POWER SECTOR DEVELOPMENT
Background Paper

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1. OVERVIEW OF BH POWER SECTOR DEVELOPMENT

Power sector in Bosnia and Herzegovina (BH) has been facing with the following challenges:
- Post war reconstruction
- Unification of the fragmented electricity system
- Market oriented reforms aiming to join Regional power markets and then to integrate with European Union power market.

The vehicle for reform process has been Entity’s Action Plans for Power Sector Restructuring, adopted in 2003 (Parliament of Republika Srpska) and in 2005 (Parliament of Federation BH).

Since July 1, 2006, when the Energy Community entered into force, the reform process of power sector has been intensified following the priorities imposed by this international Agreement.

The following is the summary of main achievements of the reform process:
- Primary legislation for electricity market is completed. All stakeholders in the electricity market have obtained appropriate licenses for their operation.
- Elaboration of Secondary legislation is in progress. The Grid Code and Market rules are adopted; Tariff Methodology introducing cost reflective tariffs is in place; Third party access rules are in place as well as Book of Rules for eligible customers; General conditions for supply adopted in RS, while in FBH are under public discussion.
- Since January 1, one third of the BH Market is opened (eligible customers are those consuming more than 10 GWh)
- New bodies established in the electricity market got some operational experience. The Regulatory function is covered by three Regulatory Commissions: one state and two entity level.
- Transmission function is unbundled from the three Electricity companies and a single Transmission Company has been established.
- Unbundling of generation and distribution of the three electricity utilities is underway: Separate accounting for generation and distribution is established. In Entity Republika Srpska legal unbundling is completed.
- The Independent System Operator represents BH in regional ITC mechanism (Inter TSO Compensation). Recently ISO became associated member of ETSO (European Transmission System Operators).
- ISO developed the initial Indicative Power System Expansion Plan, 2007-2016
- The technical tools being used by ISO will be improved soon by completion of the implementation of the Project SCADA/EMS and Telecommunications under Power 3 Project.
- The social dimension of the reform process is addressed in the BH Medium-Term Development Strategy 2004-2007 – PRSP.
- Power companies reach the payment level above 90%

Projects under implementation:
- Power 3 – Third power reconstruction project to be closed by November 2007. The Interim Report completed by the Consultant drafting BH Energy Sector Study that should be basis for development of a blueprint for Energy Strategy that should be adopted by BH.
- Power 4 – ECSEE APL 3-BH Project to enable BH effective participation in Energy Community has been in effect since April 13, 2007
2. RELEVANT COUNTRY BACKGROUND

2.1. Key statistics, 2006

- **Area**: 51,129 km²
- **Population**: 3,844,000 estimated by the Agency for Statistics of BH
- **GDP/capita**: $2,994 estimated by the Central Bank of BH

2.2. Constitutional

The General Framework Agreement for Peace (GFAP) in Bosnia and Herzegovina which put an end to a war in BH, established a complex and atypical institutional structure. The structure comprises the State level institutions for BH (Council of Ministers) and two Entity level governments (Federation of Bosnia and Herzegovina and Republika Srpska). The state also has local governments (10 Cantons in the Federation and 146 municipalities excluding the Brcko District).¹

GFAP established a highly decentralised government structure whereby the institutions of BH have only limited explicit powers which however increased over time due to substantial transfer of competencies from the entities. The BH Constitution also empowers the State to co-ordinate activities within the exclusive domain of the Entities.

