STATEMENT ON
SECURITY OF ENERGY SUPPLY
OF BOSNIA AND HERZEGOVINA

Sarajevo, May 2009
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1. ELECTRICITY

1.1 Legal and Institutional Framework

Legal and Institutional framework of Electricity sector in Bosnia and Herzegovina is defined by:
- Law on Transmission, Regulator and System Operator of Electricity in Bosnia and Herzegovina (Official Gazette of BiH, No. 7/02);
- Electricity Law in Federation BiH (Official Gazette of FBiH, No. 41/02, 24/05 and 38/05);
- Electricity Law in Republika Srpska (Official Gazette of RS, No. 8/08) and
- Law on Modifications and Amendments of Electricity Law (Official Gazette of RS, No. QQ/08);
- Law on Establishing Transmission Company in Bosnia and Herzegovina (Official Gazette of BiH, No. 35/2004) (which established BiH TRANSCO - the single transmission company in BiH - “Elektroprenos BiH”, with its seat in Banja Luka);
- Energy Law in RS, passed by National Assembly of RS on May 14th, 2009; harmonization of sector laws with it and the adoption of secondary legislation is expected until the end of 2009.

Provisions of the above mentioned laws regulate important issues within the electricity sector, establishment of the Regulatory Commissions at both, state and entity levels (independent and non-profit institutions), new sector organization, including establishment of the state companies.
- New Electricity Law in Federation BiH is in the final phase of adoption in FBIH Parliament (the adoption is expected not later than next month). The text has been aligned with Directive 2003/54/EC, the clarifications of the present law provisions have been provided, and new initiatives in compliance with modern practice have been included.
- Decree on usage of renewable resources and cogeneration in FBIH
  Text has been prepared for the adoption, the first document that defines this area in details and governs it)
- Strategic Plan and Programme for the Development of Energy Sector in Federation BiH, passed by FBIH Parliament as final document (March, 2009). The purpose for designing this document is, in absence of an overall Development Strategy for Energy sector in BiH, to intensify the activities in reforming the electricity sector in Federation BiH, to provide conceptual preconditions for the modernisation of existing and construction of new, modern energy facilities and infrastructure, with the high level of energy efficiency and sustainable development. The document will be basis for the design of Development Strategy for Energy Sector in BiH.

Note: For the more complete definition of this area is necessary to urgently pass Energy Law in BiH and Development Strategy for Energy Sector in BiH. On the state level in BiH the following is still missing: (i) Energy Balance, (ii) Energy Statistics, (iii) institution that will be expert support for energy sector (agency, institute, directorate).
SERC - State Electricity Regulatory Commission was founded pursuant to the Law on Transmission, regulator and system operator of electricity in Bosnia and Herzegovina and it is in charge of power transmission, transmission system operations and international electricity trade, according to the international norms and European Union standards.

In October 2008, with the Rules on Connection, SERC has prescribed the procedures for connection of new generation or customer facilities on the transmission grid of voltage levels 400, 220 and 110 kV, connection of facilities on medium voltage level of 35, 20, 10 and 6 kV in the Elektroprenos BIH substations 110/x kV, as well as the existing facilities in the case of increasing installed capacity, upgrade or facilities’ reconstruction.

Also, last year, SERC has been involved, as regulated by the law, into approval of documents important for development and planning of electricity sector, such as Indicative Generation Development Plan, designed for ten years period, and each year it is updated for the next year that has not been included in the plan. The aim of this plan is to inform present and future users on the needs and existing projects for construction of new generation capacities. At the same time, this plan is used as one of the few bases for the Long-term Development Plan for Transmission Grid for the ten-year period.

In March 2009, SERC made the Decision on determination of tariffs for ancillary services. Namely, until December 31st, 2007 the dry-run period was in effect, where financial calculation of ancillary services was not in effect. From January 1st, 2008 with the Decision on tariffs for ancillary services, the following has been determined: tariffs for secondary and tertiary regulation at generators, total tariff for secondary and tertiary regulation paid by customers and tariff for over-accepted reactive power from transmission grid paid by eligible customers. This decision has been modified and amended in February 2008 for the purpose of better operational implementation, and process of ancillary services regulation completion has been finalised in March 2008 with making the Decision on determination of tariffs for ancillary services for covering losses on the transmission grid. In addition to the previous decisions, the Decision on determination of tariffs for ancillary services, March 2009, determined the price for imbalances as well.

Because of importance for security of electricity supply and stability of electricity sector of the state, model for performance of these services will be in the focus of future SERC activities.

For the aim of efficient integration of BIH energy sector into Energy Community and EU market, in March 2008 the BIH Energy Sector Study has been finalised. This document provides overall review of information on energy sector in BIH and energy resources available. The study also gives projections of sector development until 2025, under different scenarios.


Competences of the Independent System Operator in BiH are:
- Control of operations of all high-voltage transmission facilities in Bosnia and Herzegovina of 110 kV voltage level and up,
- Control of facilities and assets of the main control centre and any tools for the remote control,
- Balancing market control,
- Procurement of ancillary services and offering system services,
- Preparation, modification and application of the reliability standards, market rules and grid code,
- Insurance of non-discriminatory behaviour for the system beneficiaries or classes of the system beneficiaries,
- Analysis and distribution of invoices as foreseen by the ISO Statute for tariffs which are based on costs of the ISO system operations, and for transactions at the balancing market,
- Coordination and approval of the planned supply disruptions of transmission and generation facilities and coordination and approval of the modifications to the Intermittent Schedule,
- Review, approval, direct auditing and publishing of the long-term transmission development plan submitted by the Transmission Company,
- Determination of the indicative generation development plan with details submitted by generators, distribution companies and end users directly connected to the transmission system.

