POLICY PAPER

Electricity market – a road to Europe

Mujčinagić Alija, B.Sc.E.E.

March, 2007.

TABLE OF CONTENTS

LIST OF ACRONYMS

EXECUTIVE SUMMARY

INTRODUCTION

"Good coordination cannot overcome bad market design. Markets in power, more than most markets, are made, they don't just happen."

Wiliam H. Hogan, FERC, Washington DC.june, 2001

Alija Mujčinagić has been employed by the State Electricity Regulatory Commission (SERC) since 2004.

The author participates in the project as an independent researcher. The views expressed herein are those of the author and do not necessarily coincide with the official views of SERC.

LIST OF ACRONYMS

BIH	Bosnia and Herzegovina
EC	European Commission
ECD	European Commission Delegation
EC Treaty	Energy Community Treaty
EP	Elektroprivreda (power companies)
EP BIH	Elektroprivreda BIH
EP HZHB	Elektroprivreda Hrvatske Zajednice Herceg Bosne
EP RS	Elektroprivreda Republike Srpske
EU	European Union
FBIH	Federation of Bosnia and Herzegovina
FERC	Federation Electricity Regulatory Commission
GFAP	General Framework Agreement for Peace in BIH
ISO	Independent System Operator
KM	Konvertabilna Marka
MoFTER	Ministry of Foreign Trade and Economic Relations
RS	Republika Srpska
RSERC	Republika Srpska Electricity Regulatory Commission
SCADA	Supervisory Control and Data Acquisitions

EXECUTIVE SUMMARY

In many European countries the transitional stage from a monopolistic structure of the sector to conditions of open and free competition has proven a slow and painful process. This problem was more acute in the cases where there was a vertically integrated publicly owned energy enterprise. In order to facilitate new entries into the market, some countries introduced measures of active and asymmetrical support of competition. In any case the transition is a dynamic process that requires continuous state-wise adaptive measures and depends mainly on legislative initiatives. There have been undoubtedly many problems during the transition to a competitive environment, which usually can be related to conditions of inadequate implementation of the liberalized structure or mistakes in the adoption of the transitory mechanisms. In many cases the problems were connected or occurred as a direct result of inadequate monitoring of competition in the market, a fact that allowed the existence of market power (and its abuse) by the incumbent enterprise(s).

The lack of a single Electricity Law at the state level and non-existence of any law that would precisely define a single electricity market put BIH in a difficult position considering its obligation taken over by the signing of the Treaty Establishing the Energy Community, which BIH signed in October 2005. By the signing of the Treaty, the parties to the Treaty from the region are obligated to establish a common electricity and gas market that will operate in accordance with the standards of the EU energy market with which it will eventually integrate.

According to the Treaty, Bosnia and Herzegovina has to harmonize its legislation pertaining the energy sector with the European Union regulations by July 1, 2007. The non-existence of a uniform energy strategy at the state level and defined electricity market design affect the BIH society. BIH may accelerate the process of joining the European Union by undertaking specific actions in the energy sector.

INTRODUCTION

Bosnia and Herzegovina has not created a functional electricity market. Social and political environment as well as a whole range of circumstances has slowed down the process of the electricity market creation, which is part of the energy sector reform in BIH. The creating of an internal market in accordance with European directives and its joining the regional electricity market of South-East Europe is the process that Bosnia and Herzegovina has to implement in order to accede the European Union.

The realization of international obligations ensuing from the signing of the Treaty on Energy Community and the time schedule of meeting the obligations make the situation even more complex[1].

The concept of abolishing the exclusive rights of the publicly owned, vertically-integrated monopolistic utilities, and introducing competition in the energy sector has started to occupy the minds of European and US policy makers since the 1980s. This was preceded by a long session of maturity in both technical achievements and capitalization in the electricity sector, during which the industry witnessed the onset of the law of "diminishing returns".

For many years the energy sector in most industrialized nations has been characterized by expanding electrification with increased demand, which justified a monopoly structure where regulated average prices were retained above marginal costs, and based on economies of scale and scope, achieved continuous falling of prices. Such a happy state of affairs persisted until the 1970s and 1980s when the direct and indirect effects of the oil crisis destabilized the entire structure. To those events one must add the increasing social concerns about environmental impact of the large central power plants, which forced many utilities to internalize the external costs of environmental impact mitigation.

[1] The Energy Community Treaty was signed in Athens on October 25, 2005 and entered into force on July 1, 2006. The signing of the Energy Community Treaty means that the European Union and nine partners of South East Europe - Croatia, Bosnia and Herzegovina, Serbia, Montenegro, the Former Yugoslav Republic of Macedonia, Albania, Romania, Bulgaria and UNMIK on behalf of Kosovo - will create the legal framework for an integrated energy market.

The accumulation of invested capital and size of activities led many monopolistic utilities to face a situation where the rate of increase of marginal cost of electricity far exceeded the rate of increase of the average prices allowed by regulators or governments to charge, making the classical monopoly business strategy of expansion and growth untenable.

Gradually a new strategy for the electric utility emerged, based on the assumption that scale economies for central power stations were no longer significant. The new paradigm was based upon small scale and independently owned generation and supply alternatives and end-use conservation. This model shifts the risk of the investment decisions from the customers (under a regulated monopoly), to the independent producers.

By the 1980s it has become apparent that in order to achieve higher efficiencies and the improvement of the quality of services, it was necessary to introduce competition in the sector as a concept, which during the 1990s was accelerated due to the fact that competition was the base for the creation of a single European Market. Competition encourages firms to price whatever services they produce more efficiently. In particular, if common or fixed costs have to be recovered, it is desirable that they are recovered disproportionately on services for which demand is relatively unresponsive to price.

Firms operating in markets subject to competitive entry are drawn to set prices in this fashion, because this tends to maximize their own profits. The successful introduction of competition will eventually lead to a more efficient industry.

The electricity sector in South East Europe (SEE) is going through the process of reform, and in particular of the establishment of long-term strategies to develop appropriate institutions. The reform process in each country has started at a different level. Many countries are still in transition from centrally planned economies to market economies. Some still try to cope with fundamental problems in the organization and regulation of their economy in general and their energy sector in particular.

This process was launched by the European Commission, with the support of the Stability Pact for South Eastern Europe (SPSEE) in 2002. The (SPSEE)[2] is the first serious attempt by the international community to replace the previous, reactive crisis intervention policy in South Eastern Europe with a comprehensive, long-term conflict prevention strategy. The underlying idea of the SPSEE members is to draw the countries of the region closer to the perspective of European integration. A key element in this strategy is the Stabilization and Association Process[3] for the Western Balkan countries.

Thanks to the dedication of all the parties involved it made rapid progress including the signing of Memorandum of Understanding on Electricity in November 2002 in Athens and the expansion of this co-operation to the gas sector through a second Memorandum of Understanding in December 2003. Under these, the SEE countries committed themselves to introducing common rules based on EU legislation "acquis communnautaire" in these two sectors. The process received a significant boost through the physical reconnection of the SEE grids to the UCTE network in October 2004.