Energy related issues are under responsibility of the Entities. Since July, 2004, the Department for Energy is operating within the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (MoFTER).²

2.3. State of Economy

On the whole, BH has enjoyed the benefits of strong post-war growth fuelled by high foreign aid flows and macro-economic stability. According to the latest report on BH Economic Trends 2006 by DEP/EPRU (www.eppu.ba) it is estimated that in 2006 BH economy achieved 17,559,6 mill KM of public gross product. Nominally it meant that annual growth was 11,2% i.e. that real growth of GDP was 5,7%, which is slightly faster than in the countries of the region. It is expected that additional source of growth may represent in the energy sector where big investments are announced in the area of construction of new generation plants which would mean the incentives to economic growth. Electricity, gas and water supply contribution to the growth of GDP is 1%. It is important to emphasize that the economic growth was mostly achieved through increasing of private investments at a large rate in spite of decreased foreign aid as well as a poor economic situation worldwide. A degree of macro-economic stability has been achieved through the Currency Board and the linking of the Bosnia and Herzegovina Konvertibilna Marka (BAM) to the Euro.

¹ The signing of the GFAP in November 1995 confirmed a State of Bosnia and Herzegovina (BH), which comprises two Entities, Republika Srpska (RS) and the Federation of Bosnia Herzegovina (FBH). In addition to the two Entities, the Brcko Final Arbitration Award of the 5th March 1999 established the Brcko District of BH with substantial legislative and administrative autonomy.

² per Article 9 of Law on Ministries, MoFTER: “…shall be responsible of carrying out tasks and discharging duties which are within the competence of BH and relate to defining policy, basic principles, coordinating activities and harmonising plans of the Entities authorities and bodies at the international level of….energy…”
3. CURRENT STATUS OF THE ENERGY SECTOR

3.1. Energy resources

The indigenous energy sources of BH are coal (brown coal and lignite) and hydro, currently accounting for 62% of primary energy consumption. Potential hydro is estimated at over 6000 MW, used less than 40%. Liquid fuels and natural gas are imported. According to recent research there is significant wind energy potential.

Coal deposits in BH are considerable, estimated at 10 x 10^9 tones, and coal is likely to remain a significant primary energy source in BH. The sector is characterized by high costs and staffing levels above commercial norms. Production is about 40% of pre-war levels, mainly due to reduced industrial demand. The most of production is used for electricity generation. The challenges of the sector are to lower the cost of production, increase productivity, reduce employment and improve the working conditions of and living standards of employees. Implementation of improved technology, profitability and environmental issues are major challenges.

3.2. Energy indicators

Since there is no energy statistics established, the data on key energy indicators are pure and taken from relevant international sources. At present, BH is among the countries with very high energy intensity due to pure industry development and low living standard of the population as well as inefficient use of energy. Average energy consumption in BH is about 45 GJ per capita, compared with a world average of 70 GJ per capita and OECD average of 236 GJ per capita.

3.3. Energy Related International Obligations

Energy Charter Treaty
BH is a member of the Energy Charter Conference and signatory of the Energy Charter Treaty (ECT) and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) which was signed in London in December 1994 along with the Treaty. BH participated in the Review of the Energy Charter process, which was concluded in December 2004, and its implementation thereafter. According to the ECT and PEEREA, the main issue areas include: investments; trade and transit; and energy efficiency.

The ECT requires (Article 19) that all member states strive to minimise, in an economically efficient manner, harmful environmental impacts resulting from energy-related activities. PEEREA is designed to reinforce energy efficiency policies and programmes focusing on principles of developing energy efficient strategies, real-costs reflecting prices, transparency.

Energy Community
Bosnia and Herzegovina being in the centre of the South East European region, recognizes the process on establishment of an effective and integrated regional energy market covering electricity and gas as an opportunity for economic growth and social progress in the state. BH expressed its will to participate in the process by signing of two (November 15, 2002 and of December 8, 2003) Athens Memorandums of Understanding on the Regional Energy Market in South East Europe and its integration into the European Community Internal Energy Market, as
well as by signing the legally binding document: Energy Community Treaty on October 25, 2005 in Athens. The Treaty creates a gas and electricity market without internal frontiers and calls for implementation so-called *acquis communautaire* on energy, environment, competition and renewable electricity sources.