Note:
- Due to the fact that there is no agreement between ISO BIH and Elektroprenos BiH on the ISO BIH remote access to the data from the meters on the transmission grid borders and interstate transmission lines, ISO BIH, as transmission system operator in BIH, is not able to perform its basic functions.
- The congestion management is not done in compliance with Regulation 1228 and Congestion Management Guidelines. BIH is the only country in Europe that is not applying these documents. ISO BIH is technically and personnel ready, and for more than two years is expecting SERC’s approval.

**ELEKTROPRENOVS BIH** is a single company for power transmission in BiH, in charge of transmission, maintenance, construction, expansion, and control of the power transmission grid. Establishment of the company "Elektroprenos Bosne i Hercegovine" as a uniform, state-owned company in charge of power transmission in Bosnia and Herzegovina followed the effective date of the Law on Power Transmission in August 2004, which anticipated establishment of a new, uniform state-owned company that would take over the activities related to power transmission from the three existing power utilities. The seat of "Elektroprenos Bosne i Hercegovine" is in Banja Luka, with its operational centres in Banja Luka, Mostar, Sarajevo, and Tuzla. Establishment of Elektroprenos BiH is the significant step in the application of the EU Electricity Directive (2003/54/EC) covering third party access to the transmission and distribution grids and unbundling of generation and transmission.

Note: **Long-Term Development plan for Transmission Grid has not ever been designed.**

**FERK** - Regulatory Commission for Electricity in Federation of Bosnia and Herzegovina, was founded pursuant to the Electricity Law (Official Gazette of FBiH, No. 41/02, 24/05 and 38/05), in order to prevent monopoly in the power activities, rationalisation of electricity consumption, enabling third party access to the distribution grid for the purpose of gradual introducing the electricity market, pursuant to Article 8 of Electricity Law and SERC’s documents. Pursuant to the Law, FERK is in jurisdiction to prescribe methodology for determination of tariffs in generation, distribution and electricity supply, as well as determination of tariff rates for the distribution system users and tariff rates for non-eligible customers and standards for the tariffs adoption.

For the purpose of security of electricity supply and enabling access to the distribution grid, FERK has, in addition to other documents, adopted following: General Conditions for Electricity Supply, Decision on Tariff Rates for Distribution Systems Users for both public power utilities in FBiH, and it has given approval on Rule Book on Methodology for
determination of Fee for Connection to the Distribution Grid and Grid Codes proposed by both public power companies.

**RERS -** Regulatory Commission for Energy of Republika Srpska was founded in order to regulate monopolistic behaviour and provide transparent and non-discriminatory position for all the participants in the electricity and gas market of RS, pursuant to the Electricity Law (Official Gazette of RS, No. 8/08), Law on Modifications and Amendments of Electricity Law (Official Gazette of RS, No. QQ/08) and Gas Law (Official Gazette of RS, No. 86/07). It is a specialized, autonomous, independent non-profit organization in carrying out its activities. Its task is to provide conditions for the market opening for the free competition, in the activities which are not, by their nature, inherently monopolistic, and in monopolistic activities to provide all parties with equal access, quality of services and fair price accompanied by profitable business of the participants, while respecting generally accepted international standards. Energy Law of RS defines the provisions about legal status of Regulatory Commission for Energy in RS extracted from applicable Electricity Law of RS. With the harmonisation of sector laws with this law, the regulatory jurisdictions in energy sectors shall be defined (electricity, gas, petrol, etc.)

For the purpose of providing security of electricity supply and enabling access to distribution grid, RERS has, in addition to other documents, adopted the following: General Conditions for Delivery and Supply of Electricity, Decision on determination of tariff rates for distribution system users, Rule Book on Methodology for Determination of the Fee for Connection to the Distribution Grid and it has given the approval for distribution grid codes designed by distribution companies in Republika Srpska.

### 1.2 The Existing Generation Capacities

Power generation in Bosnia and Herzegovina is exclusively related to domestic energy resources - coal and hydropower.

Total installed capacity of generation facilities in BiH is 3,765 MW, out of which 2,000 MW in the hydropower plants and 1,765 MW in thermal power plants.

Apart from major hydropower plants and thermal power plants, the existing generation capacities in Bosnia and Herzegovina include also small hydropower and industrial plants, which are mostly connected to the distribution grid.

