT

The electricity generation in Bosnia and Herzegovina is based on hydro power plants and thermal power plants, mainly coal technologies. As displayed in the figure below, the sector reached a total power generation of 16,509 GWh in 2016, increasing from 2007, where the lowest level of generation was reached (GWh 12,175).

Three vertically integrated enterprises - power utilities are the most relevant players in the power sector. These are “JP Elektroprivreda Bosne i Hercegovine - d.d.” (EPBiH), “MH Elektroprivreda Republike Srpske a.d.” (EPRS), and “JP Elektroprivreda Hrvatske Zajednice Herceg Bosne d.d.” (EPHZHB). The aforementioned three power utilities perform generation, distribution in the respective license areas and trade and supply in whole BiH territory.

Figure 1: Electricity generation structure and generators shares in Bosnia and Herzegovina.



Source: State Regulatory Commission for Electricity in BiH, 2016.

From 2010 to 2016, Bosnia and Herzegovina was net exporter (with substantial amount of both export and import realized). The amount of exports varied in proportion to the production oscillations occurred during that period. In 2016 and 2017, the allocation of cross-border capacities with Croatia and Montenegro was organized by the South-East Europe Coordinated Auction Office (SEE CAO), and auctions with Serbia were organized between the two system operators ISO BiH and EMS. The largest volume of cross-border exchange was realized with Croatia, approximately 50% of the total exchange².

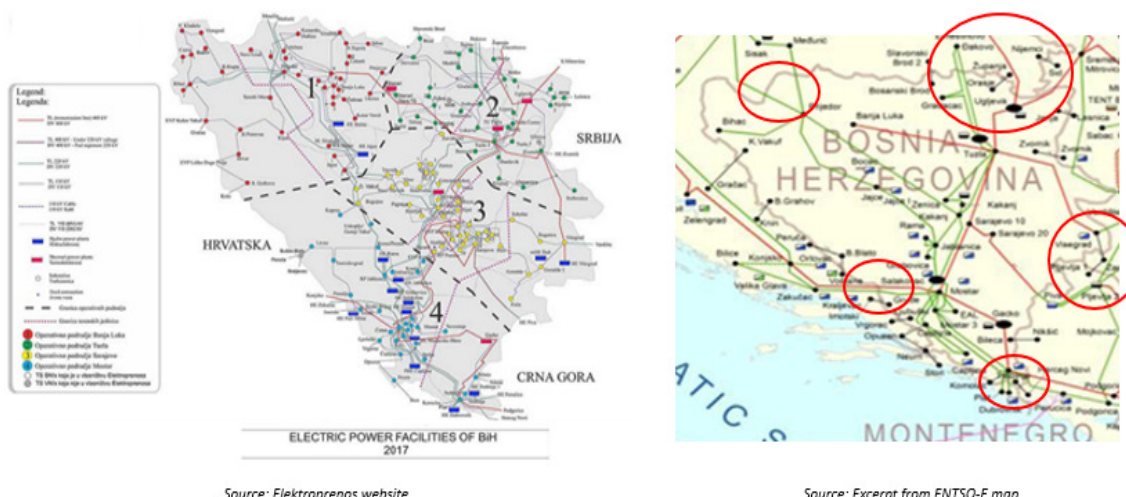
ISO BiH records all transactions in terms of quantities for settlement purposes. Since 2016, a balancing market is in place, where balancing services are procured through annual, monthly or daily tenders.

The wholesale electricity market in Bosnia and Herzegovina implements mostly bilateral transactions. Beside the incumbent power utilities, 27 licensed suppliers/traders (companies), of which 17 were active in 2016, participated in the BiH wholesale electricity market (where total of 7,861 GWh has been traded in bilateral contracts). Since March 2017, EPRS started with transactions on the Serbian organized electricity day-ahead market as a member of SEEPEX.

Compared to other European countries, the BiH electricity sector is a small market, where 16,509 GWh of electricity were generated and around 7,861 GWh of electricity were traded on the wholesale market through bilateral contracts in 2016. Bosnia and Herzegovina imported 1,525 GWh of electricity in 2016, while exporting 5,3 TWh, accounting for 32% of net electricity generation in 2016. The largest volume of wholesale electricity trading was traditionally achieved with the neighboring countries³.

"Elektroprenos - Elektroprijenos Bosne i Hercegovine" a.d. Banja Luka is a company owned 58.89% by the Federation of Bosnia and Herzegovina, and 41.11% owned by the Republika Srpska, responsible for transmission, maintenance and development of the transmission system on the whole territory of BiH. Since 2005, ISO BiH, the system operator, has been managing the operation of electricity transmission system and balancing system. The activities of both companies are regulated by SERC. The map of transmission lines and power system interconnections in Bosnia and Herzegovina is shown in Figure 2.

Figure 2: Map of the transmission lines in Bosnia and Herzegovina and power system interconnections



The electricity transmission system of Bosnia and Herzegovina operates under ENTSO-E synchronously (SHB control block) and it is interconnected with Croatia, Serbia and Montenegro.

² Draft Energy Strategy of Bosnia and Herzegovina until 2035

³ The Report on Activities of the State Electricity Regulatory Commission in 2016 (<https://www.derka.ba/en/godinj-izvjetaji-derka>).

There is a total of 37 interconnection lines (four 400 kV lines, ten 220 kV lines and twenty-three 110 kV lines).

Hence, it could be concluded that Bosnia and Herzegovina electricity system is highly interconnected. The table below reports the interconnection capacity with Croatia, Montenegro and Serbia, in both directions. It is not planned that this will change until 2018, while it is planned to rise afterwards, as shown in Figure 3.

Figure 3: Interconnection capacity (both directions) with neighboring countries (MW) and planned interconnection projects

Interconnection	2016	2018	2027	Project	Partner TSO	Voltage (kV)	Scheduled start-up
BA-HR	800	800	1.440	Visegrad (BA) – Bajina Basta (RS) Interconnector	EMS-TSO Serbia, Elektroprenos-TSO and ISO BiH Bosnia and Herzegovina and CGES-TSO Montenegro	2x400	2022
HR-BA	800	800	1.180				
BA-RS	600	600	1.460	Banja Luka (BA)–Lika/Brinje (HR) Interconnector	HOPS-TSO Croatia, Elektroprenos-TSO and ISO BiH Bosnia and Herzegovina	400	2022
RS-BA	600	600	1.510				
BA-ME	500	500	1.260	Upgrade of 400 kV interconnector Tuzla/Gradačac (BA) – Đakovo (HR) Srebrenica (BA) – Ljubovija (RS) Interconnector	HOPS-TSO Croatia, Elektroprenos-TSO and ISO BiH Bosnia and Herzegovina	400	2030
ME-BA	500	500	1.140				
					EMS-TSO Serbia, Elektroprenos-TSO and ISO BiH Bosnia and Herzegovina	110	2019

Source: Indicative Generation Development Plan 2018 – 2027, ISO BiH

Source: TYNDP 2017

2.1.2. MARKET RULES AND IMBALANCE SYSTEM IN BOSNIA AND HERZEGOVINA

In Bosnia and Herzegovina, a well-structured settlement system, introduced with “Market Rules”⁴ (developed by ISO BiH, approved by SERC in 2015 and applicable from 1 January 2016), is in place. Such system is in line with the European common practice on balancing rules and procedures, including the duties of balance responsible parties, the definition of imbalance volumes, price calculation and balancing system governance. On these terms, the BiH settlement system appears broadly adequate to accommodate spot transactions.

According to the Law on Establishment of the Independent System Operator in Bosnia and Herzegovina (and Market Rules Article 14), a balance responsible party needs to submit the daily schedule to ISO BiH by using ESS platform (ENTSO-E Scheduling System). Each delivery period should provide balance levels for all activities related to generation/purchase/reception of electricity and consumption/sales/delivery of electricity for each trading period. The delivery format is defined in ESS platform. Information about acceptance or rejection of daily schedule is also available on ESS platform. Nomination of daily schedules in day-ahead time frame (D-1) is executed in two stages:

- ❖ Nomination of transaction related to long term rights for the use of interconnection transmission capacity (annual and monthly interconnection – cross border transmission capacity) which needs to be completed by 08:00h D-1 day for D day;
- ❖ Nomination of internal transaction and transaction related to daily rights for the use of interconnection – cross border transmission capacity must be completed by 14:00h on D-1 day for D day.

After receipt of all daily schedules, ISO BiH prepares the Common Schedule and checks its feasibility. If the Common Schedule is not feasible, then all participants whose nominations contributed to the Common Schedule receive requests to change their schedule as per ISO BiH instructions. Nomination of schedule for the day D can be done from 18:00 o’clock on day “D-1” to “H-1” on day D, where H is the hour when the transaction should start.

⁴ Market Rules can be downloaded from: <http://www.nosbih.ba/en/korporativneAktivnosti/market-rules/105>

Also, the foreseen dual pricing system of imbalance charges is in line with the systems implemented in various European spot markets, including France, Belgium and Italy. The rationale behind the dual imbalance pricing system is to discourage voluntary imbalances of market participants, which might lead to inefficiencies or unwanted wealth transfers. Besides, the length of the balancing period, as per the metering code, is 15/60 minutes. This is in line with the European standards too, if we consider the ancillary service market.

When looking at the guarantees required by the ISO BiH in order to conduct settlement activities, the payment security instrument is a bank guarantee issued on behalf of a BRP and in favour of ISO BiH.

ISO BiH is also obliged to present any information and data concerning the balancing energy market which are not confidential to market participants through its website in a transparent, unbiased and non-discriminatory manner. Also, ISO BiH is obliged to publish balancing volumes and settlement prices.

Hence, from the system operations side everything what is necessary to support the spot market transactions, as a precondition of trading, is broadly in place. The existence of the above described system of rules makes the Bosnia and Herzegovina framework fit for:

- ❖ conditions for admission of market participants to the system for execution of electricity transactions;
- ❖ governing execution of electricity transactions;
- ❖ financial settlement of imbalances.

2.1.3. WB6 ELECTRICITY MARKET SIZE

General information on the WB6 power markets are reported in the following Table:

Table 1: General information on the electricity sector of WB6 countries

Country ⁶	Net installed capacity [MW]	Gross electricity consumption [GWh]	Electricity production [GWh]	Percentage of total electricity production by incumbent ⁵ generators [%]	Net export [GWh]
Albania	2,011	7,094	7,136	71.3%	42
Bosnia and Herzegovina	4,352	12,865	16,509	88.4%	3,762
Kosovo*	1,033	5,346	5,835	96.0%	489
FYR of Macedonia	2,084	7,435	5,302	91.6%	-2,133
Montenegro	892	3,338	3,023	97.7%	-314
Serbia	7,450	34,018	36,781	98.5%	1,353
Total	17,822	70,096	74,586	92.9%	3,199

*) This designation is without prejudice to positions on status, and it is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

Source: Consultant own elaboration of different sources for 2016

As reported in the Table 1 above, the total net installed capacity in the WB6 countries is 17,822 MW, with a 70,096 GWh of gross electricity consumption and a production standing at 74,586 GWh. The size of WB6 market, in its entirety, appears to be large enough for effective competition in the area.

⁵ Incumbent is the company (often a regulated monopoly) active on the market just before it was liberalized, or opened to competition.

⁶The list of countries reflects the WB6 countries.

Further, incumbent companies control a large share of production in each of the WB6 countries (above 90% on average).

Finally, as the Table 1 shows, cross border trade among the WB6 countries is significant if compared with the country electricity production.

In order to conclude, an integrated WB6 market would be large enough for meaningful competition, as cross-border competition is crucial to the well-functioning of the wholesale electricity market in the area.

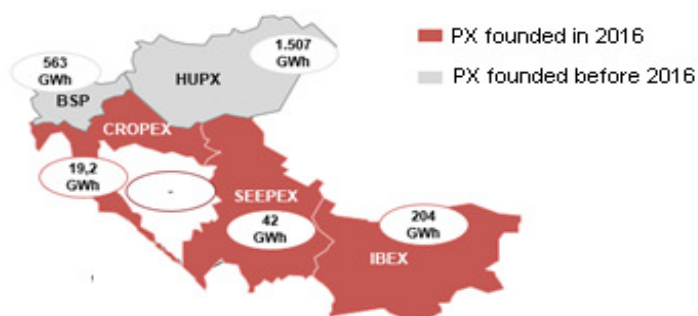
2.2. DEVELOPMENT OF ORGANIZED SPOT MARKETS IN THE REGION

In this section, we have analyzed the current status of the organized electricity spot markets in the WB6 countries and their neighboring countries, in order to detect the degree of integration among them. Also, we have been looking at the neighboring countries, because they are expected to be directly involved in a market coupling initiative.

All WB6 countries have transposed the Third Energy Package in their national legislation with the exception of Bosnia and Herzegovina and FYR Macedonia.

Countries as Croatia, Serbia and Bulgaria have launched their platforms for the organized day-ahead market in 2016. The purpose of establishment of organized day-ahead markets, including CROPEX, SEEPEX and IBEX is to introduce transparency and liquidity to the Balkan electricity market by providing reference prices. Further development of the power exchanges is aimed at merging with other markets to increase liquidity and therefore reduce cross-border price volatility. In the region, the largest quantities are traded on HUPX, the Hungarian power exchange, which is understood to be the reference power exchange for the formation of electricity prices for the region.

Figure 4: Monthly quantities traded on the neighboring DAM i.e. 1st March to 1st April 2016



Source: Draft Energy Strategy of Bosnia and Herzegovina till 2035

Table 2: Power Exchanges in the region founded in 2016.

Power Exchange	Partner PX	Start-up date	Future plans
SEEPEX – Serbia	EPEX Spot	02/2016	Market Coupling with neighboring PX's and Central Europe markets (4MMC market).
CROPEX – Croatia	Nord Pool Spot	02/2016	Market Coupling with neighboring PX's, PCR and Central Europe markets (4MMC market).
IBEX - Bulgaria	Nord Pool Spot	01/2016	Development of forward and intra-day market. Coupling with Romania market, then with 4MMC.

Source: Consultant elaboration of the final Draft Energy Strategy of Bosnia and Herzegovina until 2035.

Recently, Montenegro has established BELEN (Berza električne energije d.o.o) as a legal entity and vehicle to enable the functioning of the Montenegrin power exchange, even though it is not

operational yet. Besides, the Council of Ministers of Albania adopted a decision no. 519 which defines the Albanian market model, the plan for its implementation and the actions for establishing the power exchange named APEX⁷. Final decision on the creation of APEX is still pending.

The Government of Montenegro adopted in early November 2016 a plan for the establishment of Montenegrin power exchange in 2017. The shareholders are market operator, the transmission operator and the national power utility. Hence, Elektroprivreda Crne Gore (EPCG)-national power utility company of Montenegro, Montenegro Electricity Market Operator (COTEE) and Montenegrin Power Transmission System (CGES) signed on 21st of June 2017 an agreement for the establishment of the Montenegro power exchange, the power exchange's statute and registration of the company.