### 3.4. Projects

A major focus of post war reconstruction support from the International Community has been the rehabilitation of the energy sector. This has been undertaken through consecutive Power Programs led by the World Bank and supported by other IFIs (EBRD, EIB, KfW) as well as donors (EC, USAID, DFID-UK, Canada, Spain, Norway, Italy, Switzerland and Japan).

**Projects under implementation**

- **Power 3** – is close to completion and supports the restructuring and reform of the power sector through investments and associated covenants. The total funding package is **$231 million**.

- **Power 4** – became effective. It will provide further support for BH to join South East Electricity Market effectively. A budget of the order of **$265 million** is foreseen.

The EC has supported the formation of Transco and ISO, and is continuing to support Transco. The EC is also providing assistance to build the capacity of the state level Energy Department in the Ministry of Foreign Trade and Economic Relations (MoFTER) and to develop an energy strategy blueprint for BH (covering the period until 2030). This work will be pursued in line with EC SEE priorities. In 2007, the EC will work with the regulators to build capacity and aims to create a consolidated.

### 4. POWER SECTOR

#### 4.1. Current status of BH Power Sector

In the power sector, the transmission system has been unified and assets and authorities moved into two entity-owned joint stock companies operating at the state level, Transco, and the Independent System Operator (ISO). By the end of 2007 the generation and distribution assets of the three EPs are to be unbundled and corporatized. Although electricity production has returned to 90% of its pre-war production levels, due the post war reconstruction efforts of the electricity infrastructure, the sector needs to receive further investment and be restructured.

#### 4.2. Legal and Institutional Framework

Legal framework for power sector in Bosnia and Herzegovina is defined by:

- **Law on transmission, regulator and system operator of electricity in Bosnia and Herzegovina** (*Official Gazette of BH*, number 7/02);

- **Law on electricity in the Federation BH** (*Official Gazette of BH Federation*, number 41/02, 24/05 and 38/05);

- **Law on electricity in the Republika Srpska** (*Official Gazette of RS* number 66/02, 29/03 and 86/03);
• Law on establishment Transmission Company in Bosnia and Herzegovina ("Official Gazette of BH", number 35/2004) (which established BH TRANSCO - the single transmission company in BH - "Elektroprenos BH", with its seat in Banja Luka);


Provisions of the above mentioned laws regulate important issues within the electric power sector, establishment of the Regulatory Commissions at both state and entity levels (independent and non-profit institutions), new organization of the sector, including establishment of the state companies: ISO BH and TRANSCO.

The aforementioned laws identify the key entities for their implementation:

• State Electricity Regulatory Commission (established in 2004) – responsible for regulating transmission, transmission-related activities, and international trade. The State Regulatory Commission has its office in Tuzla.

• The Entity Electricity Regulatory Commissions responsible for regulating generation, distribution and supply, with the Federation Regulatory Commission’s offices in Mostar and the RS Regulatory Commission’s offices in Trebinje.

• Independent System Operator (ISO) – responsible for the management and control of the transmission network, directing, scheduling and coordinating maintenance, planning and development of the grid, development of Indicative generation plan with the company for transmission of electric energy (Transco). ISO was registered in July 2005 and started operation in February 2006 when Transco was registered.

• Electricity Transmission Company (Transco) – responsible for transmission, maintenance and construction. Transco was registered and started operating in February 2006.

• Ministry of Foreign Trade and Economic Relations (MoFTER) – responsible for policy formulation in the energy sector.

• Entity Ministries in charge of energy:
  • Ministry of Energy, Mining and Industry of the Federation BH
  • Ministry of Economy, Energy and Development of the Republika Srpska

4.3. Power Generation

Electricity generation in Bosnia and Herzegovina is exclusively related to indigenous energy resources - coal and hydro-power.

Overview of the major generation facilities in Bosnia and Herzegovina is presented in Annex 1 – Table 1.