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

<table>
<thead>
<tr>
<th>Hydropower plants</th>
<th>Capacity of power unit (MW)</th>
<th>Total installed capacity (MW)</th>
<th>Thermal power plants</th>
<th>Installed capacity (MW)</th>
<th>Available capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trebinje I</td>
<td>3x60</td>
<td>180</td>
<td>Tuzla</td>
<td>715</td>
<td>651</td>
</tr>
<tr>
<td>Trebinje II</td>
<td>8</td>
<td>8</td>
<td>G3</td>
<td>100</td>
<td>91</td>
</tr>
<tr>
<td>Dubrovnik (B&amp;H+Hr.)</td>
<td>2x105</td>
<td>210</td>
<td>G4</td>
<td>200</td>
<td>182</td>
</tr>
<tr>
<td>Čapljina</td>
<td>2x210</td>
<td>420</td>
<td>G5</td>
<td>200</td>
<td>180</td>
</tr>
<tr>
<td>Rama</td>
<td>2x80</td>
<td>160</td>
<td>G6</td>
<td>215</td>
<td>198</td>
</tr>
<tr>
<td>Jablanica</td>
<td>6x30</td>
<td>180</td>
<td>Kakanj</td>
<td>450</td>
<td>398</td>
</tr>
<tr>
<td>Grabovica</td>
<td>2x58,5</td>
<td>117</td>
<td>G5</td>
<td>110</td>
<td>100</td>
</tr>
<tr>
<td>Salakovac</td>
<td>3x70</td>
<td>210</td>
<td>G6</td>
<td>110</td>
<td>90</td>
</tr>
<tr>
<td>Mostar</td>
<td>3x25</td>
<td>75</td>
<td>G7</td>
<td>230</td>
<td>208</td>
</tr>
<tr>
<td>Jajce I</td>
<td>2x30</td>
<td>60</td>
<td>Gacko</td>
<td>300</td>
<td>276</td>
</tr>
<tr>
<td>Jajce II</td>
<td>3x10</td>
<td>30</td>
<td>Ugljevik</td>
<td>300</td>
<td>279</td>
</tr>
<tr>
<td>Location</td>
<td>Capacity</td>
<td>Voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>----------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bočac</td>
<td>2x55</td>
<td>110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Višegrad</td>
<td>3x105</td>
<td>315</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peć-Mlini</td>
<td>2x15</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.3 Power Generation and System Peak Load

The amount of power generation at the BiH transmission grid in 2008 was **13,270 GWh**. The engaged capacity of generation capacities at the transmission grid, in the period 2001-2005, is given in the Table 2.

**Table 2 - Engaged capacity of resources at the transmission grid in period 2001-2005**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engaged capacity of resources at the transmission grid (MW)</td>
<td>1972</td>
<td>2141</td>
<td>2074</td>
<td>2598</td>
<td>2446</td>
</tr>
</tbody>
</table>

Electricity consumption at the BiH transmission grid, in 2008, amounted to **11,339 GWh**, while transmission losses were 326 GWh or 1.95 % in relation to the available electricity at the transmission grid.

Peak capacity of the consumed amount at the BiH transmission grid in the period 2001-2008 is given in Table 3.

**Table 3 - Peak capacity of the consumption at the BiH transmission grid in period 2001-2008**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak power of the consume at the transmission grid (MW)</td>
<td>1794</td>
<td>1741</td>
<td>1854</td>
<td>1879</td>
<td>2005</td>
<td>2019</td>
<td>2078</td>
<td>2117</td>
</tr>
</tbody>
</table>

Table 4 shows forecasts of the peak capacity in the period 2007-2010.

**Table 4 - Peak capacity forecasts of the consume at the BiH transmission grid between 2007–2010**

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak power of the consume at the transmission grid (MW)</td>
<td>2062</td>
<td>2108</td>
<td>2154</td>
<td>2201</td>
</tr>
</tbody>
</table>
1.4 Power balance of BiH at the transmission grid

Figure 1 shows realization of the power balance in the period 2001-2005 at the transmission grid and forecasts for the period 2006-2016.

Figure 1. Power balance of BiH in the period 2001-2016 (blue – generation, red – consumption)

1.4.1 Power balance in power utilities

Three power utilities, mostly state-owned, perform power generation: JP Elektroprivreda BiH, MH Elektroprivreda RS a.d. Trebinje – holding company and JP Elektroprivreda HZ HB. Power distribution is performed by five power distribution companies in Republika Srpska, members of MH Elektroprivreda RS a.d. Trebinje – holding company. In Federation BiH the power distribution is performed by JP Elektroprivreda BIH and JP Elektroprivreda HZHB and in District of Brčko it is Elektrodistribucija Brčko Distrikta.

Power balances in power utilities are given in Figures 2, 3 and 4 - source of information is ISO BiH.

If we look at power balances in power utilities it is noticeable that JP Elektroprivreda HZ HB d.d. Mostar is providing the consumption of its customers (including the eligible customers) in its geographical area from its own generation facilities and with procurement at the market.
Figure 2. Power balance of JP EP BiH 2000-2016

Figure 3. Power balance of EP RS, holding company 2000-2016

Figure 4. Power balance of the JP EP HZ HB 2000-2016
1.5 Map of the BiH power system

Map of the BiH power system - December 2008 is presented in Figure 5.

![Map of the BiH power system](image)

Figure 5. Map of the power system of Bosnia and Herzegovina – December 2008.

1.6 Basic information about the transmission grid

Basic information about the transmission lines and interconnected lines of 400 kV, 220 kV and 110 kV are given in the Table 5.

<table>
<thead>
<tr>
<th>No</th>
<th>Nominal voltage of transmission lines</th>
<th>Length (km)</th>
<th>No</th>
<th>Nominal voltage of transmission lines</th>
<th>No. of interconnections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>400 kV</td>
<td>867,1</td>
<td>1</td>
<td>400 kV</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>220 kV</td>
<td>1,526,7</td>
<td>2</td>
<td>220 kV</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>110 kV</td>
<td>3,836,5</td>
<td>3</td>
<td>110 kV</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>110 kV – cable line</td>
<td>31,4</td>
<td></td>
<td>Total</td>
<td>29</td>
</tr>
</tbody>
</table>

Basic information about the substations 400/x, 220/x and 110/x and the transformers are presented in Table 6.
Table 6

<table>
<thead>
<tr>
<th>No</th>
<th>Type of substation</th>
<th>No. of substations</th>
<th>Installed capacity (MVA)</th>
<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>TS 400/kV 9 kV</td>
<td>9</td>
<td>5861,5</td>
<td>1</td>
<td>TR 400/kV 14 kV</td>
<td>14</td>
<td>4900</td>
</tr>
<tr>
<td>2</td>
<td>TS 220/kV 7 kV</td>
<td>7</td>
<td>1277,0</td>
<td>2</td>
<td>TR 220/kV 14 kV</td>
<td>14</td>
<td>1800</td>
</tr>
<tr>
<td>3</td>
<td>TS 110/kV 121 kV</td>
<td>121</td>
<td>4873,5</td>
<td>3</td>
<td>TR 110/kV 223 kV</td>
<td>223</td>
<td>5196</td>
</tr>
</tbody>
</table>

1.7 Procedural steps related to planning and development of the transmission system

1. Complete set of technical data of all elements of the transmission grid which are necessary for the reliable system control shall be made available by the Transmission Company to the BiH ISO. Transmission Company shall inform BiH ISO in writing on all estimates in technical data or facilities.