In order to complete the list of the WB6, Kosovo* and FYR Macedonia are on their way to set and define legal and contractual framework with the aim of integrating with the markets of neighboring countries or establishing their own power exchanges. The Ministers of Kosovo* and Albania have discussed the establishment of the common electricity market, as well as Albanian power exchange in which Kosovo* is ready to take part. There is a general consent that Kosovo* electricity transmission system operator KOSTT participates as a shareholder in the Albanian power exchange that is currently being established⁸, however the final agreement between the institutions in charge is still pending.

Table 3: DAM and integration status of selected markets in the region

Country	DAM status	Integration / Coupling	MRC Compatible ⁹
	Yes / No	4MMC/PCR/No	Yes / No
Albania	No but very advanced process ¹⁰	n.a.	n.a.
Bulgaria	Yes	No	Yes
Croatia	Yes	No	Yes
Greece	Yes	No	Yes
Hungary	Yes	Yes, with 4MMC.	Yes
Kosovo*	No	n.a.	n.a.
FYR of Macedonia	No	n.a.	n.a.
Montenegro	Yes (established but not operational)	n.a.	n.a.
Romania	Yes	Yes, with 4MMC.	Yes
Serbia	Yes	No	Yes
Slovenia	Yes	PCR: coupling with Austria and Italy. Intention (MoU) to integrate with WB6.	Yes
Italy	Yes	PCR: coupling with Austria, France and Slovenia	Yes
Recapitulation		Scarce integration	

From the above table is detected that the only power exchanges that are operational and have a

⁷<https://www.ost.al/wp-content/uploads/2016/04/PMD-No-519-dt-13-July-16.pdf>

⁸2017 Annual Implementation Report - Energy Community Secretariat <https://www.energy-community.org/implementation/IR2017.html>

⁹Using Euphemia or Euphemia like algorithms means compatibility with MRC.

¹⁰Council of Ministers of Albania Decision No. 519, dated 13.7.2016, describing the Albanian market model, the plan for its implementation and the actions for establishing the APEX.

<https://www.ost.al/wp-content/uploads/2016/04/PMD-No-519-dt-13-July-16.pdf>

coupling in place are the power exchanges of Hungary, Romania, Slovenia (serviced by the Italian PX) and Italy.

Besides, the neighbors of Bosnia and Herzegovina have implemented or are implementing MRC-ready solutions (see also table in the Annex 1 and 2 of this Report). The MRC compatible solutions are present when the market platform is running Euphemia or Euphemia like algorithms. This condition results as a solution that makes two hypothetic MRC compatible markets ready for MRC coupling/integration.

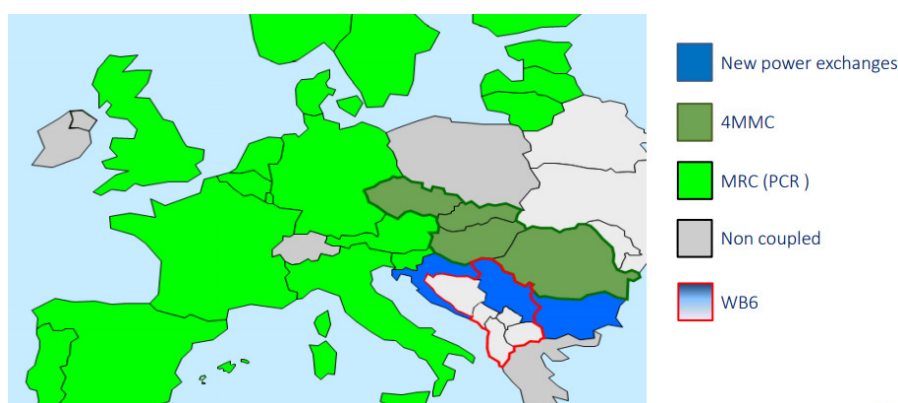
Hence, our analysis highlights that:

- ❖ Some countries (Bulgaria, Croatia, Greece, Hungary, Romania, Serbia, Slovenia and Italy) have already an active PX;
- ❖ Other countries are at different stages of development of the PX (Albania and Montenegro);
- ❖ All active PX markets use MRC compatible market clearing algorithms;
- ❖ It remains to be verified if the decisions made in the countries with organized DAM prevent pursuing some of the options that we present in section 4.2.

2.3. MAIN FEATURES OF THE EUROPEAN MARKET COUPLING

As a result of more than 10 years of negotiation and technical developments, a market coupling system is now implemented among the day-ahead markets of 19 European countries. A separate coupling area is currently represented by the Central-East Europe region where 4 other countries, namely Czech Republic, Hungary, Romania and Slovakia form the 4MMC. Both areas will be finally integrated as part of the CEE Market Project¹¹.

Figure 5: Market Coupling Status



Source: ENTSO-E 2016.

The governance of the European day-ahead market coupling system hinges on the Multi-Regional Coupling Initiative (MRC). MRC is a cooperation between the Power Exchanges APX, BelPex, EPEX SPOT, Nord Pool, GME, BSP and OMIE, and the Transmission System Operators 50Hertz, Amprion, Creos, Elia, Energinet.dk, Fingrid, National Grid, REE, REN, RTE, Statnett, SvenskaKraftnät, TenneT TSO B.V. (Netherlands), TenneT TSO GmbH (Germany), TransnetBW, Terna and Eles. MRC currently covers countries accounting for 90% of European power consumption on a day-ahead basis.

¹¹ <http://www.acer.europa.eu/Media/News/Pages/Central-Eastern-Europe-unites-towards-the-EU-single-energy-market.aspx>.

The system operator and power exchange of a country wanting to join the European market coupling system must join MRC, and accept the MRC's protocols for market coordination.

The Price Coupling of Regions consortium (PCR) owns and runs the software platform implementing the MRC. PCR is the result of multiple agreements between some European PXs (currently seven) for development, ownership and implementation of a single price coupling solution to calculate electricity prices in all participating countries, with respect to the capacity of the relevant transmission system. The MRC relies on this single algorithm to clear simultaneously all participating day ahead markets, which entails calculating simultaneously the electricity market prices, net positions and flows on interconnectors between all bidding zones¹². The algorithm run by PCR is named EUPHEMIA (acronym of Pan-European Hybrid Electricity Market Integration Algorithm).

The main features of the PCR system can be synthesized as follows:

- a) A common algorithm clears simultaneously all involved markets. This means that each of the participating PXs (seven so far) runs an identical instance of the market clearing algorithm and processes the entire set of bids and offers submitted in all involved countries. This requires that all involved PXs exchange anonymized orders and electricity network constrains.
- b) Available interconnection capacity between market zones is allocated implicitly, by accepting the set of accepted bids and offers for electricity in the different bidding areas.
- c) At the outer border of (each) PCR cluster of countries, the entire interconnection capacity is explicitly allocated. The holders of an explicit capacity right can then offset sales/purchases inside the coupled area with injections/withdrawals in the neighboring (non-coupled) areas.
- d) The algorithm is capable of addressing a wide range of product formats, including
 - ❖ Hourly bids/offers with no intertemporal link;
 - ❖ Block bids/offers, spanning across several hours;

As stated in the tender documents of this project but also, based on the current progress of the integration of the European day-ahead markets, it appears that implementation of the PCR market clearing algorithm in Bosnia and Herzegovina is basically compulsory, because:

- ❖ It would ensure immediate coupling of the Bosnia and Herzegovina market in the MRC scheme;
- ❖ It makes available to market participants a wide set of products;
- ❖ It can be rapidly implemented.

In Chapter 4 alternative arrangements to implement PCR in Bosnia and Herzegovina, and more generally in the WB6, electricity markets are discussed.

¹² Some national markets, such as Italy, feature multiple bidding zones.

3. TASK 1 - POSSIBLE MODELS FOR THE ORGANIZATION AND OPERATION OF A DAM IN BOSNIA AND HERZEGOVINA UNDER THE EXISTING LEGAL FRAMEWORK

3.1. EXISTING LEGAL FRAMEWORK

The list of laws that constitute the current framework for the functioning of the electricity sector in Bosnia and Herzegovina is provided herebelow. In accordance with the constitutional order, the laws were passed at the state, and entity level as well as at the level of Brčko District of Bosnia and Herzegovina.

Bosnia and Herzegovina

1. Law on Transmission of Electric Power, Regulator and System Operator of Bosnia and Herzegovina ("Official Gazette of BiH", number 7/02, 13/03, 76/09 and 1/11),
2. Law Establishing an Independent System Operator for the Transmission System of Bosnia and Herzegovina ("Official Gazette of BiH", number 35/04),
3. Law Establishing the Company for the Transmission of Electric Power in Bosnia and Herzegovina ("Official Gazette of BiH", number 35/04, 76/09, 20/14),
4. Law on Concessions of Bosnia and Herzegovina ("Official Gazette of BiH", number 32/02 and 56/04),
5. Law on Competition of Bosnia and Herzegovina ("Official Gazette of BiH", number 48/05, 76/07, 80/09),
6. Law on State Aid System of Bosnia and Herzegovina („Official Gazette of BiH", number 10/12),
7. Law on Value Added Tax („Official Gazette of BiH", number 09/05, 35/05, 100/08),
8. Law on Public Procurement (“Official Gazette of BiH", number 39/14”).

Federation of Bosnia and Herzegovina

1. Law on Electricity of Federation Bosnia and Herzegovina („Official Gazette of FBiH", number 66/13 and 94/15),
2. Law on Usage of Renewable Energy Sources and Efficient Co-generation ("Official Gazette of FBH", number 70/13 i 05/14),
3. The Law on Energy Efficiency in the Federation of Bosnia and Herzegovina ("Official Gazette of FBiH", No. 22/17),
4. Law on Public Enterprises of the Federation of Bosnia and Herzegovina ("Official Gazette of FBiH", No. 8/05, 81/08, 22/09, 109/12),
5. Law on Business Entities ("Official Gazette of FBiH", No. 81/15),
6. Law on Concessions of the Federation of Bosnia and Herzegovina ("Official Gazette of FBiH", No. 40/02 and 61/06),
7. The Law on Banks of the Federation of Bosnia and Herzegovina ("Official Gazette of FBiH" No. 27/17),
8. Law on Foreign Exchange Operations of the Federation of Bosnia and Herzegovina ("Official Gazette of FBiH" No. 47/10),

9. Law on Internal Payment Transactions of the Federation of Bosnia and Herzegovina ("Official Gazette of FBiH" No. 48/15),
10. Law on Internal Trade ("Official Gazette of FBiH" No. 40/10).

Republika Srpska

1. The Law on Energy ("Official Gazette of the Republika Srpska", No. 49/09),
2. The Law on Electricity ("Official Gazette of the Republika Srpska", No. 8/08 - revised text, 34/09, 92/09 and 01/11),
3. The Law on Renewable Energy Sources and Efficient Cogeneration ("Official Gazette of the Republika Srpska", No. 39 / 13,108,13 and 79/15),
4. The Law on Energy Efficiency ("Official Gazette of the Republika Srpska", No. 59/13),
5. Law on Business Entities ("Official Gazette of the Republika Srpska" No. 127/08, 58 / 09,100 / 11 and 67/13),
6. Law on Public Enterprises ("Official Gazette of Republika Srpska", No. 75/04 and 78/11),
7. Law on Concessions ("Official Gazette of the Republika Srpska", No. 59/13),
8. The Law on Banks of Republika Srpska ("Official Gazette of Republika Srpska" No. 4/17),
9. Law on Foreign Exchange Operations of Republika Srpska ("Official Gazette of the Republika Srpska No. 96/03, 123/06, 92/09, 20/14),
10. Law on Internal Payment Transactions of Republika Srpska "(Official Gazette of the Republika Srpska No. 52/12, 92/12),
11. Law on Trade („Official Gazette of the Republika Srpska” No. 6/07, 52/11 and 67/13).

Brčko District of Bosnia and Herzegovina

1. The Electricity Law of the Brčko District ("Official Gazette of the Brčko District of Bosnia and Herzegovina", No. 36/04, 28/07, 61/10 and 4/13),
2. Law on General Conditions for the Supply of Electricity ("Official Gazette of Brčko District of Bosnia and Herzegovina", No. 36/04, 3/06, 28/07, 25/08, 4/13),
3. The Law on Tariff System for the Sale of Electricity ("Official Gazette of Brčko District of Bosnia and Herzegovina", No. 37/04, 28/07, 4/13),
4. Law on Utility Activities ("Official Gazette of Brčko District of Bosnia and Herzegovina", No. 30/04, 24/07, 9/13),
5. Law on Enterprises of Brčko District of Bosnia and Herzegovina ("Official Gazette of Brčko District of Bosnia and Herzegovina", No. 11/01, 10/02, 14/02, 01/03, 08/03, 4/04, 19/07, 34/07, 49/11),
6. Law on Public Enterprises of the Brčko District of Bosnia and Herzegovina ("Official Gazette of Brčko District of Bosnia and Herzegovina", No. 15/06, 5/07, 19/07, 1/08, 24/08, 17/16),
7. Law on Concessions ("Official Gazette of the Brčko District of Bosnia and Herzegovina", No. 41/06, 19/07, 2/08),
8. Law on Banks in Brčko District of Bosnia and Herzegovina ("Official Gazette of Brčko District of Bosnia and Herzegovina" No. 5/03, 19/07).

3.2. ADEQUACY OF THE EXISTING LEGAL FRAMEWORK FOR ORGANIZATION OF A DAM

During the evaluation of the adequacy power sector in Bosnia and Herzegovina for the establishment of a day-ahead market, we have assessed the existing legal framework governing the power sector, market functioning and competition and how the power market is organized. We focused on:

1. The necessity of further legislation to be adopted by the BiH institutions in order to enable the creation of an organized electricity spot market. This is addressed in section 3.2.1 of this Report.
2. Adequacy of the existing trade and commercial laws, fiscal, financial and company laws. Special attention was dedicated to business companies, commodity exchange, VAT and public procurement legislation. This is addressed in section 3.2.3 of this Report.

3.2.1. ASSESSMENT OF THE POWER SECTOR UNDER THE EXISTING LEGAL FRAMEWORK

Bosnia and Herzegovina institutional structure has to be taken into account by the electricity sector entities when deciding to establish an institution with a state level jurisdiction. Besides, in establishing an organized day-ahead electricity market platform with the aim of coupling with the neighboring regions or countries, Bosnia and Herzegovina must consider its regional context and compatibility (or compliance) with EU directives and standards. To this regard, transposing EU directives or standards is mandatory for Bosnia and Herzegovina under the Energy Community Treaty. These must be transposed at the state level and at the level of two entities, Federation of Bosnia and Herzegovina and Republika Srpska, as well as at the level of Brčko District of Bosnia and Herzegovina. As reported by the ENTSO-E, for instance, this explains why implementation of the Third package and relevant network codes has taken more time in BiH than in some other SEE countries.¹³

Currently the wholesale electricity market in Bosnia and Herzegovina is mostly operated through bilateral agreements between 27 licensed suppliers/traders (companies), whose volumes are recorded by the system operator, the ISO BiH (NOS BiH). Also, cross-border transactions are in place where the auctions for the allocation of cross-border capacities with Croatia and Montenegro are organized by the South-East Europe Coordinated Auction Office (SEE CAO), and auctions with Serbia are currently organized between two operators – ISO BiH (NOS BiH) and EMS.