Generation of electricity in 2006 amounted to **13,749 GWh**, out of which 56% is produced by thermal power plants and 44% is produced by hydro power plants.

Consumption of electricity in 2006 amounted to **11,521 GWh**.

Net electricity export amounts **2,126.2 GWh**
4.4. **High voltage transmission network**

Basic data on high voltage transmission system are presented in Annex 1-Table 2. The reconstruction of the 400 kV and 220 kV transmission network, including the 110kV system facilities, and particularly the reconstruction of the damaged transformer stations, enabled the reconnection and reintegration of the BH power grid, as well as the reconnection with the UCTE, the Balkans and South East Europe systems, which was done in October 2004.

4.5. **Power sector utilities**

Currently in BH power sector there are three major producers and distributors of electricity (until recently three vertically integrated utilities), pubic, entity owned, utilities – Elektroprivredas (EPs): Elektroprivreda BH (EP BH), Elektroprivreda Hrvatske Zajednice Herceg-Bosne (EP HZHB) and Elektroprivreda Republika Srpska (EP RS). Each EP has their own generation and distribution facilities and is in charge of generation, distribution and supply on its territory. Distribution and supply in Brcko District is carried out by a separate entity, attached to the local government. Basic power indicators per utility are presented in Annex 1-Table 3. Map of the Power System of Bosnia and Herzegovina is in the Annex 2.

5. **POWER SECTOR REFORM**

Reform of the power sector is under way. In order to create a more unified, efficient, competitive and transparent power sector, BH is committed to reforming the Power sector. Reform process started in parallel with post-war reconstruction activities while three vertically integrated state owned monopolies were operating the BH power system.

5.1. **Reform Milestones**

1) **Electricity Policy Statement**, The guiding principles for the reform were set down in the Electricity Policy Statement, document that was developed by NERA and adopted by two entities’ government in 2000. The main objective of the reform according to the Statement is to ensure sustainability, introduce competition and then regulate the electricity industry.

2) **The Study “BH: Power Sector Restructuring and Privatisation Analysis and Action Plan”** (December 2001), funded by USAID and developed by PA Consulting, put forward recommendations for the restructuring and unbundling of the electricity sector:

3) **Harmonised Action Plans for the Restructuring of the power sector** along the lines recommended by the study were agreed by the RS in April 2003 and the FBH in May 2005. These plans set a time frame for restructuring the sector by the end of 2007. This involves different stages of: 1) Reallocation of assets; 2) Corporatization; and 3) Commercialization. The central issue in the Action plan is the unbundling of the vertically integrated EPs into separate structures for generation, distribution and transmission.

The updated RS Action Plan states that hydro and thermal power generation plants (thermal plants include coal mines) have been formed into independent organisations with separate accounting and are now shareholder companies. Five companies have been
formed in power distribution. The generation and distribution companies are majority owned by a joint holding company EP RS.

Among others, the Action Plan of FBH envisages establishment of subsidiary companies of EP BH and EP HZHB in generation and distribution. In particular, EP BH will create separate companies for two TPPs and one company for HPPs on the Neretva. EP HZHB will create three HPP companies. In addition, the two EPs will establish several 100% subsidiaries for distribution and supply of electricity. EP BH will be the sole owner of two distribution companies, and EP HZHB the owner of one company, while two distribution companies will be in joint ownership of the EPs.

Besides the action plans, electricity sector reform priorities are highlighted in the Poverty Reduction Strategy Paper (PRSP), as well as in European Partnership, which sets out the goals for creating a competitive environment for an electric power market and integration with regional markets. Specifically, it identifies the need to set up institutions responsible for managing the electricity sector.