The creation of a Regional Energy Market in South East Europe has been addressed as a priority and a challenge for regulatory and economic institutions in the area.

This policy research paper will endeavor to explore the main challenges to the establishment of electricity market in BIH and its integration into the Regional Electricity Market. Some recommendations for more efficient activities in this context will be given.

[2] At the European Union's (EU's) initiative, the Stability Pact for South Eastern Europe (SPSEE) was adopted in Cologne on June 10, 1999. Its inauguration took place at a summit meeting in Sarajevo on July 30, 1999. The Stability Pact is a political initiative to encourage and strengthen co-operation between the countries of South Eastern Europe as well as to streamline existing efforts to assist South Eastern Europe's political, economic and security integration in Europe. The Pact is an instrument to co-ordinate and facilitate the implementation of the projects of all its partners. These include the countries of South Eastern Europe and neighboring countries, the European Commission, NATO and OSCE, the International Financial Institutions (IFI), the member states of the European Union, the United States, Russia, Japan, Hungary, Canada, Norway and Switzerland.

[3] The Stabilization and Association Agreement (SAA) negotiations were officially opened in November 2005. Negotiations have progressed well from a technical point of view and a substantial part of the text of the future SAA has been agreed. However, the conclusion of the negotiations is dependent on Bosnia and Herzegovina's progress in implementing key reforms.

1. ELECTRICITY SECTOR

1.1. Country background

Bosnia and Herzegovina (BIH) is a country with 4 million people and geographically it belongs to the region of South-East Europe. The General Framework Agreement for Peace in BIH (GFAP), which put an end to a war in BIH, established a complex and atypical government institutional structure comprised of a centralized State government, two Entity level governments and local governments (10 Cantons and 146 municipalities, excluding Brcko District).[4] In each entity there are governments that have different interests and responsibilities with regard to the power sector. The war caused division of the power system which greatly contributes to the disintegration of Bosnia and Herzegovina.

1.2. Electricity

Electricity is critically important to modern societies and represents a set of complex challenges and dilemmas. This is true for all countries, but particularly for those undergoing a process of significant economic and social change, such as Bosnia and Herzegovina.

Reliable, cost effective electricity supplies are clearly fundamental for economic growth, social stability and the general functioning of advanced economies. There is also a well-established connection between access to energy and indicators of social well-being such as life expectancy, health status, educational achievement, the incidence and level of poverty, and quality of life.

[4] The signing of the GFAP in November 1995 confirmed the State of Bosnia and Herzegovina (BIH), which comprises two Entities, Republika Srpska (RS) and the Federation of Bosnia Herzegovina (FBIH). In addition to the two Entities, the Brcko Final Arbitration Award of the 5th March 1999 established the Brcko District of BIH with substantial legislative and administrative autonomy.

1.3. Electricity sector facts

Prior to the war, the energy sector played a key role in the economy, producing eight percent of GDP in 1992. After the war the power sector has a leading role in the economic and social progress of Bosnia and Herzegovina. Some of the indicators[5] supporting this are the following:

- Around 50,000 people in BIH directly "live" on the power industry (according to some estimates, the number is even higher)
- Total annual revenue realized in the power sector in Bosnia and Herzegovina is higher than 1.2 billion KM (approximately 700 million $), which is more that 12% of GDP
- The largest share of the revenue realized in the power industry is "spent" in Bosnia and Herzegovina
- The book value of power companies in Bosnia and Herzegovina is estimated at approximately 10 billion KM
- Bosnia and Herzegovina is one of the rare countries in the region which meets its electricity needs
- Due to its geographic location, BIH is on the route connecting South-East Europe with Western Europe, and integration of the BIH market in the single regional electricity market would bring a considerable income to BIH from transit of electricity.

  This income in 2005 amounted approximately 4.500.000 €.
- Good connections with the neighboring systems provide a possibility of construction of new generation capacities and sale of electricity at the regional market.

1.4. Sector structure and details

In the Federation of Bosnia and Herzegovina there are two state-owned companies engaged in electricity generation and supply. The characteristic of these companies is that they supply the areas with Bosniak and Croat ethnic majorities.

[5] Energy sector problems, Bosnia Forum International Sarajevo,30-april2003., Document No.178B-2003.

The first and the biggest company is the Public Utility "Elektroprivreda BIH" (EPBIH). EPBIH is based in Sarajevo, and serves a customer base of approximately 646.000 customers[6], over 90% of which are household customers.

EPBIH operates 2 coal-fired thermal power plants (Kakanj 578 MW and Tuzla 779 MW) and 3 hydro power plants (Grabovica, Jablanica, Salakovac) with a total installed capacity of 1.831 MW.

In addition, EPBIH operates 6 small hydro power plants with a total installed capacity of 9.6 MW. In 2002, the company's production was 5.540 GWh, and the total customer demand was approximately 3.505 GWh. These levels represent 74% of 1990 levels in generation and 63% of 1990 levels in consumption (direct consumers 14% and distribution 75%).

The performance of EPBIH has been improving steadily over the last few years. EPBIH has sufficient generation capacities to meet the needs of its customers and to export certain amount of electricity[7].

The second company in the Federation of BIH, the Public Utility "Elektroprivreda of the Croatian Community of Herzeg-Bosnia (HZ-HB)", Stock Company Mostar is considerably smaller with regard to installed capacity and the number of customers. It serves around 168.000 customers, approximately 152.000 of which are household customers. EP HZ-HB operates five hydro power plants with a total installed capacity of 775 MW (Rama, Čapljina, Jajce I, Jajce II, Mostar and Peć-Mlini).

Unlike the EP BIH, this company does not have sufficient electricity to meet the needs of its customers, consequently, it has to import electricity. It meets the needs of only 40% of the customers by its own generation[8].

---

[6] Source www.elektroprivreda.ba

7 This indicator is evident from the energy balance prepared by the Independent System Operator in BIH (ISO BIH), "The Energy Balance for 2006"

[8] "The Energy Balance for 2006", ISO BIH

One of the biggest consumers in south-east Europe, "Aluminij (Aluminum)" Stock Company Mostar consumes 50% of total energy within JP EP HZHB, i.e. 20% of total energy consumption in BIH.

In the other entity, the Republika Srpska, there is one company – the Public Utility "Elektroprivreda Republike Srpske" (ERS) Stock Company Trebinje, which is majority state-owned and also has a monopoly on the whole territory of this entity. This company supplies the area of the Republika Srpska with predominantly Serb population. ERS has a customer base of 436.000, over 400.000 of which are household customers. ERS operates two lignite-fired thermal power plants (Gacko and Ugljevik, 300 MW each) and 5 hydro plants (Bočac, Trebinje and Višegrad) with a total installed capacity of 1.424 MW.