The ISO BiH is carrying out balancing activities according to the “Law establishing an independent system operator for the transmission system of Bosnia and Herzegovina” of 2004.¹⁴

The mentioned Law defines the ISO BiH as a non-profit organization that carries-out its activities in the whole country. As per the Article 1 of the Law:

“...establishes a non-profit Independent System Operator to direct the operation of the transmission system of Bosnia and Herzegovina, the Independent System Operator in Bosnia and Herzegovina (referred to hereafter as “the ISO”), and defines its functions, powers, governance and ownership. The ISO shall perform its activities in the entire territory of Bosnia and Herzegovina.”

The same Article 1. of the Law from 2004 has already defined the ISO BiH as an organization that has to facilitate the creation of an competitive electricity market, its integration into other

¹³ ENTSO-E – “Enhancing market coupling of SEE Region” - 4 May 2017.

¹⁴ Published in the Official Gazette of BiH, 35/04 of 29 July 2004.

regional markets, based on international practices and EU Directives:

“The Law is intended to facilitate the creation of a competitive electricity market in Bosnia and Herzegovina and its integration into a regional electricity markets and regional energy development activities. The Law is based on existing international practices and applicable Directives of the European Union (and their implementation in EU Member States).

Besides, the Article 2 of the same Law seems to refer to the ISO BiH as an organization whose activities should foresee:

“... development and administration of market rules governing the provision of system services over the transmission system, and other activities as specified in Article 7 (Powers of the ISO) of this Law. ...”.

Article 2 in fact is related only to those activities and market rules governing the provision of system services in the transmission system. These activities are referring to the sole dispatch, provision of ancillary and balancing services and instructions needed to guarantee the correct functioning and safety of the transmission system.

Article 7, referred to in the above-mentioned Article 2, defines the power of the ISO BiH. Among the other, the following is worth mentioning:

- “2. Issue dispatch instructions to generators and importers;*
- 3. Operate central control centre facilities and equipment and any remote-control equipment;*
- 4. Operate the balancing market;*
- 5. Procure ancillary services and provide system services;*
- 6. Prepare, modify and apply reliability standards, the market rules and grid code;”.*

Those are typical system operator powers and do not hint at issues related to the organization of wholesale electricity market. Moreover, the full list of ISO BiH powers from Article 7 of the same Law does not contain any activity related to the creation of an organized day-ahead electricity market platform.

Our interpretation is consistent with the content of the “Market rules” from 2015 which are based on application of the 2004 Law. These rules govern balancing and settlement activities, procurement of ancillary services and do not cover matters related to the electricity wholesale market.

The new draft Law on Electricity and Natural Gas Regulator, Transmission and Electricity Market in Bosnia and Herzegovina, currently discussed, envisages to put the new TSO (with Market Operator as separate organization unit within the new TSO) in charge of setting up an organized electricity day-ahead market.

Chapter VIII of the draft Law, on electricity market, defines the organization, the scope and the tasks of the electricity market operator. Article 57 states that the market operator will be owned by the transmission system operator, under its new framework defined by the same law (see chapter VI of the same law), maintaining a defined degree of independence:

“The function of the electricity market operator is organized by the transmission system operator as a separate organizational unit in a way that ensures the independent functioning of the electricity market operator on the principle of non-discrimination of the participants in the market and which ensures efficient coupling with the neighboring electricity markets. The market operator performs his duties in accordance with the principles of transparency, objectivity and non-discrimination, under the supervision of the State Regulator. The operator has the right to charge a fee for the organization of the

electricity market determined by the State Regulator in accordance with the annual operational plan and the financial plan of the electricity market operator.”.

The entire Chapter VIII with its 15 articles describes in detail what the electricity market structure and separate institution functions should be.

Adoption of the new Law on Electricity and Gas Regulator, Transmission and the Electricity Market would also imply the enforcement of the new Law on the Establishment of the Transmission System Operator including the definition of the Market Operator activities.

In conclusion, our reading of the current legal framework is that it is not adequate to support the creation and (later) governance of an organized day-ahead market. We acknowledge a dissenting opinion of ISO BiH that finds the current legal framework adequate for establishing an organized electricity day-ahead market platform by ISO BiH. While not agreeing with ISO BiH on this matter, we note that nothing prevents ISO BiH to engage in preparatory activities, in a non-committal way and without prejudice towards the recognition of any incurred costs for the whatsoever activities conducted, due to non-existence of proper legal basis which would assign ISO BiH with appropriate budget and the responsibility for these actions.

In case the Law is adopted as drafted, the current responsibilities of ISO BiH will be transferred to the new TSO, thus TSO will have already performed those preliminary activities. More generally, the results of the ISO preliminary activities, conducted before the adoption of the legal basis, could easily be transferred in the future to any institution in charge of setting up the organized market.

We notice that, according to the draft Law, the future TSO will be fully regulated entity. On the other hand, power exchange services are regarded as a competitive business in Europe, as confirmed in the Commission’s Regulation 2015/1222, Article 5 (3) which envisages further policy measures aimed at lowering any barriers to competition among power exchanges. For this reason, it is advisable that the law establishing TSO ensures that no cross subsidies between the regulated (TSO) and the competitive (PX) businesses may take place.

3.2.2. ADEQUACY OF THE CURRENT LEGISLATION RELATED TO THE LICENSING RULES FOR THE WHOLESALE TRADE TO SUPPORT ORGANIZATION OF DAY-AHEAD MARKET

At the moment, licenses for international (cross – border wholesale) electricity trade and domestic wholesale trade and supply of end consumers in Brčko District of Bosnia and Herzegovina are issued by SERC. For the activities of domestic wholesale trade and supply of end consumers in Republika Srpska and FBiH licenses are issued by entity regulators RCERS and FERC, respectively. Jurisdiction for licensing depends on the local seat of the trader/supplier. Regardless of the fact which energy regulator (SERC, RCERS, FERC) issued wholesale trade and supply licenses, they are valid across the whole territory of Bosnia and Herzegovina.

According to the currently applied SERC licensing rules, foreign/international traders applying for a license to perform only wholesale trade must be registered as a business company in Bosnia and Herzegovina. Also, licensing rules of RCERS and FERC have the same requirements regarding domestic wholesale supply (trade) activities. In other words, every energy trader without local seat in BiH has to establish a Bosnia and Herzegovina subsidiary in order to obtain electricity wholesale trading or wholesale supply (trade) license from relevant energy regulator in accordance with the relevant laws and regulations. Such licensing procedure of SERC, but also RCERS and FERC, is not supportive and may impede the foreign entrants willing to perform wholesale supply (trade) in Bosnia and Herzegovina on the future organized day-ahead electricity market.

The draft new Law on Electricity and Gas Regulator, Transmission and Electricity Market in Article 9. paragraph (2) stipulates that for the activities of wholesale electricity trade appropriate license is required. In addition, Article 52. paragraphs (1) and (2) stipulate that the licenses are issued by SERC (wholesale only) and entity regulators (supply of end-consumers including wholesale trading, for those traders/entities that intend to at the same time trade on the wholesale market). In addition to this requirement, it is still not clear from the draft Law whether the prerequisite for such companies to establish Bosnia and Herzegovina subsidiary in order to obtain electricity trading license from the relevant authority is kept. Article 52. of the draft Law, among the other, stipulates the following:

“...The State Regulator shall ensure, in accordance with the international commitments of Bosnia and Herzegovina that the procedure for issuing the license to perform electricity trade and the requirements set out in the license do not discriminate against traders established in any Energy Community Party. The State Regulator is obliged to make possible the performance of electricity trade and supply activities for any energy subject coming from any party of the Energy Community, to exercise its activity in Bosnia and Herzegovina, provided that they comply with the market and balancing rules, taking into account the application of the Value Added Tax Regulations and the principle of reciprocity for entities from Bosnia and Herzegovina.”

The draft Law does not provide guidance on the applicable regime in case the would-be trader operates (only) in an Energy Community Contracting Party in which wholesale supply (trading) licenses are abolished. However, the consultations regarding the possible solutions to this aspect have already been initiated in the Energy Community under CESEC initiative for harmonization of licensing regimes and will be addressed by EnC.

Provided that Bosnia and Herzegovina licensing requirements do not place an unreasonable burden on applicants, we suggest that placing the standard licensing obligations on market participants already established and active in the countries without a licensing regime or, more generally, in case reciprocity conditions cannot be applied, would not create material impediments to the development of competition in the Bosnia and Herzegovina power market.

This holds in particular at the early stage of developments of the market institutions, when the arrangements to ensure market integrity might not be yet fine-tuned.

In that situation, the additional safeguards provided by the standard licensing procedure when reciprocity conditions cannot be applied may be valuable.

It may be argued that, provided the collateral requirements for participating in the market are properly designed and implemented, further safeguards – to be achieved via the licensing system - are unnecessary. This should be the matter for empirical assessment, keeping an account of the specific features of each country’s institutional framework and market design. For example, in Italy in 2011, an administrative court decision impaired the functioning of the guarantee system of the wholesale gas market for some months; during those months, some market participants withdrew gas, in the form of imbalances, worth in the range of hundreds million euros, without being covered by guarantees and some of them failed to pay for it. With the benefit of hindsight, more demanding licensing requirements might have helped to avoid that.

In any case, it is difficult to justify an asymmetric licensing policy, which handles market players already active (only) in countries that do not require a license differently, from market players that intend to operate only in the Bosnia and Herzegovina market. On that basis we would recommend that, whatever approach Bosnia and Herzegovina decides to follow, it should be the same for both types of players.

3.2.3. ADEQUACY OF THE OTHER RELEVANT LEGAL FRAMEWORK (BUSINESS COMPANIES, COMMODITY EXCHANGE, VAT AND PUBLIC PROCUREMENT LEGISLATION)

Beside the analyses of the adequacy of the existing legislation related to the power sector, the Consultant also conducted the analyses of adequacy of trade and commercial laws, fiscal, financial and company laws in order to identify if there are any other constraints in the existing legislation relevant for the functioning of an organized day-ahead electricity market. Special attention was dedicated to the business companies, commodity exchange, VAT and public procurement legislation. As far as other laws are evaluated (trade, direct taxes, finance) that exist at the entity level, no obstacles were identified which would impede the establishment and operation of organized day-ahead electricity market.

3.2.3.1. Adequacy of the current legislation related to establishment of business companies and commodity exchange

At the state level of Bosnia and Herzegovina, there is no Law on Business Companies regulating the establishment of companies. The only way to establish such company (JSC or LLC) is by adopting a special law on establishing a company at the state level. Business operations are carried out in accordance with the relevant laws of the entity in which the company's head office is located. Currently at the level of Bosnia and Herzegovina operates Legal entity - Company Elektroprenos BiH ("TRANSCO"), based in Banja Luka - Republika Srpska, established according to the Law on the Establishment of the Electricity Transmission Company in Bosnia and Herzegovina ("Official Gazette of BiH" no. 35/04).

At the level of Bosnia and Herzegovina, the Independent System Operator (NOSBiH) acts as a non-profit company, established under the Law on the Establishment of the Independent System Operator in BiH ("Official Gazette of BiH" no. 35/04).

At the level of Bosnia and Herzegovina, no commodity exchange is organized, while in both entities operate securities exchanges/securities exchange markets, which were established in accordance with the Securities Law in both entities.

The Law on Securities Exchange Market of the Republika Srpska ("Official Gazette of the Republika Srpska" no. 92/06") regulates the establishment and operation of the Securities Exchange in RS.

"...1. Securities Exchange

1.1. General provisions

Article 144.

(1)The Securities Exchange is established and operates as a joint-stock company.

(2). The provisions of the law governing the establishment and operation of joint stock companies shall be applied to the establishment and operation of the stock exchange, choice, jurisdiction and operation of the stock exchange authorities and adoption of general acts, unless otherwise provided by this law..."

The Law on Business Companies ("Official Gazette of RS, No. 127/08 and 5/09") regulates the establishment and operation of joint stock companies in the Republika Srpska.

The Law on Securities Exchange Market ("Official Gazette of FBiH no. 85/08, 109/12") regulates the establishment and operation of the Securities Exchange in FBiH.

"...SECTION B) STOCK EXCHANGE AND STOCK EXCHANGE MARKET

Establishment, operations and types of stock exchanges

Article 135.

Stock exchange and stock exchange market

The stock exchange is established and operated as a joint stock company, in accordance with the provisions of the law regulating the establishment, operation, management and termination of companies, unless otherwise provided by this Law..."

The Law on Business Companies ("Official Gazette of FBiH no. 81/15") regulates the establishment and operation of joint stock companies in FBiH.

Despite the fact that in the entities' internal trade laws commodity exchange is mentioned as a possible form of trade (among other form of trade and trade services), implementing legislation is missing in both cases and it can be concluded that there are still no definite legal solutions in Bosnia and Herzegovina for the establishment and operation of commodity exchanges.

With regards to the possible establishment of power exchange, the draft of the new Law would provide the basis for institutional organization of the day-ahead electricity market platform. The responsibility for this would be given to TSO i.e. Market Operator acting as a part of the TSO. According to the draft of the abovementioned new law, it is planned to adopt the Law on the Establishment of the Transmission System Operator in Bosnia and Herzegovina, which would directly or indirectly, among other things, deal with the possible establishment of the power exchange.

3.2.3.2. Adequacy of the current legislation related to VAT in order to enable establishment of organized electricity day-ahead market

The current VAT system in Bosnia and Herzegovina is ruled by existing Law on Value Added Tax („Official Gazette of BiH", no. 09/05 and amended 35/05 and 100/08). Based on the analyses conducted by the Consultant and findings of the "Study on examining the implementation of EU acquis on Value Added Tax in the Energy Community legal order", prepared by EIHP in August 2017, it is found that the current VAT law is not compatible with the key requirement of the EU VAT Directive, the implementation of which is a prerequisite to integrate energy markets allowing for cross-border energy trade and integration with the EU energy market.

These barriers to electricity cross border trade initially have been identified in the EnC analysis of 2015. Hence, Energy Community Secretariat developed a Policy guidelines related to elimination of VAT related barriers to cross border trade¹⁵.

The main barriers related to the energy business which are identified in the current Bosnia and Herzegovina VAT system are:

- The place for supply of services related to access and use of electricity, but also gas network are not defined in the same manner as in the EU and the neighbouring countries;
- There are no exemptions for import of electricity and gas;
- Key principles of VAT Directive regarding supply of gas and electricity to taxable dealers and customers are not implemented in the legislation;
- There is no mechanism such as reverse charge or institutes of fraud prevention implemented.