5.2. Government actions

Following the commitments from the above documents BH government intensified the activities on the reforming the power sector towards the creation of internal integrated electricity market harmonized with EU electricity market standards. To this effect, the following steps have been undertaken:

- BH Government adopted the Medium Term Development Strategy – Poverty Reduction Strategy Paper for the period 2004-2007, (PRSP) in March 2004 in which reform of the power sector and the establishment of internal electricity market is a priority
- BH Government undertook to develop an overall Energy Strategy aiming to define investments priorities from the regional energy market point of view, as well as the action plan for integration of BH energy sector with the sector of EU. The Strategy is financed by EC CARDS 2005. Within Power III Project World Bank (WB) is financing Energy Sector Study which is in the stage of Interim Report approval.
- BH Government established the Department for energy within the Ministry of Foreign Trade and Economic Relations (MOFTER) in 2004 and recruited three well qualified experts capable of developing and implementing a comprehensive energy strategy and to push through reforms.
- The implementation of the Power III project has enabled the reconstruction of the substations and 400 kV lines and interconnection of the grid to the UCTE system, which was done in October of 2004.
- In July 2006, BH ratified the Energy Community Treaty (EnC Treaty). Under the Treaty participating countries agree to: (a) develop a functioning electricity market including the agreed market liberalisation targets; and (b) integrate it into the internal electricity market of the European Union. In order to develop a regional energy market, the Energy Community Treaty requires the establishment of compatible national electricity market models, in line with EU Directive in force (Directive 54/03) and requires participating countries to follow a process (Athens process) for the development of a regional electricity market. Signature of the EnC Treaty represents BH's first agreement signed directly with the EC, and as such it will form a benchmark to evaluate BH's ability to implement commitments made under the Stabilisation and Association Agreement (SAA).

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3 Web: www.BH.prsp.info
5.3. Issues of focus

The following issues constitute a list of the most likely priorities for immediate intervention in the period up to 2010, however, the list may not be exhaustive.

Unbundling of generation and distribution in the power sector

Following the creation of ISO and Transco, generation and distribution companies have to be established. However, little consideration has yet been given to distribution reorganization in terms of DSO and Supply. The extent to which generation and distribution unbundling has progressed to date under the auspices of implementation of the Action Plans is reasonably clear, however, the speed of next steps is not clear. The overall status needs to be established.
The situation regarding coal mines associated with power generation facilities must also be considered. It must be considered that BH must carry out unbundling of the power sector in such a way that it fulfils its obligations under the Energy Community Treaty and European Partnership.

Raising awareness of BH's international agreements regarding energy (i.e. Energy Community Treaty and Energy Charter Treaty), the associated energy sector reform process and energy efficiency issues are crucial.

Awareness of the Energy Community Treaty and the Energy Charter Treaty, their implications and BH's obligations under these treaties within the energy industry and among policy makers, economic operators and the general public are unclear. Improving awareness among these groups should assist those responsible for ensuring BH meets obligations under these treaties, give momentum to energy reform, ensure the relationship with SAA negotiations is clearly outlined to policy makers and the general public, as well as ensuring customers are informed of developments that will affect them.

Improving energy efficiency at all levels (i.e. generation, distribution, end-user) is an objective of the ECT, especially the PEEREA, and a means to reduce the energy cost to consumers, improve competitiveness and achieve environmental goals. Level of awareness regarding energy efficiency within the energy industry, as well as among policy makers, economic operators and the general public is low. It is likely that awareness levels could be improved with considerable benefits to companies, consumers and BH as a whole, as well as in relation to other considerations such as the environment. The design and implementation of an appropriately targeted awareness campaign to promote energy efficiency in BH, as a 'master plan' are seen to be important in triggering the understanding necessary to create a more enabling environment for meeting real needs of the country, obligations under ECT, as well as to facilitate further energy reform.

Demonstration of energy efficiency through real life scenarios could be conceived to inform and motivate small scale consumers in BH. It is very important to prepare regulatory frameworks, transfer of technologies, establishment of domestic programs for energy efficiency and promotion of investments in energy efficiency.