2. Data necessary to plan development of the transmission grid and data related to the transmission system operation shall be made available to the Transmission Company by the BiH ISO.

3. BiH ISO shall publish every year the development plan of the transmission system for the next 10 years, indicating the structural changes for each year, in order to help existing and possible users in estimation of the possibilities for connection and usage of the transmission system.

4. Planning data shall be provided by the users while filing for a new or modified contract on connection to the transmission system, or for each significant modification at its grid or operational regime.

5. When there are no changes of data for years, instead of submitting data again, the user may send written statement expressing that there are no changes of data in relation to the previous period.

6. In coordination with the BiH ISO, the Transmission Company shall prepare the plan using the data that users submitted to the BiH ISO. The proposal of the plan shall be annually submitted to the BiH ISO until the end of July.

7. The Transmission Company shall submit the Development Plan of the transmission system to the BiH ISO for review, approval, direct auditing and publishing. When the BiH ISO finds it necessary to make certain modifications, it may ask the Transmission Company to amend certain elements of the Development Plan of the transmission system.

8. The BiH ISO shall inform the Transmission Company about any material changes of the data submitted by the user which might cause additional estimation before being included in the Development Plan of the transmission system.

9. Development Plan of the transmission system with included both, temporary and anticipated, data contains:
   a) inspection of the transmission lines and cables with technical details,
   b) maximum and minimum capacity of generation units including the planned overhauls,
   c) maximum and minimum active and reactive capacity of the consumption nodes and time of their achievement,
d) load estimation of the transmission grid elements based on the estimation and coincident maximum and minimum load of the transmission grid user, using the (n-1) reliability criteria,
e) losses in the transmission grid,
f) estimation of the short-circuit currents for each grid node,
g) estimate of the static and transient stability,
h) necessary system reinforcements and/or changes in the topological structure of the transmission grid,
i) transmission capacity which might be available for third parties,
j) statistics of failures and period of interruptions due to failures and maintenance of the transmission lines and grid transformers in the last five years,
k) necessary reconstruction and replacement of the transmission grid elements and plant’s equipment (reconstruction, replacement of the primary and secondary equipment, expansion of the substation capacities, etc),
l) estimation of the necessary investments for the realization of the proposed plans.

10. Before submitting it to SERC for approval, the BiH ISO shall organize direct audit of the Development Plan of the transmission system. The council of experts for audit of the Development Plan, established by the BiH ISO, consists of representatives of the BiH ISO, the Transmission Company and transmission grid users.

Note:
For the aim of security of electricity supply in BIH and stable connections with systems in region, it is necessary to:

a) urgently adopt Development and Investments Plan for Transmission Grid in BIH (in this moment, the obstacles in the decision-making and the investment delay are the alerting issues of power system in BIH, in near future)
b) as soon as it is possible, analyse needs and propose connections of 400 kV grid to Croatia, Serbia and Montenegro
c) include the proposal of Interconnection of BIH with Italy with technical and economic analysis of planned alternatives (alternative BIH- Italy has objective advantage in relation to other options, especially from the point of availability of electricity for exports, in comparison to other Balkan countries).

1.8 ISO BiH procedures for ensuring the security

Having adopted the Law on Transmission, Regulator and System Operator of Electricity in BiH (Official Gazette, No. 07/02), the Law Establishing the Transmission Company for Electricity in BiH (Official Gazette, No. 13/03) and the Law Establishing the Independent System Operator in BiH (Official Gazette, No. 35/04), preconditions were created for the implementation of the BiH ISO’s commitments within the scope of safety of operation of the BiH electric power system. Pursuant to the Law, the BiH ISO shall ensure development and publishing of technical rules, which shall provide, further on, the minimum technical and operation requests for connection to the uniform power system of directly connected generation units, costumers directly connected to the transmission grid and distribution systems within BiH.

The BiH ISO was defined as the responsible entity in development of the Indicative Plan for Generation Development for the next 10 years by these laws and accompanying documents, Grid Code, in particular. This plan shall serve as a basis for development of the Long-term Development Plan of the transmission grid.
Energy Sector Study of BiH is the basic document which defines key development commitments at the state level of BiH from the point of view of consumption development and its characteristics, based on the sector analysis and resources building, i.e. usage of primary energy sources for power generation, as well as the commitments from the standpoint of import or export of electricity, respectively.

The Indicative Plan for generation development is prepared by the BiH ISO every year for the next 10-year period based on data provided by generators, distribution companies and end users directly connected to the transmission system. It is updated each year and submitted to the Elektroprivreda BiH as the basis for the Long-term Development Plan of the Transmission Grid.