Import of goods (in this case electricity) is taxed and it presents an obstacle for trading in the organized day-ahead market. When it comes to export of goods, the existing VAT Law in Bosnia and Herzegovina envisages a refund in line with the EU Directive: so it is concluded that no issue

¹⁵ECS Policy guidelines on VAT https://www.energy-community.org/dam/jcr:37af643f-46c7-4146-a3c9-49ccac9f4d87/PG_01_2015_ECS_VAT_EL_trade.pdf

of double taxation has been identified. In the case of network services, the study identified an issue of double taxation which does not necessarily distort competition, but imposes an unnecessary financial burden resulting in the end with the costs passed through to all transmission network users in the country. It was also concluded that a non-established business providing the supply of goods and services should register for VAT purposes by appointing a fiscal representative in Bosnia and Herzegovina to account for and pay the VAT liability¹⁶.

To sum up, in order to remove barriers for the establishment of organized day-ahead market, the following improvement of the existing VAT legal framework in Bosnia and Herzegovina are needed: for wholesale transactions, taxation should take place where customer – taxable dealer and where recipient of the services has established his business, introduction of completely new provisions related to the VAT exception on import of electricity and natural gas and Reverse Charge Mechanism applied on wholesale electricity Bosnia and Herzegovina market.

The new VAT Law is currently being drafted in Bosnia and Herzegovina with the technical assistance from the EC to the Administration for Indirect Taxation of Bosnia and Herzegovina. The Energy Community also provides support and consultations to introduce the necessary changes and to remove existing barriers for the establishment of organized DAM.

3.2.3.3. Adequacy of the current legislation related to public procurement law in order to enable establishment of organized electricity day-ahead market

The current public procurement system in Bosnia and Herzegovina is ruled by the Law on Public Procurement ("Official Gazette of BiH no. 39/14"), further on referred as BiH PP Law.

Under Articles 2. and 5. of the BiH PP Law it is stipulated that public procurement procedure is mandatory for the contracting authorities/contracting entities which are granted special or exclusive rights. In case of direct participation of contracting authority/entity (i.e. power utility, TSO, DSO) on the organized electricity day-ahead market, as it is foreseen in the draft of the new Law on Electricity and Gas Regulator, Transmission and Electricity Market then there should not be any PP procedure applied as the required level of competition is ensured by day-ahead market platform itself. The Article 22. of BiH PP Law exempts supplies from commodity exchange, as quoted below, so this provision is in line with EU rules:

“Contract on public procurement of supplies may be concluded in a negotiated public procurement procedure without publication of notice in the following cases: ...

– c. for supplies sold and bought on the commodity exchange market....“.

When considering current legislation in Bosnia and Herzegovina related to the public procurement law in order to enable establishment of organized electricity day-ahead market, Consultant concludes that the provisions of the public procurement law shall not apply to purchases in the organized day-ahead electricity market platform, as per the current Article 22. of BiH PP Law.

¹⁶ Study on examining the implementation of EU acquis on Value Added Tax in the Energy Community legal order", EIHP, August 2017

4. TASK 2 – EVALUATION OF THE POSSIBLE SOLUTIONS FOR THE DAM ORGANIZATION AND OPERATION IN BOSNIA AND HERZEGOVINA

In this section we identify and discuss the options available to Bosnia and Herzegovina for the implementation of a day-ahead organized electricity market.

In section 4.1, we present the arrangements currently governing day-ahead electricity market coupling in Europe to identify any constraints on choices of Bosnia and Herzegovina.

In section 4.2, we discuss criteria to assess alternative implementation options for the Bosnia and Herzegovina organized spot electricity market.

In section 4.3, we discuss the main implementation choices for day-ahead power market in Bosnia and Herzegovina.

In section 4.4 and 4.5, we discuss further technical issues that might become matters of choice for Bosnia and Herzegovina (and neighboring countries) during or after implementation of the organized market. These are cross-border capacity calculation model and the format (physical or financial) of long-term transmission rights allocated to the market.

4.1. INTRODUCTION: CONSTRAINTS AND OPPORTUNITIES RESULTING FROM THE CURRENT STATE OF INTEGRATION OF THE EUROPEAN POWER MARKETS

As described in section 2.3 of this Report, currently 23 European countries run the same day-ahead electricity market clearing algorithm. Such algorithm couples (independently) two clusters of countries, MRC-PCR (comprising 19 countries) and 4MMC (comprising 4 countries).

For future reference, by market clearing algorithm or DAM clearing algorithm, we mean the algorithm, typically implemented by a software optimization that selects the offers and bids to accept, among those submitted by the market participants. For the avoidance of doubt, by financial clearing system we mean the set of arrangements, institutions and processes implementing the payments related to transactions carry-out in the electricity market. The financial clearing system is covered in chapter 5.3 of the report.

Understanding of the arrangements currently governing day-ahead electricity market coupling in Europe is crucial to identifying matters on which different choices are available for Bosnia and Herzegovina. The governance of the main European day-ahead market coupling system hinges on the Multi-Regional Coupling Initiative (MRC). MRC is a cooperation between the Power Exchanges APX, BelPex, EPEX SPOT, Nord Pool, GME, BSP and OMIE, and the Transmission System Operators 50Hertz, Amprion, Creos, Elia, Energinet.dk, Fingrid, National Grid, REE, REN, RTE, Statnett, Svenska Kraftnät, TenneT TSO B.V. (Netherlands), TenneT TSO GmbH (Germany), Transnet BW, Terna and Eles. MRC currently covers countries accounting for 90% of European total power consumption. The system operator and power exchange of a country wanting to join the European market coupling system must join MRC, and accept the MRC's protocols for market coordination. MRC regulations are based on CACM regulation¹⁷. As said in Section 2.3, MRC relies on Euphemia algorithm to clear simultaneously all participating day ahead markets, which entails calculating simultaneously the electricity market prices, net positions and flows on interconnectors between all bidding zones¹⁸. Euphemia is also the algorithm of 4MMC market.

The Euphemia algorithm is highly versatile, in that it can accommodate the range of product formats that meet the needs of traders in the MRC and PCR blocks; it is then reasonable to

¹⁷ Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management.

¹⁸ Some national markets, such as Italy, feature multiple bidding zones.

assume that Euphemia meets the needs of would-be participants to the Bosnia and Herzegovina spot market. Further, and perhaps more importantly, Euphemia and the PCR arrangements have been selected as “the” European market clearing platform. As a consequence, selecting a different market clearing algorithm/integration platform would make no sense for Bosnia and Herzegovina and more generally, for the WB6 countries. This assessment holds all the more if one considers that Bosnia and Herzegovina neighbors have implemented MRC-ready solutions (see section 2.2).

The advanced stage of development of market coupling under the MRC-PCR initiative offers Bosnia and Herzegovina the opportunity to integrate its day-ahead power market with the rest of Europe rapidly and at relatively low cost. This is due to multiple implementation options of the PCR platform. We shall discuss the options available to Bosnia and Herzegovina in the next section.

4.2. CRITERIA TO ASSESS ALTERNATIVE IMPLEMENTATION OPTIONS FOR THE DAY-AHEAD POWER MARKET IN BOSNIA AND HERZEGOVINA

In this section, we review the criteria that we believe are relevant for the assessment of alternative implementation options for the organized day-ahead market in Bosnia and Herzegovina. These are:

Efficiency

We see two dimensions of efficiency that are relevant for the selection of the best implementation option for the future Bosnia and Herzegovina organized day-ahead market.

Sub criterion: Efficiency 1 (use of interconnection capacity)

The first dimension (sub-criterion **Efficiency 1** for later reference) relates to the set of countries that the Bosnia and Herzegovina market is coupled with (for simplicity: the coupled block).

Recall that market coupling is enhancing welfare to the extent that it ensures that the efficient set of cross border transactions is carried out. The empirical assessment of the value of the efficiency gains delivered by market coupling is a very complex exercise, because it requires assessing if and to what extent transmission capacity holders in the current system:

- Engage in inefficient transactions, i.e. move power from the country in which it is worth more to the country in which it is worth less;
- Miss net-positive valued trade opportunities, i.e. fail to move power from the country in which it is worth less to the country in which it is worth more.

As a very first approximation, one may think that market coupling would deliver more value to Bosnia and Herzegovina if the coupled block joined by Bosnia and Herzegovina includes countries having larger interconnectors between them and Bosnia and Herzegovina. However, the size of the interconnectors is not necessarily showing the degree of inefficiency in the use of such capacity. For example, two highly interconnected markets might show a constant price difference. In this case, even if the interconnection capacity is very large, the benefits to be expected by the introduction of market coupling are modest, as it is easy for market participants holding explicit transmission rights to find out the optimal directions of power flows and therefore the optimal choice of import/export.

Sub criterion: Efficiency 2 (Product range)

The second dimension of efficiency relevant for Bosnia and Herzegovina decisions (sub-criterion **Efficiency 2** for later reference) relates to the products (hourly bids, block bids) traded on the day-ahead coupled market. The implementation option selected by Bosnia and Herzegovina will be more valuable if it entails products that are suitable to the needs of market participants in Bosnia and Herzegovina.

Transparency

Market participants must trust that market results delivered by the coupled day-ahead market clearing algorithm selected by Bosnia and Herzegovina are «correct». In other terms, market participants must trust that the clearing algorithm must be such that all available opportunities for net-positive trades are exploited. In the context of Euphemia, replicability of the algorithm's outcome by a single market participant is not possible, since the algorithm is complex and based on a heuristic methodology. However, market participants may detect, although indirectly, anomalies in case the market clearing solutions regularly features rejected offers that are in the money.¹⁹

Implementation cost

Higher than necessary running costs are bad *per se*. In addition, if they turn into high fees on market participants, they discourage participation to the PX, in favor -for example- of bilateral dealings. Reduced participation to the PX, in turn, makes it even more difficult to cover cost and generates pressure to increasing the fees.

Finally, note that we did not address the liquidity requirement as a stand-alone criterion to assess alternative design options. That is the case because liquidity of Bosnia and Herzegovina's spot market will be a byproduct of the requirements that we have presented above. In particular, liquidity of Bosnia and Herzegovina day-ahead market will depend on:

- the level of participation fees: assuming, as we do, that the cost of the PX will be entirely covered by the fees charged on participating market participants, minimizing the PX's **implementation cost** will contribute to maximizing trading via the PX;
- the trading opportunity (implicitly) provided to market participants by BiH's choice of the coupling block to join; this feature is already addressed by our **Efficiency/1** criterion;
- the trust of market participants in the correct functioning of the organized market; this is already addressed by our **Transparency** criterion.

For this reason, we will not address the liquidity requirement as an independent criterion.

4.3. AVAILABLE IMPLEMENTATION CHOICES FOR DAY-AHEAD POWER MARKET IN BOSNIA AND HERZEGOVINA

Before turning to the discussion on the matters between which Bosnia and Herzegovina will have to choose, recall from section 4.1 that we consider implementation of the PCR software/platform as a compelled choice for Bosnia and Herzegovina. This has an important implication: since all options for Bosnia and Herzegovina under consideration involve implementing PCR software/platform, they are all equivalent in terms of **Efficiency/2** and **Transparency** criteria discussed in the previous section. This is the case because: *i*) the market clearing algorithm that runs is the same independently of the selected implementation option and *ii*) and all participants in the European wholesale power market are familiar with and trust the PCR framework. This means that that the selection between the options presented further has to be based on the remaining two criteria:

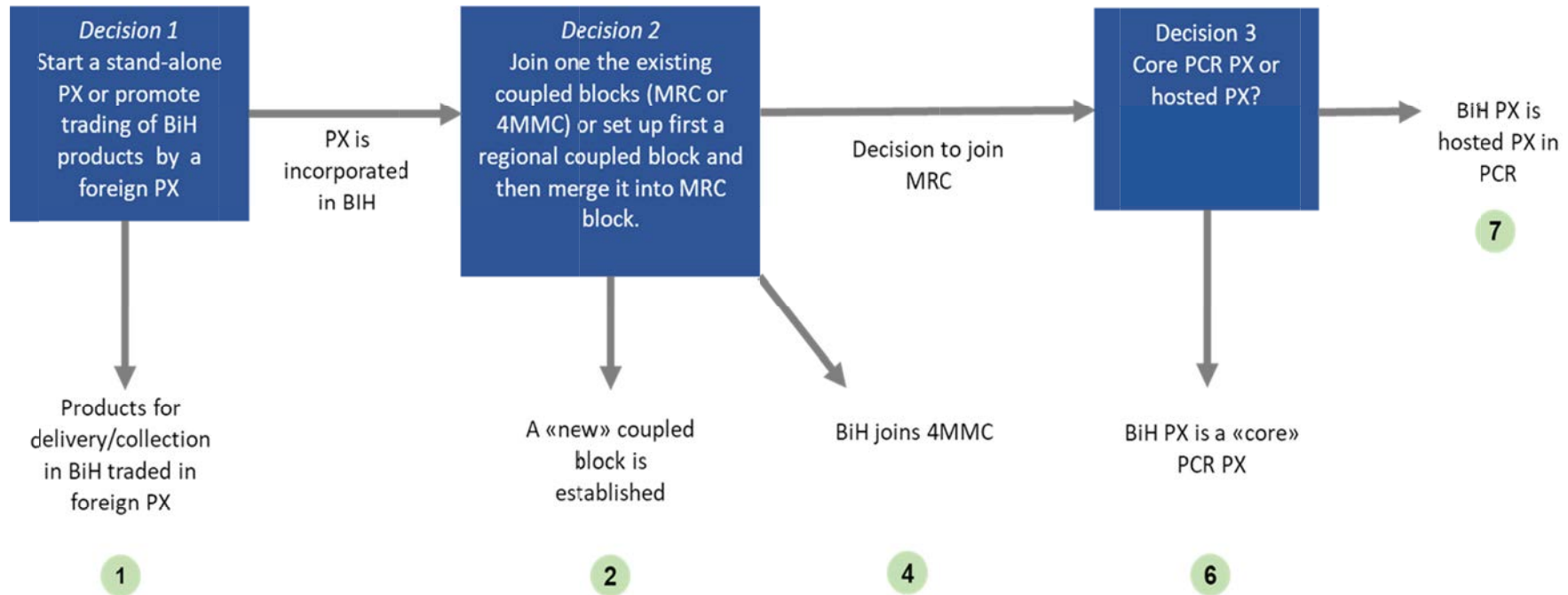
- **Efficiency/1**: this criterion will lead to discarding options that result from BiH not being coupled with those countries with which cross-border trading opportunities²⁰ are largest.
- **Implementation cost**: this criterion will lead to discarding solutions that achieve the same outcome as others, but in a costlier way.

We will discuss next the implementation options available for Bosnia and Herzegovina based on the decision tree shown in the Figure below.

¹⁹ This typically happens because of the intertemporal constraints implemented via block bids.