5.4. Power Sector Reform – Opportunities and Barriers for BH
Taking into consideration all the background explained above, the main benefits for BH reforming the power sector with an aim to join Energy Community may be summarized as following:

- **The process provides the economic recovery for the state.** Being in the centre of the region, BH will be a major cross-road for trade that will bring benefits to the state in terms of greater revenues. It would also provide an opportunity for BH to export surplus of electricity under better conditions. These revenues will allow Government to address some of domestic energy issues. The main goal of the Treaty establishing the Energy Community is to create a stable regulatory and market framework capable to attract investments in electricity and gas sectors of the region. Therefore, when the Treaty is in place the attractiveness of the sector for direct foreign investors is higher.

- **The process strengthens the state level authorities.** The process establishing the Energy Community is the one who requires the state level energy related authorities as partners and participants. For BH it means incentive to establish relevant energy authorities at the state level in order to make the state capable to respond on all requirements from the emerging Energy Community in South East Europe. It is done by establishing the Department for energy within the MOFTER which has a coordinating role on behalf of BH in the implementation of the obligations coming from the EnC Treaty. The State Regulatory Commission for electricity participates in Regional Regulatory Board while Independent System Operator represents BH in SETSO.

- **The process supports the electricity system integration within the state** in the aim of its integration with the regional and European systems. In order to establish single energy market within the state together with international donors put the priority on the transmission network reconstruction. The completion of the rehabilitation of the relevant high voltage network has enabled re-integration of BH electricity network and re-synchronization of the two UCTE zones of Western Europe and South East Europe.

- **The process facilitates BH integration with European Union.** BH is strongly committed to all principles laid down by the EU on its path to become the full-fledged member. Currently we are in the stage of expecting the initialing the Stabilization and Association Agreement. Establishment of the Energy Community gives to the participating countries opportunity to direct integration with energy market of European Union. For BH it means the opportunity to start the integration process with EU regardless of the status on the negotiation process on the Stabilization and Association Agreement. By signing of the Energy Community Treaty BH entered in its’ first contractual relation with EU.

**Barriers**

The main barrier for BH reform process to create single internal energy market and to join the regional energy market is the constitutional organization of the state with regards to the energy matters. Energy related matters are the responsibility of entities: 1) there is no integrated state driven action plan, 2) instead of a single regulatory commission there are three (one state and two entity). 3) There is a big disharmony between growing international obligations and capabilities of the state to implement them through its coordinating role assigned in a manner as it is. Lack of coordinating mechanism and civil servants at both state and entity level is a serious and urgent issue to be resolved.

Economic growth of BH is in direct line with energy sector reforms, reconstruction and new investment in generation capacities so that means a real challenge for improving of BH economy.
One of the main obstacles in the acceleration of reforms process is an absence of political agreement on the importance of the establishment of a modern and efficient energy sector from technical, economical and functional aspect of view.

Social aspect of power sector reforms is connected with the deficiency of financial capability in order to be solved the problems of surplus of workers in the power sector.

Other barriers could be summarized as following:
- Energy Sector study (WB credit) – only in preparation (to be finished Dec. 2007)
- Energy sector strategy (EC CARDS) – slow progress
- Neither Energy law nor Energy efficiency law at the state level
- No Energy Agency/Center at the state or entity level
- No Energy Efficiency Agency/Center at any level
- No Energy balance at the state level
- No Energy statistics at any level

6. NEW POWER GENERATION PROJECTS DEVELOPMENT

There have not been any significant investments in new power system facilities in BH since the war. Nonetheless, there is large private sector interest in harnessing the substantial and relatively diversified energy resource base in BH to expand power generation capacity to meet growing electricity supply deficit within the region of the Energy Community. The status of new generation projects (both coal-fired thermal power and hydropower plants) under consideration for implementation within BH, is summarized below.

It is an urgent issue to develop and adopt a state-wide, uniform and transparent procedure for construction of new generation plants on the basis of recommendation from EU Directive 2003/54.