The aim of the Indicative Plan for Generation Development is to inform users (existing and future) on needs and projects related to construction of new generation capacities. The following items shall be taken into account in the process of the generation planning:

a) necessary generation capacities to meet peak loads,
b) energy balances at the transmission grid,
c) reserves in the capacity and energy and possible deficits,
d) compliance with the Development Plan of the Transmission System;
e) fulfilment of the energy requirements from their own sources as the basic criterion for design of the Indicative Plan of Generation Development.

While creating the Indicative Plan for Generation Development, the BiH ISO shall, as much as possible, coordinate and share information with parties responsible for creation of the generation development plans. The BiH ISO shall annually submit the Transmission System Development Plan and the Indicative Plan for Generation Development to SERC for approval. Upon the approval, the BiH ISO shall publish the plans and make them available to all stakeholders.

The BiH ISO is also responsible, pursuant to the UCTE Operation Handbook and the Grid Code, for application of the defined technical criteria, while the Market Rules entitle it to apply economic criteria related to provision and engagement of primary, secondary and tertiary reserves of the power system.

### 1.9 Construction of new generation capacities in Bosnia and Herzegovina

#### 1.9.1 Planned construction of new generation capacities in Federation BiH

The increased electricity consumption requirements and expected shortfall of energy after 2015 require urgent construction of new energy capacities.

In accordance with adopted Strategic Plan and Programme for the Development of Energy Sector in Federation BiH, the rehabilitation of existing units in TPP Tuzla and TPP Kakanj has been anticipated as well as construction of new replacement units on the same locations, opening of new mines and thermal power plants Bugojno and Kongora, as well as new hydropower plants and wind farms. The estimated installed capacity in priority phase is approximately 3,000 MW.

The feasibility study, researches, and preparation of project documents, environmental studies and similar are ongoing.

Also, in addition to already constructed, the number of small hydropower plants is in the process of construction.

Having constructed these resources, power generation, intended for the export as well, would be considerably increased.
The list of all plants that are in the process of construction is contained in the specified Strategic Plan and Programme for Development of Energy Sector in Federation BIH. The Electricity Law (Official Gazette of FBiH, No. 41/02, 24/05 and 38/05), has defined, by using a new approach in this area, new principles in the sphere of the tariff policy and relationships with electricity customers in FBiH, based on which the Regulatory Commission for Electricity in FBiH- FERK is in charge of:

- supervision and regulation of relationships between generation, distribution and customers of electricity, including electricity traders,
- prescribing methodology and criteria for determination of the supply prices for non-eligible (tariff) electricity customers,
- determination of tariff rates for distribution system users and tariff rates for non-eligible (tariff) customers,
- issuance or revocation of the licenses for generation, distribution, supply and trade of electricity,
- issuance of the initial licenses for construction of the power facilities other than power transmission facilities,
- determination of the general conditions for electricity supply.

Apart from the FBiH Decision on methodology for determination of electricity purchase prices from the renewable sources of the installed capacity up to 5 MW (2002), other documents giving implicit and explicit incentives for the construction of energy capacities, have not yet been developed, except guidelines stipulated by the federal laws: the Law on regional planning and land use, the Electricity Law, the Law on Concessions, the Law on Water, the Law on Environmental Protection etc.

1.9.1.1 Investments in future generation in the next three years - FERK Report

Until May 15th, 2009, Regulatory Commission for Electricity in Federation of Bosnia and Herzegovina has received nine applications for issuance of the initial license for construction of the power generation facilities.

Last year, FERK has issued six initial licences for construction of the power generation facilities. The estimated annual generation from these small HPPs is 15.726 GWh.

The procedure related to issuance of the initial license for construction of the following generation facilities is currently ongoing:

- small HPP Dubrava on river Kozica, municipality of Gornji Vakuf/Uskoplje, applicant Wind-Neretva d.o.o. Konjic. Estimated annual generation from this hydropower plant is 13.779 GWh.
- small HPP T3 Lukač on river Trešanica, municipality of Konjic, applicant Wind-Neretva d.o.o. Konjic. Estimated annual generation from this hydropower plant is 12.060 GWh.
- small HPP Ipota on stream Ipota, municipality of Vinac-Jajce, applicant Elgrad d.o.o. Jajce. Estimated annual generation from this hydropower plant is 0.477 GWh.
- small HPP Kasumi on stream Kasumi, municipality of Vinac-Jajce, applicant Elgrad d.o.o. Jajce. Estimated annual generation from this hydropower plant is 0.223 GWh.
- small HPP Poljanski potok/Granbantski potok on Poljanski/Grabantski stream, municipality of Vinac-Jajce, applicant Elgrad d.o.o. Jajce. Estimated annual generation from this hydropower plant is 0.223 GWh.
- small HPP Glasinac on Glasinac stream, municipality of Vinac-Jajce, applicant Elgrad d.o.o. Jajce. Estimated annual generation from this hydropower plant is 0.478 GWh.
small HPP Zagradačka on Zagradačka river, municipality of Prozor-Rama, applicant small HPP Zagradačka d.o.o. Prozor/Rama. Estimated annual generation from this hydropower plant is 3.136 GWh.

small HPP Crima, on river Crima, municipality of Prozor/Rama, applicant Ecco-Crima d.o.o. Prozor/Rama. Estimated annual generation from this hydropower plant is 7.180 GWh.

small HPP Grablje on river Borovnica, municipality of Fojnica, applicant Kara-drvo d.o.o. Fojnica. Estimated annual generation from this hydropower plant is 2.150 GWh.

Hence, the estimated annual consumption of generation facilities, which are in procedure for issuing initial construction license, is 39.727 GWh.