²⁰ In the meaning discussed in section 4.2.

Figure 6: Decision tree for BiH regarding the implementation of a day-ahead power market



Source: own elaboration.

Decision 1 - Stand alone or serviced by the foreign PX

The first decision that Bosnia and Herzegovina has to make, is whether it should establish a legal entity in Bosnia and Herzegovina with the role of a PX. The scope of the activities of such legal entity, if established, will depend on the outcome of the decisions discussed later in this section. Here we focus on the on the option of not creating a PX in Bosnia and Herzegovina (**Solution 1** in the picture).

Solution 1 – serviced by a foreign PX

In this case, Bosnia and Herzegovina would just agree with an existing PX (hereafter the “foreign PX”) that an additional product (or set of products) is to be traded on the latter’s platform. The distinguishing feature of these products is that they would relate to electricity injected into or withdrawn from the Bosnia and Herzegovina power network. This means that Bosnia and Herzegovina generators and load serving entities would join and trade on the foreign PX, in order to exchange commitments related to power injected and withdrawn from the Bosnia and Herzegovina transmission system.

Solution 1 is the one that would move the trading of electricity generated and delivered in Bosnia and Herzegovina abroad.

Coupling of the Bosnia and Herzegovina system would require that the Bosnia and Herzegovina system operator respects the obligations – in particular on cross-border capacity calculation and notification – of the coupling block on which the foreign PX operates.

In the discussion on the scope of the project it was suggested that we analyze this option based on its expected low cost. Indeed, this solution would save Bosnia and Herzegovina the cost of setting up legal entity to manage the day-ahead power market. In order to assess the scope of this cost savings, **Solution 1** needs to be compared with the alternative of sourcing the market clearing service from one of the PCR PXs (as in **Solution 7**, discussed later), which is the minimum cost solution for implementing a PX in Bosnia and Herzegovina.

Compared to **Solution 7**, the cost that Solution 1 would save is basically the cost of setting up and running a legal entity in Bosnia and Herzegovina (incorporation cost, board member salaries, some fixed operating cost), net of the cost for the Bosnia and Herzegovina public administration and/or system operator to reach and administer the agreement with the foreign PX²¹.

Further, total IT costs might be lower in Solution 1, if the incremental cost of making the new product available by the foreign PX is lower than the cost of setting up a market participant interface in Bosnia and Herzegovina according to **Solution 7**.

The reason why cost savings of Solution 1, compared to Solution 7 can be expected to be modest is that also in Solution 7 most of the PX activities are outsourced. As we will discuss later, one can set-up a very “light” (and inexpensive) own PX, while relying on other PXs for the supply of some key services. This would allow full exploitation of economies of scale by the suppliers of service PX solution, precisely as it would happen with Solution 1, which would turn into low service charges for the BiH PX.

In addition, it is unlikely that Bosnia and Herzegovina (traders and, indirectly, electricity consumers) will appropriate the entire cost savings. This is the case because the foreign PX will charge market participants fees for trading the Bosnia and Herzegovina products and there is no reason to expect that these fees will equal the incremental cost of providing the service. In

²¹ The scope and nature of the agreement between the foreign PX and BiH institution is a matter for further investigation, as there are no examples of this kind of arrangements in Europe.

addition, notice that any profits made by the foreign PX would be taxed by its hosting country, and not by Bosnia and Herzegovina.

Further, market participants might have to bear additional cost to trade on a foreign power exchange, such as for example establishing branches in the country where the PX is based, hire consultants and service providers to comply with the legal and tax system in that country.

A drawback of **Solution 1**, is that Bosnia and Herzegovina would have limited control on the foreign PX. This might be less important in the day-by-day “operations” perspective that can be governed by contracts than in the strategic perspective, where Bosnia and Herzegovina would have no word on the foreign PX’s decisions. This issue might be mitigated – in case the foreign PX were granted NEMO status according to CACM regulation – by the powers granted on national authorities on NEMOs.

Finally, we note that this approach might not be feasible to apply it to intraday markets or to the procurement of ancillary services – for which so far there is not a commonly accepted European design.

For all these reasons we consider **Solution 1** as inferior to the solutions based on the creation of a legal entity in Bosnia and Herzegovina, based on the Control and possibly Implementation Cost criteria.

Solution [2] or [1.b] - [stand-alone] PX incorporated in Bosnia and Herzegovina

Decision 1bis: *Temporary stand-alone DAM vs simultaneous implementation of DAM and coupling mechanism*

In case a PX is set up in Bosnia and Herzegovina, several coupling strategies are available. Before discussing them, note that the decision tree presented in Figure 6 assumes that coupling of the Bosnia and Herzegovina market should be implemented from the start of the PX operations. If that was not the case, for some time the Bosnia and Herzegovina day-ahead market would be run on a stand-alone basis, and the entire cross-border interconnection capacity would continue being allocated via explicit auctions (through the CAO). During the period of stand-alone operations, a market clearing algorithm would have to be implemented by the BiH PX; such algorithm would then be scrapped once coupling is implemented.

If the cost of the temporary stand-alone set-up of the BiH PX proves to be high, it may be advisable to link the start of day-ahead market operations to the implementation of the coupling mechanism. Investigating this issue entails starting discussions with would-be IT system vendors to the BiH PX.

Decision 2 Coupling strategy

The second decision for Bosnia and Herzegovina to make relates to the coupling strategy. We see three options on this respect:

- The first possibility would be that Bosnia and Herzegovina participates in a newly established coupling block that includes all or a subset of the neighboring countries. This would require setting up arrangements equivalent to those governing the 4MMC coupling block – including leasing of the PCR platform. (**Solution 2** in the picture)
- The second possibility would be that Bosnia and Herzegovina decides to join 4MMC. This would require that Serbia joins 4MMC too, since the Bosnia and Herzegovina network is connected to the 4MMC block via Serbia (**Solution 4** in the picture).
- The third possibility would be that Bosnia and Herzegovina decide to join MRC. This would require that Croatia joins MRC too, since the Bosnia and Herzegovina network is connected

to the MRC block via Croatia (**Solution 7**²²).

The selection among **Solution 2**, **Solution 4** and **Solution 7** is a matter for decision based on feasibility considerations. Feasibility of the alternative options depends on what can be agreed with the neighboring countries, on several issues including, the future of existing national PXs. For example, we understand that Croatia is considering to join MRC (through the interconnection with Slovenia) and so is Montenegro, once the new interconnector with Italy is completed; Serbia, instead, is considering to join 4MMC. In this situation, establishing an independent coupling block (**Solution 2**) might not be feasible. If those plans go through, Bosnia and Herzegovina will have to choose whether to couple with 4MMC (through Serbia, **Solution 4**) or MRC (through Montenegro and Croatia, **Solution 7**).

When it comes to selecting between **Solution 4** and **Solution 7**, the optimal decision depends – other things equal - on the evaluation of the expected efficiency gains resulting from coupling the Bosnia and Herzegovina market with each block²³. As a first approximation, one may assume that coupling with Croatia would be more beneficial than coupling with Serbia, because the sum of Bosnia and Herzegovina’s interconnection capacity with Croatia is larger than interconnection capacity between Bosnia and Herzegovina and Serbia. However, as we argue in section 4.2, a more thorough analysis of the market fundamentals within the alternative coupled blocks will be necessary to reach a final conclusion. In particular, the volatility of the difference between spot prices might be an indicator of the possible inefficiencies of bilateral trading, which would be addressed by market coupling.

Decision 3

In case Bosnia and Herzegovina decides to couple with MRC-PCR, two implementation options would be available.

- Run an instance of the PCR market clearing software in Bosnia and Herzegovina (**Solution 6** in the Figure). A peculiar feature of PCR is that each of the seven “core” PXs runs an identical instance of the market clearing algorithm and processes the entire set of bids and offers submitted in the entire coupling area. One possible way for the BiH PX to join PCR is to take on the same responsibility. This would be an expensive solution, as BiH PX would have to set up the necessary hardware and software infrastructure; however, in our view, this would bring no advantages compared to the alternative solution as this would have no impact on the market outcome, nor on the services delivered by BiH PX to the market participants
- Source the market clearing service from one of the PCR PXs (**Solution 7** in the figure). In this case BiH PX would buy from one of the core PCR PXs (hereafter: the hosting PX) the market clearing service. Consequently:
 - The BiH PX would then collect bids and offers from BiH market participants and transfer them after anonymization, to the hosting PX;
 - The hosting PX would clear the Bosnia and Herzegovina market, together with all markets in the MRC region, and return to BiH PX the market results (accepted and rejected offers, market clearing prices, cross border commercial flows);

²² We will argue shortly that Solution 7 is superior to Solution 6.

²³ In other terms, the relevant decision criterion is Efficiency/1 (see section 4.2).

- The hosting PX would interact with future TSO-BiH through the MRC-PCR protocols to receive the information necessary to clear the market, in particular cross-border transfer capacities.

This approach is already implemented in Slovenia for example.

Joining MRC-PCR via a hosting PX is in our view a highly effective and efficient solution, because:

- it would allow to achieve from the start full coupling with the MRC block;
- it does not require BiH PX to set up an expensive and complex software and hardware infrastructure;
- it can be expected to have shorter implementation times than alternative solutions.

For these reasons we consider Solution 6 as inferior to Solution 7.

4.4. ATC BASED VS FLOW-BASED CROSS BORDER CAPACITY ASSESSMENT

In this and in the following section we will discuss further technical issues that might become matters of choice for Bosnia and Herzegovina (and neighboring countries) during or after the implementation of the organized day-ahead market.

The first decision relates to the methodology to assess cross border capacity, and in particular to the move from the traditional ATC capacity calculation methodology to the flow-based methodology. We provide in the rest of this section a sketchy description of the two methodologies.

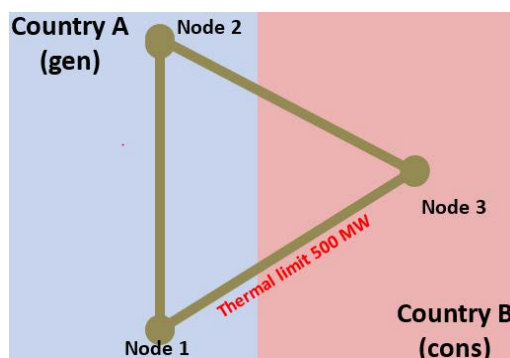
Traditionally, transmission capacity available for cross-border electricity transactions has been calculated following the so-called ATC methodology.

In the ATC model, the bidding areas are linked by interfaces that are meant to synthesize the performances of the physical network. The energy that is allowed to “commercially” flow through the interface between two bidding areas is limited by the available transfer capacity (ATC) of the interconnector.

Since May of 2015, so-called flow-based capacity calculation has been introduced to assess cross-border capacity between Central and West Europe countries (namely France, Germany and Benelux). Flow-based capacity calculation is meant to deliver greater cross-border capacity available for trading by directly assessing the load of physical critical infrastructure.

The following Figure illustrates, with a great deal of simplification, the conceptual difference between ATC and Flow-based capacity calculation.

Figure 7: ATC vs Flow-based capacity calculation



In the Figure 7. we represent a simple power system connecting two countries (A and B). The country has excess low-cost generation capacity and is therefore the exporting country.

In this very simplified representation, the ATC methodology would assess transfer capacity from country A and country B without using any information about where, in Country A, injections will take place (node 1 or node 2). However, the same volume of injections produces different flows on security constrained line 1->3 depending on whether the injection takes place. As consequence, the ATC methodology - that does not use that information - must prudentially set the transfer capacity between Country A and Country B at level low enough to guarantee that the security constraint is met even if the market outcome is such that injections concentrate entirely in the most impacting node.

Contrary to the ATC approach, the Flow-based methodology would incorporate in the calculation of cross-border transfer capacity the information on where, in country A, the injections will take place. In this case transfer capacity will be above the ATC level in case the market outcome is such that injections will take place in the node with smaller impact on the security constrained line.

Flow-based capacity calculations place a greater analytical and coordination burden on system operators.

EUPHEMIA market clearing algorithm supports flow-based capacity calculation, as well as the traditional ATC based algorithm; flow-based calculations are currently implemented to assess transfer capacity at the borders between Germany, France, and Benelux.

A thorough analysis of the flow-based methodology can be found following the link below:

<http://www.statnett.no/Global/Dokumenter/Kundeportalen/Methodology%20and%20concepts%20for%20the%20Nordic%20Flow-Based%20Market%20Coupling%20Approach.pdf>

4.5. SHARE OF TRANSMISSION CAPACITY ALLOCATED VIA MARKET COUPLING

The second decision that might become relevant in the context of market coupling relates to the definition of long term “explicit” transmission rights, and in particular to the move from their traditional “physical” definition to a “financial” definition. We provide in the rest of this section a sketchy description of the two methodologies.

Explicit transmission rights may coexist with implicit capacity allocation in alternative ways. Transmission rights traditionally implemented in Europe are defined in *physical* terms. A physical transmission right from market A to market B entitles the holder to schedule symmetric injections in A and withdrawals from B; this allows the transmission right holder to offset sales in B with purchases in A.

As described above, currently the SEE CAO is in charge for cross-border capacity allocation with Croatia and Montenegro and ISO BiH (NOS BiH) and EMS, for capacity with Serbia, allocating physical transmission rights.

Transmission rights implicitly allocated in a coupled system are also physical in nature, since bids or offers for electricity in a certain bidding zone, when accepted, entitle – in fact, commit – their holders to respectively withdraw and inject the corresponding amount of electricity in the bidding zone. The physical definition of explicit transmission rights carries the following implications:

- ❖ if cross-border capacity from A to B is, say 1000 MW and 800 MW have been allocated in the form of explicit transmission rights, only 200 MW can be allocated via implicit auction in the coupled market session;

- ❖ the day-ahead allocation of explicit transmission rights becomes redundant once day-ahead implicit allocation is in place;
- ❖ in case flow-based capacity calculation is implemented, intended injection/withdrawal schedules of the holders of explicit transmission rights are a crucial input to the implicit auction, as they determine the level of capacity available for implicit allocation.

The alternative model is based on explicit financial transmission rights. For example 1 MW financial transmission right from A to B entitles the holder to receive $(P_b - P_a)$, i.e. the difference between the spot market clearing prices in B and A. In other terms, a financial transmission right entitles the holder to a share of the congestion rent accruing to the market operator that runs the coupled day-ahead market. In case transmission rights are defined in financial terms the entire cross-border transmission capacity is allocated via the implicit auction, maximizing the efficiency-enhancing feature of the implicit auction²⁴.

Financial explicit transmission rights may simplify operations of coupled spot markets and ultimately lead to more efficient market outcomes. In particular, a financial design of explicit transmission rights makes it unnecessary to fix ex-ante the split of available physical capacity between short term allocation (via the implicit auction) and long term (in the form of explicit transmission right) allocation.

However, physical rights are extensively implemented in Europe and the move to financial rights requires agreement of all interested parties.