Large Thermal Power Generation Projects: A total of seven (7) new coal-fired thermal power generation projects were identified by the Federation and RS Entity Government and the EPs, with most of the incremental electricity production capacity (approximately 1600-1800 MW from rehabilitation and expansion of the existing facilities at Gacko, Kakanj, Tuzla and Ugljevik plus about 1600 MW from entirely new coal mine/power generation plant complexes to be established at Stanari, Bugojno and Kongora) being earmarked for export. There are different approaches being followed by the Federation and RS Entity Governments to solicit the involvement of strategic investors in the above coal-fired thermal power generation projects. For example, in the RS Entity, the Stanari project is being developed as Build-Own-Operate concession by a private strategic investor whilst the rehabilitation and capacity expansion projects at Gacko and Ugljevik are being structured as joint ventures between EPRS and strategic investors. By contrast, the rehabilitation and capacity expansion projects at Kakanj and Tuzla and the development of the “greenfield project” at Bugojno are being structured on a Build-Operate-Transfer basis with EPBH. Similarly, a Build-Operate-Transfer structure with EPHZHB is proposed for the development of the “greenfield project” at Kongora.

Large and Small Hydropower Projects: In the RS, EPRS takes the lead in identifying and developing all large and small hydropower projects, preferably with financing to be secured from

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IFIs including the World Bank and the European Investment Bank. In the Federation, the mission discussed the efficacy of a recent solicitation process that has resulted in the selection of an Austrian-based consortium to develop four (4) new small hydropower projects on a Build-Operate-Transfer basis, three with EPBH and one with EPHZHB. In addition, several other concessions to develop small hydropower projects on the Upper Neretva River Basin had been granted to local private interests. Again, there are differences in approach being followed by the Federation and RS Entity Governments to develop large and small hydropower projects.

**Mini Hydropower Projects:** Many concessions have been awarded for mini hydropower plants (plants with capacity of 5MW or less). This is an important issue with significant implications, because the cumulative capacity and output of mini-hydropower concession could be quite substantial. For example, 100 mini-hydropower concessions have been granted by the RS authorities with total potential capacity of 230 MW. In the Federation, the EPBH was currently pursuing from municipalities some 29 mini-hydropower concessions (total potential capacity of 30 MW) and similarly for the EPHZHB, about 12 mini-hydropower concessions in three river basins. It is necessary to assess more comprehensively the technical, financial and regulatory safeguards that are needed to facilitate sustainable development of mini hydropower plants in the river basins of BH, taking into account lessons of experience in the Energy Community.

**Wind Power Utilisation Projects:** In the recent period a number of investors expressed their interest in construction of wind power plants. Some research studies to explore the wind conditions for the South-Eastern region of Hercegovina and for BHac region have been done. Since this increase the share of electricity produced by renewable sources it is considered to be an important project.

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**Annex 1: Basic Data on the Power System of Bosnia and Herzegovina**

**Table 1: Major generation facilities**

<table>
<thead>
<tr>
<th>Hydro power plants</th>
<th>Capacity of power unit (MW)</th>
<th>Total installed capacity (MW)</th>
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</thead>
<tbody>
<tr>
<td>Trebinje I</td>
<td>3×60</td>
<td>180</td>
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<table>
<thead>
<tr>
<th>Thermal power plants</th>
<th>Installed capacity (MW)</th>
<th>Available capacity (MW)</th>
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<tbody>
<tr>
<td>TUZLA</td>
<td>779</td>
<td>709</td>
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(used ISO BH data)
<table>
<thead>
<tr>
<th>Location</th>
<th>No.</th>
<th>Nominal voltage of lines</th>
<th>Length (km)</th>
<th>Interconnection</th>
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<tbody>
<tr>
<td>Trebinje II</td>
<td>8</td>
<td>400 kV</td>
<td>992</td>
<td></td>
</tr>
<tr>
<td>Dubrovnik (BH+Hr.)</td>
<td>2×105</td>
<td>220 kV</td>
<td>1691</td>
<td></td>
</tr>
<tr>
<td>Čapljina</td>
<td>2×210</td>
<td>110 kV</td>
<td>3649</td>
<td></td>
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<tr>
<td>Rama</td>
<td>2×80</td>
<td>215</td>
<td>230</td>
<td></td>
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<td>Jablanica</td>
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<td>Grabovica</td>
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<td>Salakovac</td>
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<td>Jajce I</td>
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<td>Peć-Mlini</td>
<td>2×15</td>
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**Table 2: Basic data on the transmission system**