Just like JP "Elektroprivreda BIH", this company also has sufficient capacity to fully meet the consumption of its customers and to export some electricity[9].

				kWh
Production 2006.	EP BIH	EP HZHB	ERS	Total
Hydro power plant	1.389,20	1.381,00	2.378,00	5.148,20
Termo power plant	4.574,60		2.910,65	7.485,25
Mini hydro and industry plants	80,84		64,95	145,79
Total (GWh)	6.044,64	1.381,00	5.353,60	**12.779,24**

Table 1. Electricity production in 2006

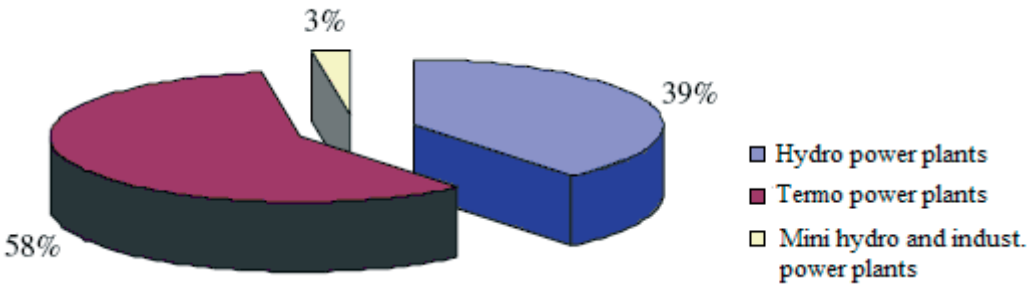

Chart 1. Structure of electricity production in BIH

[9] "The Energy Balance for 2006", ISO BIH

					kWh
Consumption 2006.	EP BIH	EP HZHB	ERS	Brčko District[10]	Total
Net distribution	3.364,09	1.092,27	2.820,61	215,74	7.492,71
Distribution losses	393,01	207,73	651,04	53,94	1.305,72
110 kV Consumption	531,02	2.278,00			2.809,02
Coal mine consumption on 110 kV			39,15		39,15
Transmission losses	159,00	60,00	141,00		360,00
Total (GWh)	4.447,12	3.638,00	3.651,80	269,68	**12.006,60**

Table 2. Electricity consumption in 2006 (estimation)

It is obvious that BIH can meet the needs of domestic customers from its own resources (It can be seen from tables 1 and 2 that the total generation in BIH is higher than the total consumption), however, due to non-existence of a single market a paradox is created whereby electricity is imported for one part of the customers.

The obvious problem contributes to irrational trade where two electricity utilities export electricity while the same electricity is imported by the third company to meet the needs of its customers, just at a considerably higher price. The power companies are synchronized and interconnected but there is no competition among them; they are virtual monopolies within their exclusive ethnically based service territories. The non-existence of a single market is used by electricity traders to the detriment of BIH people. This situation in the sector has created the difference in the prices that have been issued by the regulatory commissions and are applicable since April 2006[11] (Table 3).

[10] In addition to the three main companies, there is also a small autonomous distribution grid in the town of Brcko. It has no generation assets, purchasing all the electricity from the three state owned companies. It has approximately 26,000 customers, around 90% of which are household customers, who consume average 340 kWh per month.

[11] The Tariff Systems for the Territory of the Federation of BIH and the Republic of Srpska (www.ferk.ba and www.reers.ba)

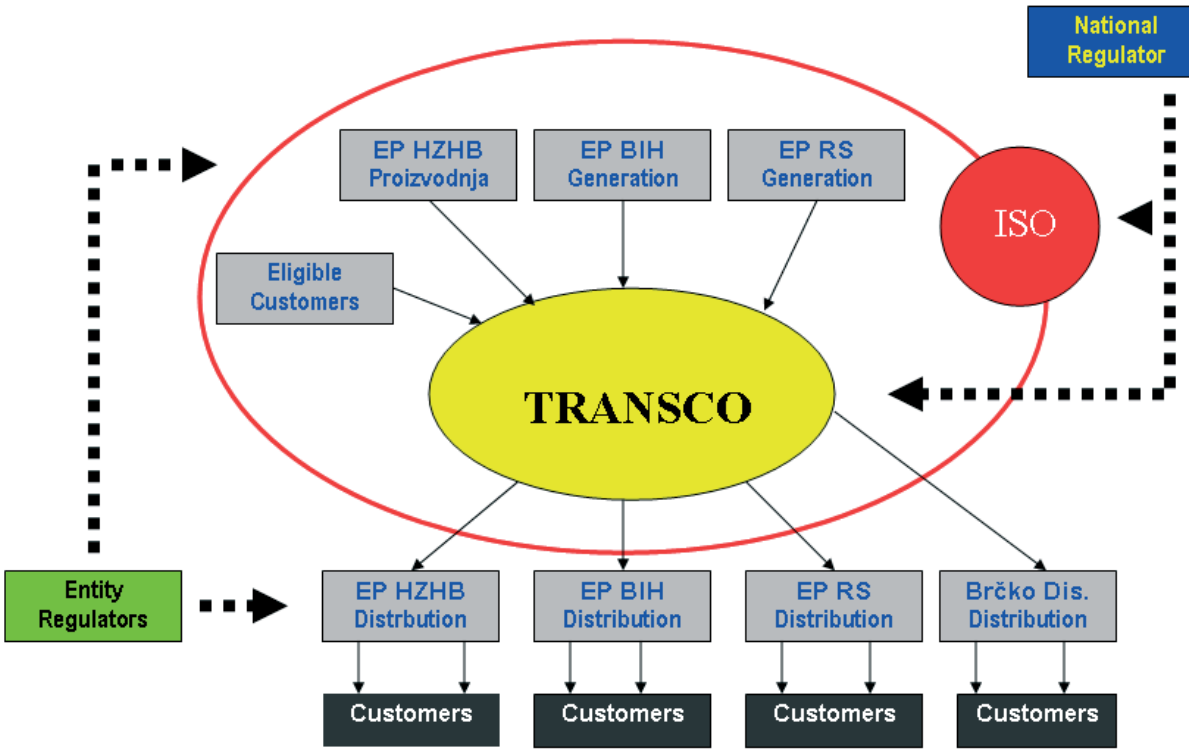

Figure 1. Power sector structure, January 2007.

The same category of customers in the area supplied by JP EP HZ-HB pays considerably higher electricity than the same customers supplied by JP ERS and JP EP BIH. Although JP EP HZ-HB supplies its customers with electricity generated in hydro power plants producing cheap electricity, the end-customer price is much higher due to a high price of electricity that is imported in order to meet the need of all customers.

	pfennig/kWh				pfennig/kW
Companies	High Season		Low Season		Fix cost demand charge
	High Tariff	Low Tariff	High Tariff	Low Tariff	
EP BIH	14,49	7,80	11,40	6,26	3,85
EP HZHB	14,67	7,90	11,55	6,34	4,85+3,73
ERS	13,04	6,52	8,70	4,35	1

Table 3. Household retail tariffs in BIH -2006

2. ELECTRICITY SECTOR REFORM

2.1. Reforms objectives

The main objective of reforms is the introduction of competition in the sector in order to break the current monopoly of state-owned companies and privatization that will attract desirable strategic investors and necessary investments to the sector. In a technical and economic sense, it means ensuring secure system operation, electricity supply, stability of wholesale prices. The primary goal of restructuring is to develop electricity trade beyond the national and entity borders to the benefit of the society.