**Competences of FERK**

Pursuant to Article 14 of the Electricity Law of FBiH (Official Gazette of FBiH, No. 41/02), FERK is in charge for issuing the initial licenses for construction and licenses for operation of the power facilities except power transmission facilities. Articles 75 and 76 of the Electricity Law define the following:

- Construction of facilities and plants for power generation and distribution, other than connections at low voltage, is subject to issuance of the initial license, pursuant to the Law;
- The initial license for construction of the generation facility is issued once the concession is obtained from the authorised body, if necessary to obtain the concession right for such a facility, pursuant to the special law provisions;
- Facilities and plants for power generation and distribution may be constructed by domestic and foreign legal persons under the conditions prescribed by these or other laws;
- Before the initial licenses for construction of the power facilities and plants for power generation and distribution are issued, the investor shall obtain the consent for project documentation pursuant to the law.

**FERK Licensing Rule (Official Gazette of FBiH, No. 29/05),** defines the criteria for the issuance of initial licenses for construction and reconstruction of the power facilities to applicant, if the applicant proves the following:

- it demonstrates that it has appropriate property and legal rights for each estate included in the proposed construction plan;
- it proves that it has fulfilled all technical, operational, safety, water industry, and other conditions in the operation;
- it has fulfilled all established criteria for the protection of the environment and will ensure continuous control over the impact on the environment;
- it has the financial and technical capacity to complete the construction in accordance with the license terms;
- it or its members of management has not been found liable for economic crime or been found liable under criminal laws for fraud, financial impropriety, significant license violations, or environmental infractions from the applicant’s field of activity;
- it has demonstrated the capacity to provide accounting reports to the Commission in the format and detail required by FERK or other authorities;
- it has demonstrated the financial and technical capacity to dispose of all construction-related wastes, as well as to dismantle all plants and facilities and return the land to its primary condition once the license has expired in accordance with the Law;
- it provides appropriate financial guarantees for construction to assure Licensee will fulfill all license conditions;
i) it has obtained any necessary concession and has obtained the approval on investment-technical documents.

1.9.2 Planned construction of new generation capacities in Republika Srpska

The Ministry of Industry, Energy and Mining in cooperation with the Regulatory Commission for Energy of RS conducts the activities related to adopting the measures which would stimulate power generation in small hydro power plants (reservoir and run-of-river). In accordance with future development plans it has been anticipated to support generation from renewables and effective cogeneration that are not presently in place in Republic of Srpska (wind energy, solar energy, biomass, etc).

The laws in Republika Srpska prescribe that RS Government is authorized for energy policy that would provide usage of renewables and possibility of using different primary energy sources, and define the indicative aim of portion of renewables used for power generation in the gross consumption, and RERS prescribes, with RS Government approval, the supporting system for power generation and cogeneration i.e. how to provide and use support funds.

Related to above mentioned, RERS has designed during 2008 the draft Rule on Eligible Producer and support for power generation from renewables and cogeneration of heat and electricity as well as draft Decision on amount for premiums and guaranteed purchase prices of electricity generated in eligible plants and efficient cogeneration plants. It is expected that activities on the design of these documents will be finalised during 2009 and in this way be incentive for construction of these generation facilities.

Ministry of Industry, Energy and Mining of RS is in jurisdiction of planning and construction of power facilities in Republika Srpska.

To date, the government of Republika Srpska has awarded 100 concessions for construction of small hydro power plants with the capacity up to 5 MW. One small hydropower plant is in operation already for two years HPP Diviĉ – 2.4 MW, and one is just commissioned for trial operation HE RS1-1.8 MW. The contracts are signed for number of hydropower plants of capacity more than 5 MW: three on Bistrica River, of total installed capacity approximately 40 MW and 7 on river Bosna, of total installed capacity approximately 85 MW.

Total estimated capacity of power plants given the concessions is about 240 MW.

The total capacity of the planned large hydropower plants with capacity above 10 MW amounts approx. 1,400 MW: system of HPPs on river Vrbas (HPP Krupa, Banja Luka – low, 4 HPPs on the lower Vrbas river, on upper Drina river (HPP Buk Bijela-lower, HPP Foĉa, HPP Paunci) as well as number of insufficiently explored locations on the middle Drina river (HPP Rogaĉica, HPP Srednje Tegare, HPP Mala Dubravica) and lower Drina river (HPP Kozluk, HPP Drina I, HPP Drina II, HPP Drina III), then Mrsovo on river Lim, Vikoĉ on river Čehotina and Gornji Horizonti (HPP Dabar, HPP Bileĉa, HPP Nevesinje).

Preparatory activities are underway related to construction of the second generator in TPP Gacko II and TPP Ugljevik II with capacity of 600 MW each.

In February 2008, the contract has been signed relating to construction of TPP Stanari with the capacity of 420 MW. On August, 7th, 2008 RERS has issued the license for construction of power facility to the company EFT – Rudnik i Termoelektrana Stanari d.o.o. Stanari.

The total estimated capacity of the planned thermal power plants in Republika Srpska is about 1,600 MW.
1.9.2.1 Investments in future generation in the next three years - RERS Report

In the previous period Regulatory Commission for Energy RS has adopted the ruling on issuance of construction license for TPP Stanari of capacity 420 MW with the validity period of six years, and it has issued the license for the construction of distribution substation SS Bijeljina IV, installed capacity 2x8 MVA, voltage level 35/10 kV.

Until May 15\textsuperscript{th}, 2009 the Regulatory Commission for Energy of Republika Srpska has received the applications for the construction of new generation capacity (small hydropower plants) by the following applicants:

- Eling MHE d.o.o. Teslići – construction of small HPP Novakovići
- Bobar Taubinger elektrik d.o.o. Brod na Drini, Foča – construction of small HPP Bistrica B5-A.