²⁴ For more details see also P. Ranci, G. Cervigni, "The economics of electricity markets" Theory and Policy - The Loyola de Palacio Series on European Energy Policy – E. Elgar Publisher.

5. TASK 3 - PROPOSAL OF THE INSTITUTIONAL SETUP FOR A DAY-AHEAD MARKET

Based on the analysis carried out in Chapter 4, in this chapter we provide recommendations on the institutional and organisation set up for a day-ahead market in Bosnia and Herzegovina.

In section 5.1 we outline the main elements of an action plan to develop and couple a day-ahead market in Bosnia and Herzegovina. In the following sections we focus on two topics that attracted a particular interest in the discussion with the project beneficiaries. These are the content of the DAM and intraday market rules (section 5.2) and the scope for outsourcing of PX activities (section 5.3).

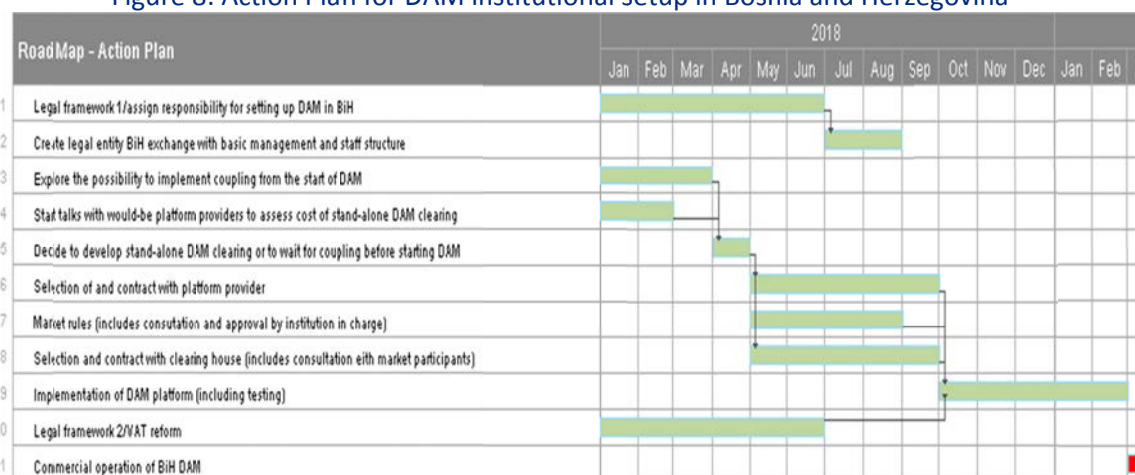
By the Market rules we mean on the rules governing admission to, participation in and functioning of the markets run by the PX, comprising the DAM and possibly intraday energy markets. Our notion of market rules does not include rules related to system operation activities nor to power retailing.

5.1. AN ACTION PLAN TO DEVELOP A DAY-AHEAD COUPLED ELECTRICITY MARKET IN BOSNIA AND HERZEGOVINA

The following Figure reports the main high-level activities necessary to reach commercial operations of the DAM market in Bosnia and Herzegovina. The timing we have assumed for the activities is tentative and generally consistent with a fast implementation of DAM in Bosnia and Herzegovina, with multiple work streams implemented in parallel.

In the rest of this section we illustrate these activities.

Figure 8: Action Plan for DAM institutional setup in Bosnia and Herzegovina



Source: own elaboration

Legal framework 1/assign responsibility for setting-up the DAM

In section 3 of the Report, we have assessed that it is necessary to establish via a primary law a formal allocation of responsibility for setting-up a PX in Bosnia and Herzegovina, as well as the general guidelines for the organization and design of the electricity market in Bosnia and Herzegovina. The timing for this activity depends on the political process in Bosnia and Herzegovina. In the Figure 8 we have assumed 6 months.

However, we notice that activities 3, 4, 5, having a non-committal nature, could be started before the Law assigning responsibility for setting up the BiH PX is passed; ISO BiH would appear the obvious institution to carry-out those activities pending a law-based allocation of responsibilities because of:

- the draft law (see section 3.2.1) being currently discussed in Bosnia and Herzegovina envisage that the ISO BiH (or its descendant company) will be involved in establishing the spot market; this provides some indications of the likely outcome of the law-making process;
- ISO BiH, as a system operator, is already in contact with the institutions in charge of running and developing the power markets in the neighboring countries.

Create legal entity BiH exchange with basic management and staff structure²⁵

The establishment of the legal entity in charge of implementing the DAM in Bosnia and Herzegovina is subject to the Law assigning responsibility for setting up the spot market being in force. From now on we will refer to this legal entity as to the BiH PX.

We envisage that the BiH PX will have very limited permanent staff once in operation and that to minimize cost, the peak of workload (and competencies) necessary to set up the DAM and develop the necessary agreements with external service providers will be met by hiring consultants or temporary workers. The workforce will be then reduced when the PX reaches normal operating conditions.

Explore the possibility to implement coupling from the start of DAM and start talks with would-be platform providers to assess cost of non-coupled DAM implementation

As discussed in section 4, the PCR market coupling algorithm clears all coupled markets simultaneously. For this reason, once Bosnia and Herzegovina joins a coupling-block – be it MRC, 4MMC or a newly established Balkan block – the clearing function will be performed by the coupling algorithm. This means that:

- in case market coupling is implemented when the BiH DAM operations start, an independent market clearing algorithm will not have to be implemented by BiH PX. In fact, in this case, the BiH PX will just collect bids and offers from market participants, feed them to the market coupling algorithm, receive from the market coupling algorithm and publish the results;
- in case BiH DAM operations start before joining a coupling-block, instead, the BiH PX platform will have to include a clearing algorithm.

A preliminary assessment of the possibility to start DAM operations simultaneously with coupling operations is necessary before starting the procurement process for the DAM platform. This assessment should be based on talks with the neighboring countries and with the institutions governing MRC and 4MMC.

In practice, however, we would expect that the cost of a multi-purpose platform, that can quickly be switched from “non-coupled” to “coupled” operations be not much higher compared to the cost of a single-purpose solution. This should be the case because:

- Based on the experience of the neighboring countries, it is likely that the platform provider will be selected among the PCR members;

²⁵ Under the condition that the option of establishing a legal entity in BiH is selected (see section 4.3 above).

- By construction, the PCR market clearing algorithm (used in coupling-blocks) may be downscaled to a single market clearing algorithm at no cost.

For those reasons, each of the most likely suppliers of the DAM market platform to BiH PX is in the position to embed in that platform a market clearing algorithm – to be discarded once Bosnia and Herzegovina joins a coupling block - at little or no incremental cost.

We note incidentally that both the Croatian and the Serbian PXs appear to have chosen this option, as they run stand-alone PXs that are designed to be “MRC compatible” or “4MMC compatible”.

On this basis we assume that BiH PX will implement a flexible platform, used initially stand alone and then “downgraded” to acting as the interface with the market coupling platform.

Decide whether to develop stand-alone day-ahead market (DAM) clearing or wait for coupling to start DAM

Based on the ranking of the solutions presented in section 4.3 (in decision 1bis) we assume in what follows that BiH will set up a stand-alone DAM market, i.e. a DAM with its own market clearing algorithm, that will join a coupling block at a later stage. Notice however that this decision does not have a material impact on the scope and therefore timing of the activities presented further.

Selection of and contract with platform provider

We assume that 5 months are necessary to select and contract the provider of the IT platform implementing DAM in Bosnia and Herzegovina, via a tendering procedure. We assume that this activity can start before the legal framework is in force but must end (at least 3 months) after the legal framework is in place, to account for the time necessary to implement a tendering procedure.

Market rules (includes time for consultation and approval by the institution in charge)

We allow 4 months to draft and publicly consult on the market rules, under the assumption that market rules will be largely similar to those already implemented in the neighboring countries. This should greatly reduce the time to develop the market rules and ease building consensus among market participants. We assume that this activity can start before the legal framework is in force but must end (at least 2 months) after the legal framework is in place, to account for the time necessary for official public consultation and approval by the relevant institutions.

Selection and contract with clearing house (includes consultation with stakeholders²⁶)

We assume that BiH PX will purchase settlement, invoice and payment services from an independent clearing house, as discussed in section 5.2. Our forecast of 4 months to reach an agreement on clearing services does not include the time necessary to the clearing house to adjust their platform to deliver the service agreed with BiH PX.

Note that we include in the activities leading to the procurement of the clearing services a stage of public consultation; this is necessary to avoid that the clearing arrangements agreed upon by BiH PX and the clearing house do not meet the need of current and would-be market participants, discouraging their participation in the DAM.

²⁶Current market participants are not necessarily future members of PX or participants in PX.

We assume that this activity can start before the legal framework is in force but must end (at least 2 months) after the legal framework is in place, to account for the time necessary for approval by the relevant institutions and for drafting and signing contracts.

Implementation of DAM platform (including testing)

We assume 6 months for implementation of the DAM platform and processes, including, among the other things:

- drafting of contract between the market participants and the clearing house;
- between the market participants and the PX;
- roll-out of the DAM software platform and integration with the clearing house systems;
- integration with the TSO's settlement system;
- dry-runs for testing purposes.

5.2. MARKET RULES

In this section, we analyze the content of the market rules in selected countries²⁷ and propose a hierarchy of rules suitable for implementation in the Bosnia and Herzegovina context. The selection is meant to present a diverse set of options, among those chosen in Europe, and to describe the recent experiences of DAM deployment in the neighboring countries, such as in Croatia and Serbia.

The Table 4 from the „ANNEX 1 – Market rules comparison and clearing house main features in selected countries” presents:

- how market rules are adopted and what legislation level is involved (law, by-laws, Regulator decision, market operator discretion);
- how the process to update or amend each type of market rules is structured.

In all countries the following types of rules are addressed differently:

1. Organizational market rules (market design rules) and
2. Operational market rules (technical rules for an organized market).

The first category has a base in a primary law act in all selected countries. This base defines, among the other things, the market operator responsibilities, the principles to be followed in developing the organizational market rules and the approval/amendment process.

However, the approval/amendment process may vary from case to case. In Italy, for instance, the organizational market rules are approved by the Ministry in charge of energy matters, after the prior opinion of the energy Regulator. Alternatively, in Croatia, the organizational market rules are subject to prior opinion of the transmission system operator and the distribution system operator and prior approval of the regulatory agency, before getting to Ministry approval. EPEX rules and regulations are approved or modified with a prior consent of Exchange Council. The Exchange Council of EPEX SPOT is an official body of the Exchange. Total of 22 members and 4 permanent guests represent the diversity of economic and corporate

²⁷ We have been looking at EPEX (offering spot trading services with day-ahead and intraday expiries for the following market areas: Austria, France, Germany, the Netherlands, Switzerland, Belgium and the UK), GME (offering spot trading services for Italy and Slovenia), CROPEX (Croatia) and SEEPEX (Serbia).

profiles that exists among the Exchange Members from various sectors: power trading companies, transmission system operators, regional suppliers, brokers and financial service providers, as well as commercial consumers and academics.

The second category of rules that we identified, the operational rules, are typically issued and updated following criteria defined either by primary or secondary law and are related to the technical operations of the PX platforms. The experiences of the selected countries suggest that PX operator always unilaterally modifies this kind of rules. The PX Members have only the possibility to submit comments within a pre-defined period (usually 10 - 14 days).

Market rules exceptions can be found in setting the market participants fees, the inclusion or not in the market rules of the bilateral trading rules, balancing rules or ancillary services rules. These set of services, according to the experiences seen in the selected countries may be regulated by the market operator, hence regulated by the operational (technical) market rules and follow the same approval and amendment process. Alternatively, they may be part of a different set of rules and follow different approval and amendment process²⁸.

In most of the cases, the PX ownership is divided in equal parts between the TSO and the Market Operator. Only in few cases the sector utilities have a PX ownership share (see the case of Spain). In the case of Italy, the PX is 100% publicly owned. For more detail on the PX ownership share see “ANNEX 2 – DAM legal and organizational framework of the neighboring countries and others” of this Report.

Finally, we notice that in the EU the activity of the PX is not regarded as a monopoly, even though in all countries except the UK only one PX is being active. The current arrangements for the integration of day-ahead, and soon intraday, power markets in Europe give rise to the competition concerns reflected in the Commission’s Regulation 2015/1222; article 5.3 of the Regulation, in particular, envisages further policy measures aimed at lowering any barriers to competition among power exchanges and, more generally, at increasing transparency of the market coupling system. No final decision has still been taken on this matter.

Based on the survey of the governance structure of the main European power exchanges, we find that a three-level hierarchy of rules may strike the optimal balance between stability of the market framework and flexibility of the operations of the PX. The first layer includes rules contained in primary laws that are relatively difficult to change. These rules would:

- identify the entities responsible for setting up and running the PX²⁹ and possibly set rules and requisites for the appointment of board members;
- spell-out general principles for design, access to and operations of the PX (for example: neutrality, transparency, objectivity and competition);
- assign supervision responsibilities on PX operations and possibly further governance provisions (for example: approval requirements for DAM market rules changes; obligation of public consultation for certain market rules amendments);
- establish the protection against actions of the electricity market operator;
- set an indicative list of topics to be regulated by organizational market rules (model, procedures, method of identifying and registering participants in the electricity market, types of contracts concluded in the electricity market, products for trade in the electricity market, standards and procedures for registering transactions in the

²⁸ Bilateral trading rules, balancing rules or ancillary services rules may be part of the Transmission operator rules or system operator rules, depending on how the electricity market is designed in the country.

²⁹ Which it does not have to be same

electricity market, standards and procedures related to problematic suppliers in the electricity market, standards and procedures for establishing and keeping a database for the needs of the electricity market, standards and procedures for applying, preparing, verifying and modifying daily, schedules of electricity sale and purchase, rules and procedure for exchange of metering data of network users).

The second layer of rules implements the market organization, design and governance of the high-level aspects of the market operations; in most countries these rules are the result of the first layer of rules and principles and are referred to as “the market rules”. These rules cover matters such as:

- Requisites for admission to the market;
- The market architecture (market sessions, market clearing algorithm, market coupling ...);
- Guarantee requirements;
- Information flows implemented in the market;
- Market operations in emergency situation;
- Settlement of payments;
- Cases of default;
- Penalties, complaints and disputes.

The second layer of rules has the power to shape the market. For this reason, it makes sense to subject it to approval by the political authorities (the relevant Ministry or the industry or Regulator) and to preliminary public consultation.

The third layer of rules is the one referred as the operational/technical rules. It contains operation-related rules, such as

- Trading rules:
 - Market platforms regulations (registration orders, orders types, trading errors, matching, suspension of trading, market information, nominations, case of decoupling, reporting activities, handling of errors, auction delay or failure);
 - Products Specifications (deadline for bid and offer submission, gate closure, trade lot, tick size, currency, order types, price steps, max/min price/order limit, delivery);
 - Clearing and Settlement Rules (requisites for clearing, account structure, clearing procedures, VAT, non-compliance);
 - Market Conduct Rules;
 - Fee Schedule.
- Trading Agreements:
 - Membership Agreement;
 - Billing Invoices Agreement.