The process of the electricity sector reform in Bosnia and Herzegovina (BIH) was initiated by the signing the Statements of the entity governments on the electricity policy[12] in 2000, and was continued by the adoption of the Law on Transmission of Electric Power, Regulator and System Operator in BIH[13] and the Entity Laws on Electricity[14] (in 2002).

During 2004, the adoption of the Law Establishing the Company for Transmission of Electric Power in BIH[15], and the Law Establishing an Independent System Operator for the Transmission System of BIH[16], Bosnia and Herzegovina commenced the electricity sector reform in practice.

[12] Policy Statement summarizes the plans of the Governments of FBIH and RS for the restructuring of, and for regulatory reforms in, the electricity industry.
[13] "Official Gazette of BIH", No. 7/02 and 13/03
[14] Law on Electricity of the Federation of Bosnia and Herzegovina "Official Gazette of F BIH", No. 41/02 of August 23, 2002 and the Law on Electricity of Republika Srpska "Official Gazette of Republika Srpska", No. 66/02 of October 23, 2002
[15] "Official Gazette of BIH", N° 35/04 of July 29, 2004
[16] "Official Gazette of BIH", N° 35/04 of July 29, 2004

2.2. Regulatory framework

The laws adopted at the state and entity levels provided for the establishment of the regulatory practice in the electricity sector of Bosnia and Herzegovina. Regulation of the electricity sector of BIH is carried out at two different levels and involves three regulatory commissions.

The State Electricity Regulatory Commission in Bosnia and Herzegovina (SERC) has been operational since July 1, 2003. SERC is based in Tuzla. Regulatory practice does not cover the activities of generation, distribution and supply of electricity in the Brčko District of Bosnia and Herzegovina.

The Federal Electricity Regulatory Commission (FERC) and the Republika Srpska Electricity Regulatory Commission (REERS) have, inter alia, competences in the activities of electricity generation and distribution. FERC is based in Mostar and REERS is based in Trebinje.

The Regulatory Commissions have been established in accordance with international regulatory standards based on the principles of independence and transparency. The key characteristic of the independent regulator model is the decision-making independence. This means that regulator's decisions are made without prior approval of any other government entity, and no entity other than a court or a pre-established appellate panel can overrule the regulator's decisions.

The principal motivation for trying to create an independent regulatory entity is to "depoliticize" tariff-setting and other regulatory decisions by insulating the regulatory entity from day-to-day political considerations[17].

However, the process of establishment of regulators, as many other processes, is a reflection of the compromise from the Dayton Peace Agreement, thus, Bosnia and Herzegovina is

[17] Handbook for Evaluating Infrastructure Regulatory Systems, The World Bank, Ashley C.Brown, Jon Stern and Bernard Tenenbaum with Defne Gencer

faced now with the problem of harmonization and unification of these three commissions into one.

The power sector of BIH is small compared with some developed European countries, consequently, the existence of the three regulatory commissions is unnecessary and it creates a bureaucratic environment with unnecessary costs and delays.

Although the adopted laws set the deadlines for the completion of some processes and the establishment of new entities, those deadlines have not been met.

The Independent System Operator in Bosnia and Herzegovina (ISO BIH) started its operations in July 2005. According to the ISO Law, ISO BIH shall manage system electricity flows, maintain a balancing market and otherwise ensure the reliable and non-interrupted flow of electricity within the system. ISO BIH shall administer the balancing market. It is based in Sarajevo.

The Company for Transmission of Electricity in BIH ("Elektroprenos Bosne i Hercegovine", JSC Banja Luka, TRANSCO) started its operations in February 2006 with a considerable delay. TRANSCO is a new single company at the state level which runs transmission activities of the three mentioned companies. TRANSCO is based in Banja Luka with operational centers in Banja Luka, Mostar, Sarajevo and Tuzla.

The activities of TRANSCO include transmission, maintenance, construction, expansion of the transmission network of Bosnia and Herzegovina. Upon the establishment of TRANSCO, no other electric company or any other company has jurisdiction or authority in such matters.

The establishment of TRANSCO is an important step in ensuring the compliance with the EU Electricity Directive (2003/54/EC) as the latter addresses third party access to transmission and distribution networks and unbundling of supply from transmission.

> "*Delegation of the European Commission to BIH welcomes the establishment of TRANSCO «Elektroprenos Bosne i Hercegovine», a single, national, electricity transmission company in Bosnia and Herzegovina, as a major milestone in the reform of BIH's power sector. This step is only the beginning of a major process of integration for TRANSCO whose successful completion is of great importance for Bosnia and Herzegovina's integration into the Energy Community for South East Europe as well as the European Union."*[18]

The Council of Ministers established the Energy Department within the Ministry of Foreign Trade and Economic Relations (MOFTER) tasked with the coordination of energy sector activities in BIH, including relationships with international and regional bodies.

The application of several laws which regulate the functioning of the power sector in BIH is slowed down due to slow implementation of the Action plans for restructuring of the electric power sector in BIH for Federation of Bosnia and Herzegovina and Republika Srpska.

The inconsistency (three Laws on Electricity – different treatments of the electricity market) of some provisions of the Laws on Electricity, the need for harmonization of all aforementioned laws in Bosnia and Herzegovina as well as the obligation to harmonize with the provisions of the Treaty Establishing the Energy Community of South-East Europe impose the need for review of the Laws.

[18] Federal News Agency (FENA), Sarajevo, February 2, 2006.

3. ENERGY COMMUNITY TREATY OBLIGATIONS

The specific obligations of the Contracting Parties of the Treaty establishing Energy Community are as follows:

1. Implementation of Acquis Communautaire on Energy:

- Implementation the EC Directives No. 2003/54 and 2003/55, and the EC Regulations No. 1228/2003 within six months of entry into force of the Treaty;
- The contracting parties must ensure that the eligible customers are:
  1. From 1st January 2008, all non-household customers; and
  2. From 1st January 2015, all customers.

The deadline for implementation of these directives is July 1, 2007.