*Transmission lines*

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<th>No</th>
<th>Nominal voltage of lines</th>
<th>Length (km)</th>
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<td>1</td>
<td>400 kV</td>
<td>992</td>
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<td>1</td>
<td>400 kV</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>220 kV</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>110 kV</td>
<td>17</td>
</tr>
</tbody>
</table>
Transmission sub-stations

<table>
<thead>
<tr>
<th>No</th>
<th>Type of sub-station</th>
<th>No. of substations</th>
<th>Installed capacity (MVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TS 400/x kV</td>
<td>8</td>
<td>5861.5</td>
</tr>
<tr>
<td>2</td>
<td>TS 220/x kV</td>
<td>7</td>
<td>1277.0</td>
</tr>
<tr>
<td>3</td>
<td>TS 110/x kV</td>
<td>119</td>
<td>4873.5</td>
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</table>

Transmission transformers

<table>
<thead>
<tr>
<th>No</th>
<th>Transmission ratio of transformers</th>
<th>No. of transformers</th>
<th>Installed capacity (MVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TR 400/x kV</td>
<td>14</td>
<td>4900</td>
</tr>
<tr>
<td>2</td>
<td>TR 220/x kV</td>
<td>12</td>
<td>1800</td>
</tr>
<tr>
<td>3</td>
<td>TR 110/x kV</td>
<td>205</td>
<td>5196</td>
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</table>

Table 3: Basic Power Indicators

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<thead>
<tr>
<th>Estimate for 2006</th>
<th>EP BH</th>
<th>ERS</th>
<th>EP HZHB</th>
<th>Brčko District</th>
<th>BH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation</td>
<td>6460.00</td>
<td>5405.00</td>
<td>1884.00</td>
<td>1884.00</td>
<td>13749.00</td>
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<tr>
<td>Gen. in hydro power plants</td>
<td>1505.00</td>
<td>2470.00</td>
<td>1884.00</td>
<td>5859.00</td>
<td></td>
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<tr>
<td>Gen. in thermal power plants</td>
<td>4870.00</td>
<td>2860.00</td>
<td>7730.00</td>
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<td></td>
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<tr>
<td>Gen. in small and industrial PPs</td>
<td>85.00</td>
<td>75.00</td>
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<td>160.00</td>
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<tr>
<td>Consumption</td>
<td>4250.00</td>
<td>3324.00</td>
<td>3287.00</td>
<td>270.00</td>
<td>11521.00</td>
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<tr>
<td>Distribution consumption</td>
<td>3830.00</td>
<td>3054.00</td>
<td>1065.00</td>
<td>270.00</td>
<td>8219.00</td>
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<tr>
<td>Transmission losses</td>
<td></td>
<td></td>
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<td>390.00</td>
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<tr>
<td>Large consumers</td>
<td>420.00</td>
<td>220.00</td>
<td>2200.00</td>
<td>2840.00</td>
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<tr>
<td>Pumping and mines consumption</td>
<td>50.00</td>
<td>22.00</td>
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<td>72.00</td>
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</tr>
</tbody>
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Annex 2: Map of the Power System of Bosnia and Herzegovina with Operational Areas of “Elektroprenos BH” (the Company for Transmission of Electric Power in BH) and Areas of Public Utilities