5.3. OUTSOURCING SOME FUNCTIONS BY ESTABLISHED PX

As discussed in section 4.3, joining either MRC or 4MMC would allow BiH PX to outsource the market clearing function, because the coupling algorithm implemented in both cases, in fact, clears all involved markets simultaneously. In this section we discuss the opportunity that Bosnia and Herzegovina outsources also settlement and payment functions to a separate clearing house.

The clearing house:

- Manages the counterparty risk, by monitoring the exposure of each market participant and ensuring that adequate collaterals are in place at all times;
- Settle the transactions carried out by each market participant on the PX and possibly OTC, netting opposite signed positions;
- Issue invoices;
- Collect and make payments.

As shown in Table 5 (see “ANNEX 1 – Market rules comparison and clearing house main features in selected countries”) several European PXs outsource the settlement and payment functions to a separate clearing house.

EPEX and SEEPEX PXs have outsourced the clearing house services to an external clearing house, the European Commodity Clearing (ECC). ECC assumes the counterparty risk and guarantees the physical and financial settlement of transactions, providing security and cross-margining benefits to market participants. As part of EEX Group, ECC provides clearing services for EEX, EPEX SPOT, Powernext and PXE. Hence, ECC is currently providing its clearing services to power markets in several European countries, including Germany, France, United Kingdom, the Netherlands, Belgium, Austria, Switzerland, Luxembourg and Czech Republic. Further, through EPEX, ECC provides services to other markets including:

- Market operation services for the Hungarian power exchange HUPX;
- Market coupling services for the Romanian Power Exchange OPCOM, Slovakian OKTE and HUPX, and
- Market operation services for the Serbian power exchange SEEPEX.

The other cases analyzed, the Italian GME and the Croatian CROPEX, have adopted an internal solution. Both PXs are using a NordPool customized clearing platform (on this see the below Table 5 in ANNEX 1).

We find that outsourcing the settlement and payment functions to a clearing house would bring the following benefits to Bosnia and Herzegovina, compared to in-house delivery of the same services by BiH PX.

First, outsourcing the service to an existing clearing house allows full exploitation of scale and learning economies, ultimately reducing the cost borne by market participants. Second, it might be possible to transfer some volume risk to the clearing house. Third, an institution specializing in the supply of guarantee, settlement and payment services might offer a better service: for example, superior risk-assessment capabilities may reduce the collateral requirements placed on market participants; familiarity with alternative forms of guarantee may lead the clearing house to accept a wider range of collaterals from market participants; market participants might already have been served by an existing clearing house and therefore be familiar with its requirements and processes. Finally, outsourcing settlement and payment services to an experienced and renowned institution might increase trust by market

participants in the institutional framework and trading arrangements governing the Bosnia and Herzegovina electricity market.

By outsourcing market clearing to the institution running the market coupling software and the guarantee, settlement and payment functions to a clearing house, the amount of resources required to set-up and run the BiH PX is minimized, and so is cost and risk ultimately borne by Bosnia and Herzegovina electricity customers. This would not prevent to assign further responsibilities to BiH PX at a later stage, for example related to managing the dispatch and balancing service market.

6. ANNEX 1 – MARKET RULES COMPARISON AND CLEARING HOUSE MAIN FEATURES IN SELECTED COUNTRIES

Table 4: Market rules comparison

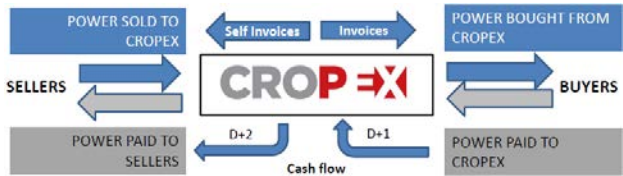
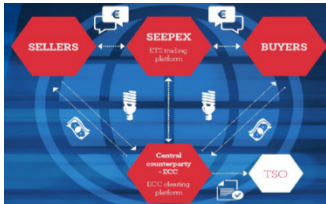
	Croatia	Italy
Name of PX	CROPEX Ltd	GME SpA
Market Rules for the organization of the electricity market	<p>Electricity Market Act 2013 (the Act). Chapter VIII on the organization of the electricity market.</p> <ul style="list-style-type: none"> On article 53 the Act lists the responsibilities of the electricity market operator regarding the electricity market organization and market rules. On article 55 the Act lists the topics, on the electricity market organization, that should be regulated by the electricity market operator rules. These rules on the electricity market organization are adopted by the market operator and are subject to prior opinion of the transmission system operator and the distribution system operator and with prior approval of the Agency. It is also required that the rules on electricity market organization are published in the Official Gazette. 	<p>Legislative Decree 79/99.</p> <ul style="list-style-type: none"> Article 5 vested GME with the responsibility of organizing and managing transactions in the electricity market under certain criteria. Following such criteria, the market operator, GME, is in charge to issue the organizational market rules within one year of its institution. Organizational market rules are then approved by the Ministry in charge of energy matters, after the prior opinion of the energy independent Regulator AEEGSI.
Amendments	<p>The organizational market rules can be amended following the initiative of the market operator and, also in this case, are subject to prior opinion of the transmission system operator and the distribution system operator. The Agency will approve the amendments and will publish them in the Official Gazette.</p>	<p>Market operator proposes changes, receive comments from concerned parties and send them to the Ministry who decide after hearing Regulator opinion. The above do not apply in case of urgent amendments with purpose of safeguarding the market functioning.</p>
Technical rules for the electricity market operations	<p>The market operator CROPEX is responsible to issue also the trading rules to allow the electricity market operation. These trading rules are effective after the publishing on CROPEX website and mainly focus on:</p> <ul style="list-style-type: none"> Day ahead market regulations Intraday market regulations 	<p>GME is responsible for the implementation and procedural provisions of the technical market rules (DTF – Disposizioni Tecniche di Funzionamento). In formulating the technical rules, GME adopts criteria of neutrality, transparency, objectivity and competition between or among market participants.</p>

	<ul style="list-style-type: none"> Product specification Clearing and settlement rules Market conduct rules Fee schedule 	
Amendments	Technical market rules can be amended by the market operator CROPEX after 14 days of the publication of the draft on CROPEX website and after member observations evaluation.	GME can amend the technical rule and may draft a version of the technical rules amended to interested parties, setting a date by which such parties may submit their comments and suggestions.
Exceptions	<p>The process to setting the fees does not follow the same process as per the either organizational or technical rules.</p> <p>Hence, the fees for organization of the electricity market are settled by the Agency upon proposal of the electricity market operator. The proposal of the electricity market operator need to be based on justified operation costs and are required to be aligned with the annual program of operations and financial plan.</p>	<p>The fees are yearly updated and published the GME on its website, with effect from the 1 of January of the following year.</p> <p>Ancillary service rules (MSD) and balancing (MB) rules are also part of the operational rules set by the market operator (GME)</p>
Ownership and legal status	50% HROTE (market operator) and 50% HOPS the TSO	100% Public (Minister of economic development through GSE and AU).
PX market model	De facto monopoly	De facto monopoly

	Serbia	European Power Exchange
Name of PX	SEEPEX Ltd	EPEX Spot
Market Rules for the organization of the electricity market	<p>Energy law n. 144/2014 ("OG of the RS", No. 145/2014).</p> <ul style="list-style-type: none"> According to the article 182, the market operator issues the rules on the organized electricity market operation. Article 183 lists the topics, on the electricity market organization, that should be regulated by the electricity operator market rules. <p>These rules on the electricity market organization are adopted by the</p>	<p>EPEX SPOT is a fully electronic exchange offering services for spot trading through closed auctions and continuous trading with day-ahead and intraday expiries for the following market areas: Austria, France, Germany, the Netherlands, Switzerland and the UK.</p> <p>When operating on EPEX Spot, all the parties in agreement are required to comply always with its rules and regulations. They consist of:</p>

	<p>market operator and published on its website.</p> <p>The organizational market rules of SEEPEX consist of the following parts:</p> <ul style="list-style-type: none"> • the Trading Agreement, • the Exchange Rules, • the Code of Conduct, • the Operational Rules 	<ul style="list-style-type: none"> • the Trading Agreement; • the Market Coupling Facilitator Agreement; • the Exchange Rules; • the Code of Conduct; • the Operational Rules.
Amendments	<p>SEEPEX may change the market rules by sending the modifications to the organized market committee instituted to the SEEPEX. The committee decides on the changes and become effective on the day of their publication unless a different time is provided.</p>	<p>EPEX Spot may modify the rules and regulations unilaterally. Any amendment to the exchange rules and code of conduct requires the prior approval of the exchange council.</p> <p>Changes to the rules and regulations become effective on the day of their publication, unless provided otherwise.</p>
Technical rules for the electricity market operations	<p>The market operator SEEPEX is responsible to issue operational rules to allow the electricity market operation. These trading rules are effective after the publishing on SEEPEX website and mainly focus on:</p> <ul style="list-style-type: none"> • Contracts and trading parameters • Day ahead trading procedures • Market activity and service conditions • Price list (fees) • Technical access rules 	<p>EPEX Spot as part of its rules and regulations oversees the issuing of, among the others, the operational rules. These are effective after being published and mainly refers to:</p> <ul style="list-style-type: none"> • Day ahead trading procedures • Intraday trading procedures • Capacity guarantees trading procedures • General services conditions • Price list (fees) • Technical access rules
Amendments	<p>Operational market rules are part of the above mentioned organizational rules and follow the same amendment procedure, apart from the approval from the committee that is not required.</p>	<p>Operational market rules are part of the above mentioned organizational rules and follow the same amendment procedure, apart from the approval from the exchange council that is not required.</p>
Exceptions	<p>EMS TSO establishes the Market Rules for Bilateral trading and the Rules for Operation of the Electricity Balancing Market, and submits them to the Agency for approval.</p>	n. a.
Ownership and legal status	EMS Serbian TSO 75% and EPEX Spot 25%	EEX Group 51% and HGRT 49%
PX market model	De facto monopoly	Competitive

Table 5: Clearing house main features in selected countries.

	Croatia – CROPEX	Serbia - SEEPEX
Internal or external clearing house	Internal – NordPool customized for CROPEX	External – ECC Clearing Platform
PX - clearing house - market participants cash and bid/offer flows of information³⁰		
Collaterals accepted	<p>Collaterals in HRK and/or EUR:</p> <ul style="list-style-type: none"> • Cash deposits <ul style="list-style-type: none"> ○ CROPEX opens account for each participant at selected settlement bank ○ deposits secured against legal enforcement and foreclosure following amended Electricity Market Act • Bank guarantees <ul style="list-style-type: none"> ○ subject to CROPEX approval • Collateral minimum for net sellers • Collateral minimum for net buyers 	<p>ECC accepts EUR cash and a broad range of ECB (European Central Bank) eligible government bonds and EUA emission allowances to fund margin requirements. For Spot Market Initial Margin Requirements ECC accepts Bank.</p>
Integration of the guarantee system		
For spot and forward products	n. a.	n. a.
For spot and imbalance products	The balancing market in Croatia is not yet in place. Currently, balancing energy and all capacity reserved for these	No

³⁰ Source: website of SEEPEX (<http://seepex-spot.rs/en/>) and CROPEX (<https://www.cropex.hr/en/about-us.html>)

	services is acquired through bilateral contracts and through imbalance netting cooperation on Slovenian border	
	EPEX Spot	Italy - GME
Internal or external clearing house	External – ECC Clearing Platform	Internal – NordPool customized for GME
PX - clearing house - market participants cash and bid/offer flows of information		
Collaterals accepted	ECC accepts EUR cash and a broad range of ECB (European Central Bank) eligible government bonds and EUA emission allowances to fund margin requirements. For Spot Market Initial Margin Requirements ECC accepts Bank.	Bank guarantee or non-interest-bearing cash deposit to be disposed on the GME bank account.
Integration of the guarantee system		
For spot and forward products	Yes	No
For spot and imbalance products	n.a	Yes

7. ANNEX 2 – DAM LEGAL AND ORGANIZATIONAL FRAMEWORK OF THE NEIGHBORING COUNTRIES AND OTHERS

Table 6: Institutional framework for typical organized day-ahead electricity markets in the EU and in the Energy Community

	Albania	Croatia	Kosovo*	FYR of Macedonia	Montenegro
Name of PX	APEX (not operational yet)	CROPEX Ltd	n.a	n.a.	Berza elektricne energije doo
Ownership	Majority by the TSO OST and KOSTT (Kosovo* TSO) a minority by the market management system DAMAS.	50% HROTE (market operator) and 50% HOPS the TSO.	n.a.	n.a.	State-owned power utility EPCG, power transmission system operator CGES and electricity market operator COTEE own the majority.
Legal framework	LAW No. 9072, dated 22.05.2003 on Power Sector and law 45/2015 on power sector	2013 Electricity Market Act	A set of primary laws defining the legal and contractual framework for establishing organized spot markets for electricity and market coupling was adopted in June 2016. Amendments to the Law on Public Procurement were adopted in January 2016. The amendments allow state-owned companies to apply simplified tendering procedures in procuring electricity	The old Energy Law recognizes the possibility of establishing a power exchange. The new energy law implementing the third energy package recognizes the role of market operator (see below).	New Energy Law dated December 2015
General principles	LAW No. 9072 on Power Sector: Art. 25 recognize the electricity market as an exchange to be carried as a public service.	Electricity Market Act: Art. 2 define the electricity market operator. Art. 3 trading and mediation as electricity market activities. Art. 29 and 30 defines market operator activities.	n.a	According to the old energy law: Trading in electricity is recognized as a non-regulated activity. To undertake electricity	The new energy law: Art. 3 recognize trading and mediation as energy activities Art. 124 defines electricity market

	Art. 48 ERE the Regulator to adopt electricity market rules. Art. 53, 54, 55 select either single buyer or bilateral transaction as a model; market model rules and interconnection rules.			trading, it is necessary to obtain a license from the Energy Regulatory Commission. According to the new Energy Law, the state-owned Electricity Transmission System Operator of FYR of Macedonia (MEPSO) act as a transmission system operator and as a market operator.	activities and market operator and activities including balancing Art. 129, 130, 131, 132 are on rights, duties and responsibilities of market operator
Market rules	Responsible is the Regulator (sent for approval in April 2017)	CROPEX amends market rules and come into force after 14 days and after member observations evaluation	n.a.	n.a.	The Market Operator shall establish the Market Rules and the Rules for Operation of the Electricity Balancing Market, and it shall submit them to the Agency for approval.
Decision on interconnection capacity amount reserved for the PX, and how much is allocated explicitly?	The Regulator. The TSO OST implicitly allocates day-ahead import/export capacity through the market making available as part of its daily capacity allocation a minimum share of 50% of the available capacity to the PX.	The Regulator and the Ministry of Economy. Minimum capacity allocated is 1MW.	n.a.	n.a.	The Regulator. The TSO REE implicitly allocates day-ahead import/export capacity through the market.
Risk of default of a party	n.a.	In case of non-compliance event, CROPEX may issue a written warning to the Member in question and/or suspend a Member from Trading with immediate effect. CROPEX may withhold any cash settlement amount owed to the Member and to set-off such withheld amounts with the amount owed by the Member to CROPEX; and/or enforce, realize and apply its rights in the	n.a.	n.a.	n.a.