2. Implementation of Acquis Communautaire on Environment

- European Community Council Directive 85/337/EEC of June 27, 1985 on assessment of the effects of certain public and private projects on environment, with subsequent amendments of March 3, 1997 (Directive 97/11/EC) and Directive 2003/35/EC of the European Parliament and the Council of May 26, 2003; implementation after entry into force of the Treaty;
- Directive 2005/53 of the European Parliament and of the Council of July 6, 2005, amending Directive 199/32 of April 26, 1999 relating to the reduction of sulfur content of certain liquid fuels; implementation by December 31, 2011;
- Directive 2001/80/EC of the European Parliament and of the Council of October 23, 2001 on limitation of emissions of certain air pollutants by large combustion plants (≥ 50MW); implementation by December 31, 2017;
- Article 4(2) of the European Community Council Directive 79/409/EEC of April 2, 1979 on conservation of wild birds; implementation after entry into force of the Treaty;

Endeavour to accede to the Kyoto Protocol and implementation of the Directive 96/61/EC of September 24, 1996 on pollution prevention and control.

3. Implementation of Acquis on Renewable Energy Sources

- Provide to the European Commission a plan to implement the Directives 2001/77/EC and 2003/30/EC of the European Community on the renewable sources;

4. Implementation of Acquis Communautaire on Competition

The following activities are not allowed and shall be assessed pursuant to Article 81, 82 and 87 of the Treaty Establishing the Energy Community:

- Prevention, restriction or distortion of competition,
- Abuse of dominant position,
- Any public aid which distorts or threatens to distort competition.

In addition to the above obligations directly arising from the Treaty establishing the Energy Community, among others, Bosnia and Herzegovina has to:

- Create a market framework permitting the efficient operation of Network Energy Market and capable of attracting investments in the energy sector.

4. ELECTRICITY MARKET

4.1. Basic Principles of Electricity Markets

Taking into consideration the current publications on electricity markets and liberalization, it becomes obvious, that the question is no longer if competition should be introduced but how to organize markets in order to achieve an optimum performance. Power delivery is nowadays a bundle of many services including mainly generation, transmission and distribution. While the former vertically integrated utilities charged one price for power delivery today every single service has to be priced separately[19].

The theory of perfect competition is well developed but not applicable to the "real" world. The concept is claimed to be an idealized fiction, useful mainly for the conceptual development of ideas.

Perfectly competitive markets are referred to be efficient, where "efficiency means:

1. the output is produced by the cheapest suppliers,
2. it is consumed by those most willing to pay for it, and
3. the right amount is produced.

Another formulation of efficiency is, that the social welfare has been maximized. Elementary microeconomics state that the intersection of the supply and demand curve determine a stable equilibrium in perfectly competitive markets (see figure 1). The demand curve represents the aggregated preferences of the consumers. It defines how much the consumers are willing to consume at a certain price. In contrast, the supply curve shows how much output the suppliers are willing to produce at a given price. From the crossing of both curves the competitive price (or market price) and the competitive quantity can be read.

[19] Evaluation of Transmission Pricing Methods for Liberalized Markets - A Literature Survey Internal Report EEH PSL 2003 001 Zurich, 07 July 2003

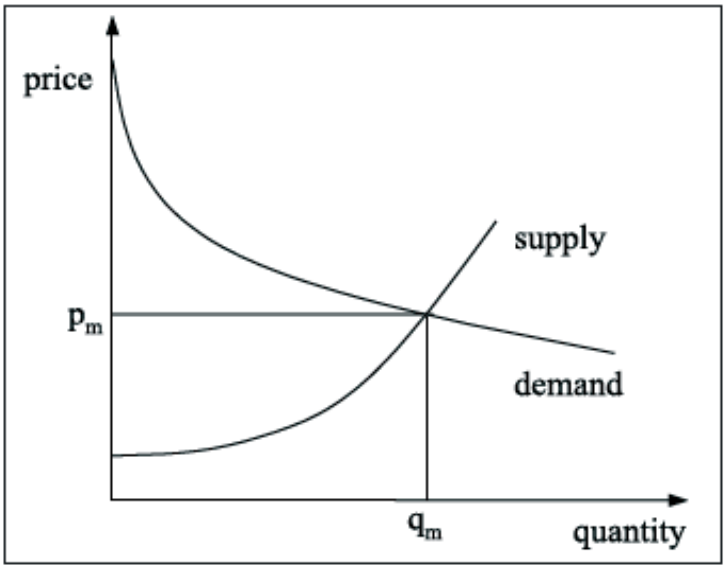

Figure 2: Equilibrium price and quantity in competitive markets

As seen in figure 2, there are consumers who are willing to pay significantly more than the current market price *pm*. That difference between the consumers' willingness to pay and their real expenditures is referred to as consumers' rent or surplus *CS* (red area). The same considerations apply to the suppliers' side. A number of suppliers produce even at a significantly lower price, but, in fact, they are paid the higher market price. The difference on the production side is called producers rent or surplus *PS*. The sum of both, the consumers' and the producers' surplus is referred to as total surplus *TS*. Figure 3 depicts a graphical definition of the terms.

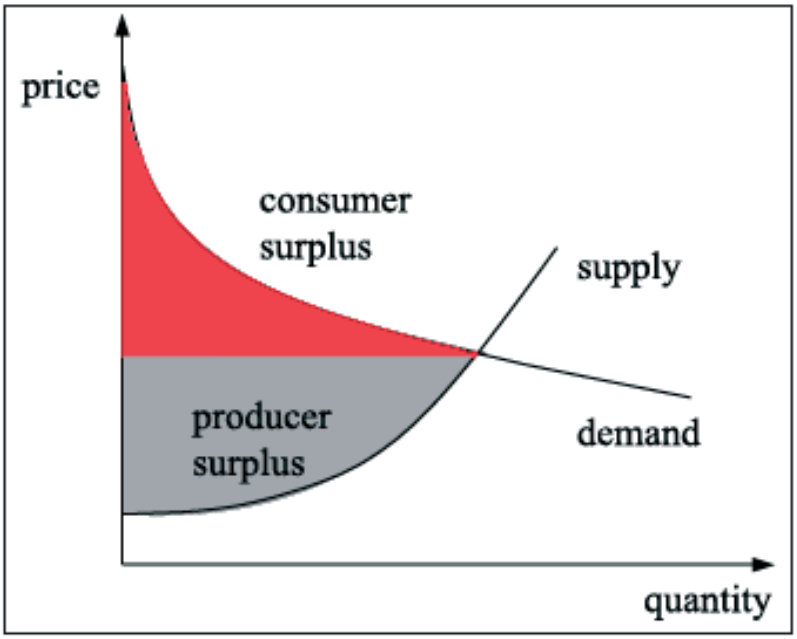

Figure 3: Graphical Definition of Surplus

In perfectly competitive markets the total surplus is maximal, whereas in all other situations (e.g. monopoly or oligopoly) the total surplus decreases.

The electricity market must deliver reasonably priced energy with the highest service levels to the end-customer. Nevertheless the establishment of energy markets does not happen overnight simply by the setting of rules but as a result of careful design. The mere introduction of competition does not create an efficient liquid market, but there is clearly the need of carefully designed rules, interfaces and trading arrangements.

A successful fully competitive energy market is the final result of a stage-by-stage approach in each step of which the necessary pre-requisites for formation must exist.