RERS has no official information about planned start for construction of other generation facilities that have been given the concessions.

Role of the Regulatory Commission for Energy of Republika Srpska

Based on the Electricity Law, in order to regulate monopolistic behaviour and provide all participants in the electricity market in Republic of Srpska with transparent and non-discriminatory position, the Regulatory Commission for Energy of Republika Srpska has been established.

Competences of RERS are as follows:

- supervision and regulation of relations between generation, distribution and electricity customers including electricity traders,
- prescribing methodology and criteria for determination of price for usage of distribution grid and electricity supply price for non-eligible customers and methodology for determination of distribution grid connection fee,
- determination of tariff system for sales of electricity and usage of distribution grid,
- determination of tariff rates for distribution system users and tariff rates for non-eligible customers,
- issuance or revocation of the licenses for generation, distribution and trade of electricity,
- determination of general conditions for supply of electricity.

While implementing its jurisdictions and performing its functions, pursuant to its competences, RERS shall:

- improve efficiency, reliability and cost-effectiveness of the system for power generation, distribution and power exchange,
- improve the competitiveness,
- stimulate efficiency, cost-effectiveness and safety in use of electricity,
- regulate the quality of services and tariffs and profitable prices, taking into account customers’ interests and suppliers’ needs,
- provide fairness in the power supply,
- provide transparent and non-discriminatory behaviour in the electricity market,
- ensure that the power activity on the territory of Republika Srpska does not have adverse impact on health, safety and environmental protection,
- create conditions for development of the power system (generation and distribution),
adopt measures to prevent misuse of the monopolistic behaviour of the licensee, whose licence was issued by RERS.

Within the scope of its jurisdictions, RERS issues the licenses both for power activities operation and construction of the power facilities. While constructing a new power facility, the investor shall file an application for issuance of the construction license, i.e. shall obtain the license for construction from RERS.

The application for obtaining construction license shall be filed in a form prescribed by RERS and it contains the following details:

- data on the type of the power facility,
- general details of the applicant,
- basic technical data for the power facility such as:
  - location and type of the generation facility,
  - description of the generation facility,
  - connection of the generation facility to the power system,
  - data on heat or technological steam customers, if available
- as well as the list of appropriate statements and evidences.

The application should be accompanied by statements and evidences among which the most important are:

- Feasibility study,
- Environmental impact assessment study,
- Environmental permit,
- Water management permit,
- Concession contract,
- Electric power permit or any other evidence on conditions for connection to power grid;
- Town planning certificate.

**Criteria for making decision on issuance of the construction license**

The license for construction is issued to each applicant that proves the following:

- that the power facility was designed in way which provides reliable and safe functioning of the power system on which it is connecting,
- that the power facility was designed in a way which provides reliable and safe functioning of accompanying installations and equipment,
- that the power facility was designed in a way to meet the established criteria related to environmental protection and that continuous monitoring of the criteria fulfilment is provided,
- that the applicant confirms compliance with the concession requirements, bid concession requirement or other requirements related to the construction of power facilities on the basis of concession, including the obligation to supply electricity to tariff customers,
- that supply regularity shall not be considerably reduced because of the construction or reconstruction of the power facilities,
- that it meets the conditions related to health and safety at work in the power facility,
- that it has regulated property-legal issues related to the use of land, determination of the site location and use and construction of the appropriate infrastructure,
- that there are no limitations related to the use of the primary energy sources for power generation,
- that the power facility was designed in a way that provides energy efficiency of the primary sources use,
that it has available sufficient own funds and/or has the possibility of bank loan or may obtain the bank guarantees,
that it has technical and personnel possibilities to prepare his financial reports pursuant to the accounting standards of Republika Srpska,
that it has financial and technical capacity to dismantle and/or remove all the waste occurred during the construction process, to arrange the land upon the license expiry pursuant to the law.

2. NATURAL GAS

2.1 Legal and institutional framework in Bosnia and Herzegovina

At this moment in the natural gas sector in BIH there is legal framework, but only on the level of Entities, i.e. Gas Law in Republic of Srpska (Official Gazette RS, No. 86/07) and Decree on Organisation and Regulation of Gas Industry Sector (Official Gazette FBIH, No. 83/07). Having in mind shortcomings and non-harmonisation of entity legal frameworks, Ministry of Foreign Trade and Economic Relations BIH has established Expert Team with the task to design draft of framework legislation on gas on BIH level and to give recommendations in what direction it is necessary to modify entity legislations to get fully compliant and harmonised legal framework in BIH.

Institutional framework in BIH consists, first of all, of three ministries that have jurisdiction over energy matters, including also natural gas and these are:

- on BIH level, Ministry of Foreign Trade and Economic Relations
- in Republika Srpska, Ministry of Industry, Energy and Mining
- in Federation BIH, Federal Ministry of Energy, Mining and Industry

When it comes to regulatory commissions, in BIH there are three bodies in jurisdiction of electricity, while only Regulatory Commission for Energy in Republika Srpska has been given the jurisdiction of natural gas. Aforesaid Gas Law in Republic of Srpska has prescribed that regulation of activities in natural gas sector in the territory of Republika Srpska is performed by Regulatory Commission for Energy in Republic of Srpska. On the other hand, Decree on Organisation and Regulation of Gas Industry Sector in Federation BIH has determined that regulatory body, i.e. regulatory agency shall be subsequently established. In the meantime, Federal Ministry of Energy, Mining and Industry is performing the regulatory role.