		Collateral posted by the Member by: (i) drawing upon Bank Guarantees provided, and/or (ii) drawing upon the balance of the Deposit Accounts		
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Source: own elaboration

Table 7 continued: Institutional framework for typical organized day-ahead electricity markets in the EU and in the Energy Community³¹

	Serbia	Slovenia	UK	Italy	Spain
Name of PX	SEEPEX Ltd	BSP Regionalna Energetska Borza d.o.o.	1. APX Commodities Limited 2. Nord Pool Spot AS 3. SONI Ltd	1. GME SpA	1. OMIE SA
Ownership	EMS Serbian TSO 75% and EPEX Spot 25%	50% Market operator Borzen 50% TSO ELES	1. 100% EPEX Spot 2. Statnett (28.2%); Svenskakraftnät (28.2%); Fingrid (18.8%); Energinet.dk (18.8%); Elering (2%); Litgrid (2%); AST (2%) 3. 100% EirGrid Irish TSO	100% Public (Minister of economic development through GSE and AU).	50% OMEL (40% energy companies; 60% other) 50% OMIP (50% market operator; 50% others)
Legal framework	Energy law (Official Gazette of the RS", No. 145/2014)	Energy Act of 2001 establishing the role of the market operator.	Electricity Act 1989 regulated the bids of generator on the England and Wales pool. Later reforms refer to RETA, NETA and Utilities Act (2000).	Legislative Decree 79/99. Article 5 - Vested GME with the responsibility of organizing and managing transactions in the Electricity Market under certain criteria. Subsequent laws and decrees regulated other topics like green	Royal Decree 2019/1997. (amended by R. D. 5/2005, R. D. 6/2000, R. D. 1454/2005) - Article 2 - the electricity market organization. Definition of market agents and their powers. Article 5 – Defines

³¹ UK and Spain have been added because they are particularly representative. They served as “school cases” or “examples” for the others: a review of legal and organizational framework is more complete if includes information on those that first have been implemented in Europe.

				certificates trading and gas trading.	market operator functions in coordination with the Spanish System Operator. Coordination in conformity with the Electricity Sector Act. Electricity sector Act Law 54/1997, settlement and payment to be public, transparent and objective. And International agreement between Spain and Portugal
General principles	YES - Energy law defines: Competitiveness of electricity market based on the principles of non-discrimination, publicity and transparency; promotion of regional operation.	YES –Electricity Act and subsequent amendments.	YES –Electricity Act and subsequent amendments.	YES – L. Decree: criteria of neutrality, transparency, objectivity and competition between producers. Market rules: market operator functions to be exercised in a non-discriminatory way.	YES –Royal Decree: Energy settlement and payment operations, will be public, transparent and objective.
Market rules	EMS TSO establishes the Market Rules for Bilateral trading and the Rules for Operation of the Electricity Balancing Market, and submits them to the Agency for approval. Organized Market Operator Rules (SEEPEx): pass the rules on the organized electricity market operation;	Market operator proposes and after receiving comments by the market participants, decide in issuing market rules changes. This process lasts 15 days. Unless changes in law require quicker period.	Market operator proposes and after receiving comments by the market participants decide in issuing market rules changes. Market operator may consult the Regulator. If a change in Law will render any provision(s) of the APX Rules illegal,	Market operator is in charge and requires conformity to all market participants. Market operator proposes changes, receive comments from concerned parties and send them to the Ministry who decide after hearing Regulator opinion. The above do not apply in case	Market operator to the Ministry of the Economy, for its approval, the proposals for modifications of the Market Activity Rules that the said operator considers suitable for the best execution of the Electric Sector Act and its regulations.

			unenforceable, or impracticable, then APX shall as soon as reasonably practicable after becoming aware of such change in Law notify each Power Member of the change in Law and its effect on such provision(s).	of urgent amendments with purpose of safeguarding the market functioning.	In those cases, in which it is necessary to comply with the law and its regulations, proposals are sent to the Ministry who makes its decisions based on the report of the National Energy Commission.
Decision on interconnection capacity amount reserved for the PX, and how much is allocated explicitly?	The TSO. Minimum capacity allocated is 1MW.	The regulator. Cross border with Italy is explicitly allocated. Minimum capacity allocated is 1MW.	Coupling implicitly allocated.	The regulator. Cross border with Slovenia is explicitly allocated. Minimum capacity allocated is 1MW.	The TSO. Minimum capacity allocated is 1MW.
Risk of default of a party	If the Exchange Member fails to fulfil one of its obligations under the Rules and Regulations of SEEPEX and if it fails to implement the modifications required by SEEPEX AD, then SEEPEX AD may suspend or terminate the Trading Agreement as provided in the Exchange Rules.	BSP may revoke or suspend a Member. Transactions affected shall be entitled to financial reimbursement (from bank accounts or deposit) for the cost related to it in accordance with a Price List.	The Clearing House may buy, sell or enter as many Power Products at such times and at such prices as the Clearing House in its absolute discretion considers necessary and the Power Member irrevocably appoints APX as its agent, in order to secure to APX the ability to trade out the position to which APX would be otherwise exposed. And the Power Member shall be liable for any costs, fees, charges or other amounts payable.	GME suspend the Market Participant from the Electricity Market and redeem the guarantees; close all the contractual positions of the defaulting Market Participant and register the net delivery position onto the PCE. If the guarantees redeemed are insufficient to cover the debit of the defaulting Market Participant or if the bank issuing the guarantee defaults on its obligations GME shall contribute to covering the debits of the defaulting Market	The market operator may execute the guarantees of the market participant. If executing the guarantee does not enable the immediate collection of the amount owed, the Market Operator shall reduce, on a pro rata basis, the collection rights of the seller agents, which gives rise to a loan to the non-paying agent from the seller agents. The amount owed earns interest for delayed payment.

				<p>Participants or the default by the bank issuing the guarantee by utilizing its own funds, up to a maximum amount to be established on a year-by-year basis and allocated for such purpose. This amount is established by the Minister of Economic Development at the proposal of GME and posted on GME's website.</p>	
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Source: own elaboration

	Art. 48 ERE the Regulator to adopt electricity market rules. Art. 53, 54, 55 select either single buyer or bilateral transaction as a model; market model rules and interconnection rules.			trading, it is necessary to obtain a license from the Energy Regulatory Commission. According to the new Energy Law, the state-owned Electricity Transmission System Operator of FYR of Macedonia (MEPSO) act as a transmission system operator and as a market operator.	activities and market operator and activities including balancing Art. 129, 130, 131, 132 are on rights, duties and responsibilities of market operator
Market rules	Responsible is the Regulator (sent for approval in April 2017)	CROPEX amends market rules and come into force after 14 days and after member observations evaluation	n.a.	n.a.	The Market Operator shall establish the Market Rules and the Rules for Operation of the Electricity Balancing Market, and it shall submit them to the Agency for approval.
Decision on interconnection capacity amount reserved for the PX, and how much is allocated explicitly?	The Regulator. The TSO OST implicitly allocates day-ahead import/export capacity through the market making available as part of its daily capacity allocation a minimum share of 50% of the available capacity to the PX.	The Regulator and the Ministry of Economy. Minimum capacity allocated is 1MW.	n.a.	n.a.	The Regulator. The TSO REE implicitly allocates day-ahead import/export capacity through the market.
Risk of default of a party	n.a.	In case of non-compliance event, CROPEX may issue a written warning to the Member in question and/or suspend a Member from Trading with immediate effect. CROPEX may withhold any cash settlement amount owed to the Member and to set-off such withheld amounts with the amount owed by the Member to CROPEX; and/or enforce, realize and apply its rights in the	n.a.	n.a.	n.a.

		Collateral posted by the Member by: (i) drawing upon Bank Guarantees provided, and/or (ii) drawing upon the balance of the Deposit Accounts		
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Source: own elaboration

Table 7 continued: Institutional framework for typical organized day-ahead electricity markets in the EU and in the Energy Community³¹

	Serbia	Slovenia	UK	Italy	Spain
Name of PX	SEEPEX Ltd	BSP Regionalna Energetska Borza d.o.o.	1. APX Commodities Limited 2. Nord Pool Spot AS 3. SONI Ltd	1. GME SpA	1. OMIE SA
Ownership	EMS Serbian TSO 75% and EPEX Spot 25%	50% Market operator Borzen 50% TSO ELES	1. 100% EPEX Spot 2. Statnett (28.2%); Svenskakraftnät (28.2%); Fingrid (18.8%); Energinet.dk (18.8%); Elering (2%); Litgrid (2%); AST (2%) 3. 100% EirGrid Irish TSO	100% Public (Minister of economic development through GSE and AU).	50% OMEL (40% energy companies; 60% other) 50% OMIP (50% market operator; 50% others)
Legal framework	Energy law (Official Gazette of the RS", No. 145/2014)	Energy Act of 2001 establishing the role of the market operator.	Electricity Act 1989 regulated the bids of generator on the England and Wales pool. Later reforms refer to RETA, NETA and Utilities Act (2000).	Legislative Decree 79/99. Article 5 - Vested GME with the responsibility of organizing and managing transactions in the Electricity Market under certain criteria. Subsequent laws and decrees regulated other topics like green	Royal Decree 2019/1997. (amended by R. D. 5/2005, R. D. 6/2000, R. D. 1454/2005) - Article 2 - the electricity market organization. Definition of market agents and their powers. Article 5 – Defines

³¹ UK and Spain have been added because they are particularly representative. They served as “school cases” or “examples” for the others: a review of legal and organizational framework is more complete if includes information on those that first have been implemented in Europe.

				certificates trading and gas trading.	market operator functions in coordination with the Spanish System Operator. Coordination in conformity with the Electricity Sector Act. Electricity sector Act Law 54/1997, settlement and payment to be public, transparent and objective. And International agreement between Spain and Portugal
General principles	YES - Energy law defines: Competitiveness of electricity market based on the principles of non-discrimination, publicity and transparency; promotion of regional operation.	YES –Electricity Act and subsequent amendments.	YES –Electricity Act and subsequent amendments.	YES – L. Decree: criteria of neutrality, transparency, objectivity and competition between producers. Market rules: market operator functions to be exercised in a non-discriminatory way.	YES –Royal Decree: Energy settlement and payment operations, will be public, transparent and objective.
Market rules	EMS TSO establishes the Market Rules for Bilateral trading and the Rules for Operation of the Electricity Balancing Market, and submits them to the Agency for approval. Organized Market Operator Rules (SEEPEx): pass the rules on the organized electricity market operation;	Market operator proposes and after receiving comments by the market participants, decide in issuing market rules changes. This process lasts 15 days. Unless changes in law require quicker period.	Market operator proposes and after receiving comments by the market participants decide in issuing market rules changes. Market operator may consult the Regulator. If a change in Law will render any provision(s) of the APX Rules illegal,	Market operator is in charge and requires conformity to all market participants. Market operator proposes changes, receive comments from concerned parties and send them to the Ministry who decide after hearing Regulator opinion. The above do not apply in case	Market operator to the Ministry of the Economy, for its approval, the proposals for modifications of the Market Activity Rules that the said operator considers suitable for the best execution of the Electric Sector Act and its regulations.

			unenforceable, or impracticable, then APX shall as soon as reasonably practicable after becoming aware of such change in Law notify each Power Member of the change in Law and its effect on such provision(s).	of urgent amendments with purpose of safeguarding the market functioning.	In those cases, in which it is necessary to comply with the law and its regulations, proposals are sent to the Ministry who makes its decisions based on the report of the National Energy Commission.
Decision on interconnection capacity amount reserved for the PX, and how much is allocated explicitly?	The TSO. Minimum capacity allocated is 1MW.	The regulator. Cross border with Italy is explicitly allocated. Minimum capacity allocated is 1MW.	Coupling implicitly allocated.	The regulator. Cross border with Slovenia is explicitly allocated. Minimum capacity allocated is 1MW.	The TSO. Minimum capacity allocated is 1MW.
Risk of default of a party	If the Exchange Member fails to fulfil one of its obligations under the Rules and Regulations of SEEPEX and if it fails to implement the modifications required by SEEPEX AD, then SEEPEX AD may suspend or terminate the Trading Agreement as provided in the Exchange Rules.	BSP may revoke or suspend a Member. Transactions affected shall be entitled to financial reimbursement (from bank accounts or deposit) for the cost related to it in accordance with a Price List.	The Clearing House may buy, sell or enter as many Power Products at such times and at such prices as the Clearing House in its absolute discretion considers necessary and the Power Member irrevocably appoints APX as its agent, in order to secure to APX the ability to trade out the position to which APX would be otherwise exposed. And the Power Member shall be liable for any costs, fees, charges or other amounts payable.	GME suspend the Market Participant from the Electricity Market and redeem the guarantees; close all the contractual positions of the defaulting Market Participant and register the net delivery position onto the PCE. If the guarantees redeemed are insufficient to cover the debit of the defaulting Market Participant or if the bank issuing the guarantee defaults on its obligations GME shall contribute to covering the debits of the defaulting Market	The market operator may execute the guarantees of the market participant. If executing the guarantee does not enable the immediate collection of the amount owed, the Market Operator shall reduce, on a pro rata basis, the collection rights of the seller agents, which gives rise to a loan to the non-paying agent from the seller agents. The amount owed earns interest for delayed payment.

				<p>Participants or the default by the bank issuing the guarantee by utilizing its own funds, up to a maximum amount to be established on a year-by-year basis and allocated for such purpose. This amount is established by the Minister of Economic Development at the proposal of GME and posted on GME's website.</p>	
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Source: own elaboration

8. ANNEX 3 - SEE CAO AUCTION BORDERS

Procedures for capacity allocation are performed by the SEE CAO platform since 2012 but essentially since 2014, when the Board of Director agreed on setting up SEE CAO and agree on its functions. SEE CAO performs in its own name but on behalf and for the account of the participating TSOs explicit allocation of available transmission capacities on the borders between participating TSOs in accordance with SEE CAO Auction Rules and following the requirements of Regulation (EC) 714/2009 of the European Parliament and of the Council on conditions for access to the network for cross border exchanges in electricity which also became a part of Energy Community acquis in line with the stipulations of Energy Community Treaty.

Explicit auctions are Net Transmission Capacity (NTC) based and conducted using the DAMAS Auction Platform on three timeframes- yearly, monthly and daily on the borders reported in the following Figure.

Figure 9: SEE CAO auction borders.



Source: SEE CAO website.