The elements that need to be in place for the markets to be competitive and work properly are:

- Many Buyers and many Sellers – lack of market power on both sides;
- Demand and Supply responsiveness to price;

- Liquid (easily absorb the addition or loss of any player without a noticeable change in the market price) and efficient (if participants cannot predict which way prices will move) market places;
- Transparent and non-discriminatory access to any essential facilities (networks);
- Treatment of subsidies and environmental controls so that they do not interfere with the workings of the market.

Achieving all the above in electricity is quite a substantial design job, due to its special physical characteristics, namely, of non-storability, flowing through the path of least resistance, that transmission of power over the network is subject to a complex series of physical interactions, so that what happens on one part of the system affects conditions on the network many miles away, and finally propagation at the speed of light.

Energy markets should be structured to achieve best for all market players. At least two approaches are conceivable:

(1) direct or bilateral electricity trading

(2) centralized electricity trading via a power exchange or a pool

4.2. Bilateral trading

According to the Action plan of the Federation of Bosnia and Herzegovina for restructuring and privatization of the electricity sector and the Action plan of the Republika Srpska for restructuring and privatization of the electricity sector[20], the wholesale market is based on the bilateral trading.

[20] The Action Plans for the Restructuring of the energy sector along these lines were agreed by Republika Srpska in April 2003 and the Federation in May 2005. These plans set out a time frame for restructuring of the sector by the end of 2007. This involves different stages of 1) reallocation of assets; 2) Corporatisation; and 3) Commercialization.

According to the bilateral trading of electricity, suppliers and consumers independently arrange power transactions with each other according to their own financial terms. Economic efficiency is promoted by consumers choosing the least expensive generators. The bilateral approach gives a great latitude for decentralized decision making. It is motivated by the concept of free market competition providing the customers with “direct access” to the producer of choice. Figure 4 depicts the bilateral trading approach.

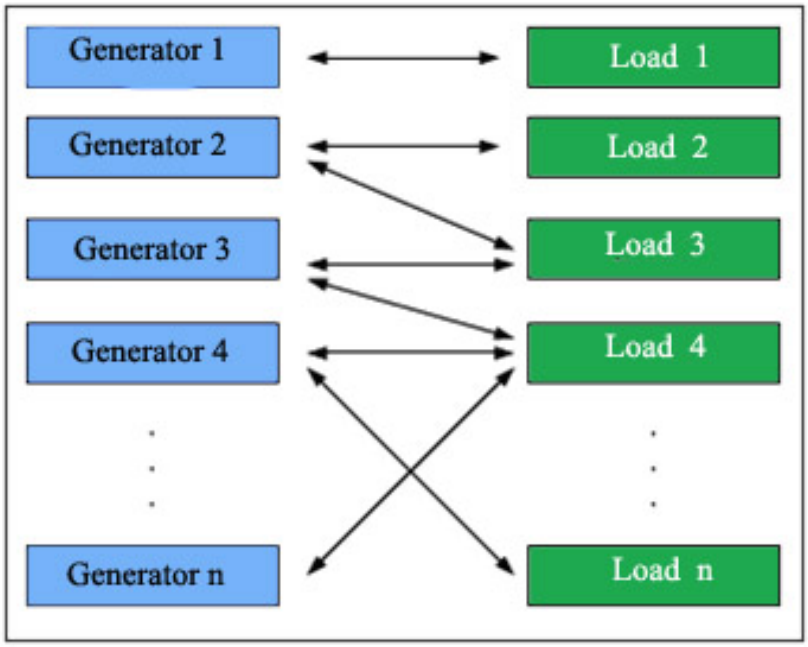

Figure 4: Bilateral Electricity Trading

As seen several constellations are possible. Generators may only have one load to supply as well as loads may only have one supplying generator. It is presumable that loads settle in contracts with more than one generator and generators deliver electricity to several loads in order to optimize their performance.

4.3. Market opening in BIH

The commencement of competitive market operation in BIH is envisaged for January 1, 2007, when it will be possible to implement the first bilateral arrangements for sale of electricity among market participants. With regard to consumption, in the beginning the electricity market will be divided into tariff customer and eligible customer markets. Subsequently, smaller commercial customers, and eventually households, will acquire the right to choose suppliers.

In June 2006, SERC issued the Decision on the Market Opening, which was the beginning of the approach towards the realization of overall obligations of Bosnia and Herzegovina after the signing of the Treaty on Establishment of the Energy Community.

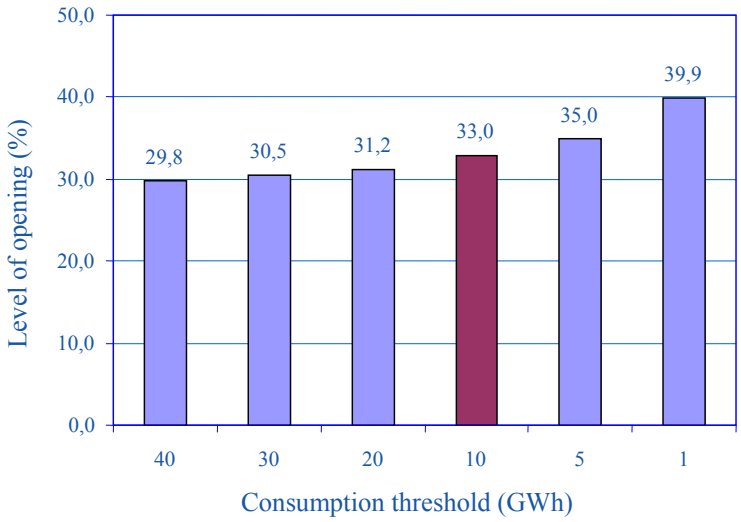

Chart 2. Level of BIH market opening in relation to consumption threshold

The Decision includes gradual electricity market opening. In line with the Decision, SERC has chosen to introduce an initial threshold of 10 GWh for the acquisition of the eligible customer status[21], which is already defined by the Republika Srpska legislation. This threshold results in 33 % electricity market opening in Bosnia and Herzegovina (Chart 2).

[21] The eligible customer means the electricity customer who is entitled to buy electricity at its own choice.

This relatively high percentage of opening is a result of the existence of dominant customer ("Aluminij" JSC Mostar) whose consumption amounts to around 20% (cca 1.864 GWh per year) of the total consumption in Bosnia and Herzegovina (9.663 GWh in 2005).

Threshold (GWh)	Energy (kWh)	Level of opening (%)	Number of customers
40	2.876.515.620	29,77	10
30	2.948.108.259	30,51	12
20	3.016.497.109	31,22	15
10	**3.184.960.527**	**32,96**	**27**
5	3.382.985.028	35,01	57
1	3.859.980.595	39,94	286

Table 4. Electricity consumption 2005 by big industrial customers in BIH

The Entity Regulatory Commissions adopted the Rules of Acquiring the Eligible Customer Status applicable on the territory of the entity in which the relevant Commission operates. Different approaches of the Entity Regulatory Commissions to the regulation of generation activity as well as the tariff setting for end-customers and distribution tariffs, are not conducive to the establishment of a single electricity market in BIH. REERS set the tariffs for the utilization of the distribution network (35 kV, 10kV and 0.4 kV) which entered into force on April 1, 2006 thus creating basic prerequisites for new electricity market entrants but only in the territory of the Republika Srpska[22] . Unlike REERS, FERC did not publish the tariffs for the utilization of the distribution network in the first tariff proceedings, which means that at the moment there are different trends of the electricity market opening in the two entities.

[22] REERS Decision No. 01-1437-3/06 of March 22, 2006

The unbundling of the activities (notably of accounts) within the power companies in the Federation of BiH has not been completed yet, while this process in the Republika Srpska has achieved a certain level[23].

Although large customers with annual electricity consumption higher than 10 GWh have been given a possibility to choose freely their electricity suppliers, i.e. to acquire the eligible customer status, none of 27 of them in Bosnia and Herzegovina has opted to change its supplier. Since the tariffs for the utilization of the distribution network are unknown, large customers in the Federation of BiH that take over electricity at 35kV and 10 kV are still unable to use the eligible customer status.

All these customers are currently supplied by the three existing power utilities at the regulated prices set by the entity regulatory commissions.

Some large customers, such as "Aluminij" Stock Company Mostar, have been granted international trade licenses[24], i.e. they have been given a possibility to import electricity for their own needs. However, since the regulated electricity prices in BiH are lower than prices in many countries in the region (Chart 3), and due to the public service obligation, the large customers continue to purchase electricity from the same suppliers at the applicable regulated tariffs.

The current situation in the power sector as well as the achieved level of restructuring do not provide conditions for entry of a higher number of suppliers that would make the electricity market more efficient.

[23] The distribution activity in the Republika Srpska is divided into five distribution companies that are organized as stock companies.

[24] State Electricity Regulatory Commission in BiH – www.derk.ba

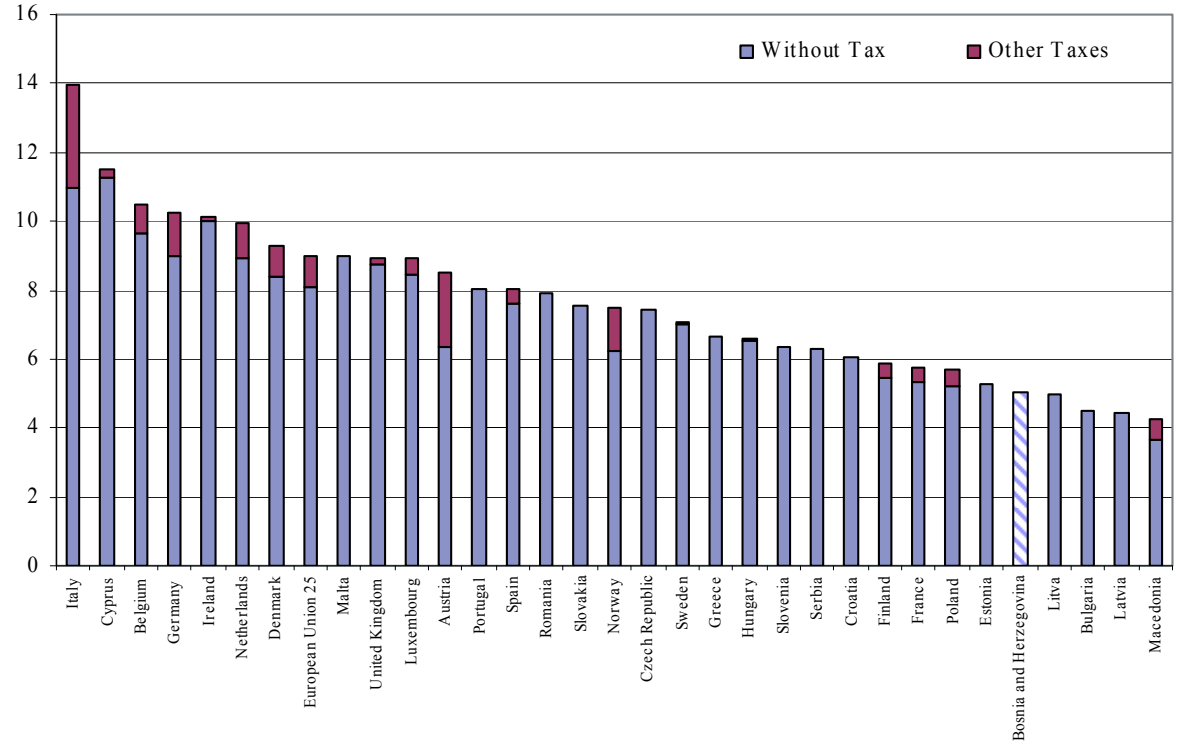

Chart 3. Composition of electricity price for industrial customer Ie
in € per 100 kWh, on July 1, 2006[25]

The obstacles to the electricity market development ensue from the fact that the process of the electricity sector re-structuring has not been competed yet, and the activities of generation, distribution and supply are still within the three companies which are predominantly state-owned.

The unbundling of these activities, setting of clear and transparent tariffs for utilization of the distribution network and deregulation of generation activity would be conducive to the establishment of competition i.e. to the entry of new (private) companies into the market game.

One of the important obligations which BIH has accepted by the signing of the Energy Community Treaty is to enable all customers except households to freely choose their electricity suppliers from January 1, 2008.

[25] Source: Eurostat18/2006

If the sector reform, i.e. further re-structuring of the electricity sector does not proceed, and this, in the first place, refers to the unbundling of activities and setting of transparent tariffs for the activity of electricity distribution, it is uncertain if BIH can meet the requirements put in front of it.

In the literature and practice it is known that if there is a common ownership of networks and generation, or networks and supply, or both, there is a conflict of interest, so that the incumbent is incentivised to raise the entry barrier and excessively charge the new entrants. New entrants need to be guaranteed free and fair access to power generation or consumption. Hence to allow competition, it is first necessary to restructure the national monopolies into vertically disintegrated (unbundled) form, and for there to be some form of commercial arrangement between the unbundled tiers so that the arrangement can be followed by the new entrants[26].

The market opening with regard to consumption also instigates an adequate activity with regard to generation. The generation activity in BiH is fully regulated. De-regulation of generation is a necessary step towards the establishment of a wholesale electricity market. However, a de-regulation plan, i.e. the manner of organizing the market with regard to generation remains unknown and is not clearly defined by an appropriate act.

[26] Electricity Markets, Pricing,Structures and Economies, Chris Harris, John Wiley & Sons, Ltd

5. POLICY PAPER RECOMMENDATIONS

From the presented analysis of the cuurent situation in the electricity sector it can be concluded that the establishment of an efficient electricity market in BIH to the benefit of all its citizens is a complex task. BIH has initiated the reform of the electricity sector and some progress has been achieved with obvious delays. The most relevant results of the reform include the establishment of the regulatory framework (SERC, FERC and RSERC), a single transmission company (TRANSCO) and the Independent System Operator (ISO).

A very important positive factor in the process of reform is a strong influence of the international community which is reflected through the realization of some projects that are being implemented at the moment in BIH (the projects of strengthening the Energy Department within MOFTER and the project of merging the three electricity regulatory commissions into one which will be competent for electricity and gas issues). The development of the Study of the Electricity Sector in BIH[27] is in progress and its publishing is expected by the end of 2007. One of the goals of the Study, which is financed by the World Bank, is to give recommendations for further reform and strengthening of the energy sector in BIH.

The restructuring plan follows the USAID-funded study (December 2001) "*BIH: Power Sector Restructuring and Privatisation Analysis and Action Plan*" that put forward recommendations for the restructuring and unbundling of the energy sector into:

- Four separate thermal power plants;
- Three to four separate hydro-power companies, each organised along the river systems;
- *One Independent System Operator (done);*

[27] The project is implemented by a consortium headed by the Institute of Energy Hrvoje Pozar from Croatia.

- *One state transmission company, owning and maintaining all high voltage transmission assets (done);*
- A number of distribution companies in defined service territories.

It is obvious that further reform requires additional efforts by the relevant institutions in BIH as well (entity governments and ministries). The political will at all state levels is of crucial relevance for the success of the continuation of the reform leading to the establishment of a single economic space in BIH and successful European integration.

Steps to be taken can be separated into two wider categories. The first one is the creation of a market-based sector, with policies and legal framework compatible with the EU (institutional and legal reform), while the second relates to technical capacities (SCADA system and infrastructure) and the increase of reliability and availability of energy system to all consumers. Special attention should be paid to the realization of projects for the establishment of metering systems at all boundary points between market participants. Reliable electricity metering and data processing, as well as their availability to all participants are key technical prerequisites for the establishment of a functional market.

Institutional and legal reforms include adjustments in laws. The experiences of the European countries in transition and EU countries show that changes of national energy legislations are needed after a few years of the application of the initial reform laws. This is necessary for alignment with the "acquis", but should also include provisions that are not directly EU-integration related, but clarify responsibilities of each of the subjects, especially the Government, the Regulators and utilities.

Missing secondary legislation should be adopted, which would allow the removal of the existing barriers to enter the market. Some documents (the Grid Code and the Market Rules)

that regulate to a certain extent the manner of planning, development of the transmission system and the conditions for connection as well as relationships among market participants have been adopted.

Existing legal gaps (in the first place it is the adoption of "Market Law" at the state level which will define the electricity market rules for in the whole country) should be resolved, which requires wide preparation and is closely related to power sector restructuring and energy regulation. Therefore, measures should be prioritized and sequenced. Such reforms should also encourage investments, since transparent and predictable framework is a necessity for attracting potential investors. A clear and enforceable legal framework is also among the top priorities for investors. They want the "rules of the game" to remain credible and enforceable—not altered at the government's convenience once they have made investment decisions based on those rules. A government's willingness and ability to honor its commitments are crucial[28].

There are essentially three components of the electricity sector liberalization [12]:

1. Reduction of the role of the state, in terms of ownership, command and control, prescriptive solutions and direct cross subsidy.
2. Creation and enhancement of competition by deregulation, vertical de-integration (unbundling), horizontal de-integration (divestment) and regulated third party access.
3. Increasing choice for customers and participation in short and long term demand management and responsibility to secure their energy.

The activities that should be realized in the process of the creation of an efficient electricity market in BIH may be put in the following order:

1. Unbundling distribution and supplying activity;

[28] What International Investors Look For When Investing In Developing Countries, Results from a survey of International Investors in the Power Sector, Ranjit Lamech and Kazim Saeed, Paper No . 6 May 2003

2. Establishing an authority for the market activity (Market Operator);
3. Introducing competition in generation – deregulation;
4. Introducing customer choice;
5. Dealing with independent power producer;
6. Attracting private investment;
7. Entrenching universal service obligations.

This requires the completion of the ongoing restructuring of energy companies, and increased credibility of the regulatory system through a clear division of responsibilities between the Governments, the Parliaments and the Regulators.

6. BIBLIOGRAPHY

[1.] S. Stoft, Power System Economics - Designing Markets for Electricity. IEEE Press, 2002.

[2.] Reform, liberalization, restructuring and privatization energy sector in Croatia, Energy Institute Hrvoje Požar, Zagreb 2004.

[3.] Bosnia and Herzegovina Power Sector Restructuring and Privatization Analysis and Action Plan, PA Consultation Group, 2001.godine

[4.] The Energy Balance for 2005 and 2006, Independent System Operator (ISO), Sarajevo

[5.] Treaty on Energy Community

[6.] Directive 2003/54/EC European Parliament and Council, 26. June 2003

[7.] Study of the Obstacles to Trade and Compatibility Of Market Rules, Southeastern Europe Electrical System Technical Support Project (SEETEC Balkans), Volume 1 – Main Report**,** 2006.

[8.] Support to promotion of reciprocal understanding between the European Union and the Western Balkans, Ana Maria Boromisa (Ph.D., Croatian Energy Regulatory Council, Zagreb)

[9.] Bosnia and Herzegovina, EBRD country fact sheet, European Bank for Reconstruction and Development (EBRD**)**

[10.] Bosnia and Herzegovina Infrastructure and Energy Strategy, June 15, 2004 Infrastructure and Energy Department Europe & Central Asia Region The World Bank, Report No. 29023-BA

[11.] Bosnia and Herzegovina 2006 Progress Report, Brussels, 08.11.2006, SEC (2006) 1384

[12.] Electricity Markets, Pricing, Structures and Economies, Chris Harris, John Wiley & Sons, Ltd, 2006.

[13.] Power Engineering International, January/February 2007., PennWell Global Energy Group

[14.] State Electricity Regulatory Commission in BIH, Annual Reports 2004, 2005 and 2006.

[15.] Development Of South-East European Regional Energy Market Experience Of Bosnia And Herzegovina, Ms. Mubera Bičakčić, Senior Adviser Ministry of Foreign Trade and Economic Relations of Bosnia and

Herzegovina UNECE Committee on Sustainable Energy, Opening Session of the Committee on Sustainable Energy Geneva, 27 June 2005

[16.] Annual Reports 2004 and 2005, Energy Regulatory Office – Kosovo

[17.] Between Regulation and Competition Electric Power Sector, mr.sc. Vinko Bošnjak, dipl. ing.VII Savjetovanje Bosanskohercegovačkog Komiteta CIGRÉ, Neum, 25. 09- 29. 09. 2005.

[18.] Communication from the Commission, Inquiry pursuant to Article 17 of Regulation (EC) No 1/2003 into the European gas and electricity sectors (Final Report), Brussels, 10.1.2007

APPENDIX 1. Map Of The Power System Of Bosnia And Herzegovina