In the natural gas sector in BIH few companies that perform different activities, are involved in gas business. The below is the list of companies in natural gas sector in BIH with short description of their activities:

- BH-Gas Sarajevo (together with company Energoinvest from Sarajevo is the only importer of natural gas in BIH, while BH Gas is in the same time the gas transport system operator in Federation BIH).
- Gaspromet from Istočno Sarajevo (gas transport system operator in Republic of Srpska)
- Sarajevo-gas from Sarajevo (performing distribution of natural gas in Sarajevo Canton)
- Sarajevo-gas from Istočno Sarajevo (performing distribution of natural gas in Istočno Sarajevo and is the owner of part of the transport gas pipeline in Republika Srpska)
- Zvornik Stan from Zvornik (performing distribution of natural gas in Zvornik)
- Visokogas from Visoko (performing distribution of natural gas in Visoko).
2.2 Gas Pipeline System in BiH

Bosnia and Herzegovina does not have its own natural gas sources so its supplying is exclusively based on import of this energy source. For the time being, it is only from one source and with using only one transport direction which is Beregovo - Horgos - Zvornik. All natural gas quantities for Bosnia and Herzegovina are imported from the Russian Federation through the transport systems of Ukraine, Hungary and Serbia.

The main characteristics of the natural gas transport system in BiH are the following:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of the gas pipeline</td>
<td>191 km</td>
</tr>
<tr>
<td>Gas pipeline diameter</td>
<td>406.4 mm</td>
</tr>
<tr>
<td>Designed pressure</td>
<td>50 bars</td>
</tr>
<tr>
<td>Designed capacity</td>
<td>1 billion m³/year</td>
</tr>
</tbody>
</table>

The actual rented transport capacity to Bosnia and Herzegovina is 750 million m³/year, while the pressure of the natural gas takeover in the transfer station in Zvornik is 26 bars. The gas pipeline was designed and constructed pursuant to the regulation ANSI B31.8; steel pipes were factory pre-insulated with poly-ethylene, and the whole system is covered with cathode protection. There are 9 metering stations, 12 block stations and 4 cleaning stations at the transport system.

![Figure 6. Gas Transport System of Bosnia and Herzegovina](image)

2.3 Natural Gas Demand in BIH

Natural gas is currently available only for limited number of customers because gas infrastructure is developed only in part of the country, in towns: Sarajevo, Istočno Sarajevo, Zvornik, Visoko and Zenica. Below table shows total natural gas demand in period 2000-2008.
The natural gas demand in industry sector in BIH is mainly based on consumption of the companies that produce steel and alumina. The business of these companies directly influence the total natural gas consumption, so the shoot up in consumption in period 2002-2005 and reducing the consumption in the period after that, is the direct consequence of trends on the world steel and aluminium markets, and at the certain point also the offer of cheaper replacement energy sources, mostly heating oil, i.e. mazut. The following Figure shows the natural gas demand structure by sectors in 2007. Also, it is necessary to mention that same trend in the demand structure is kept in 2008.

<table>
<thead>
<tr>
<th>Natural Gas Demand Structure by sectors in BIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
</tr>
<tr>
<td>6%</td>
</tr>
</tbody>
</table>

### 2.4 Current available import capacity

Company Energoinvest from Sarajevo is the contractor for natural gas supply for BIH, but the contract is still not long-term because there are outstanding debts, incurred during 1992-1995. Presently there are activities about solving this issue and creation of conditions for the agreement upon long-term contract for the natural gas supply.

Company BH-Gas, in cooperation with company Energoinvest, has signed long-term contracts on transit of natural gas with foreign partners, as follows:
- with company Mol for transit of natural gas through transport system in Hungary until 2018;

<table>
<thead>
<tr>
<th>Gas Demand in BIH bil.m³</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 bil.m³</td>
<td>251.20</td>
<td>164.28</td>
<td>155.53</td>
<td>203.33</td>
<td>320.38</td>
<td>380.46</td>
<td>360.5</td>
<td>314.7</td>
<td>310</td>
</tr>
</tbody>
</table>
2.5 Gas system development in BIH

When it comes to gas system, it is necessary to note that in BIH there are several plans for the construction of new infrastructure for natural gas transport and plans for the expansion and construction of new distribution networks. Momentarily, there is no mechanism for harmonisation and ranking of the potential projects in BIH.

In the Federation BiH natural gas sector the Strategic Plan and Programme of Energy Sector Development is in place. In the scope of this plan the project determined as the highest priority is the project for construction of the transport gas pipeline from the existing system in Zenica to Bosanski Brod, and connection to transport system in Croatia, in length of approximately 120 km. As it has been presented, this project shall provide a new transport direction with new input of natural gas in BiH and, on the long-term basis, a possibility for diversification of sources of supply with natural gas, because of connection with Croatian transport system. The Feasibility Study of Gas Pipeline Construction for this project has been finalised, as well as the estimation of project costs and the EBRD financing approval has been received. For the successful realization of this project it is necessary to provide the approval of entity authorities in Republika Srpska, because the gas pipeline route is going through the territory of Republika Srpska.

On the other hand, in Republic of Srpska, few years ago the concession contract has been signed for the construction of transport gas pipeline Sava, through northern part of Republika Srpska in the total length, with planned branches, of about 456 km. This gas pipeline should be connecting the towns of Bijeljina-Brčko-Modriča-Derventa-Prnjavor-Laktaši-Banja Luka-Prijedor-Novigrad, with the branches towards the towns of Ugljevik, Šamac, Bosanski Brod, Doboj and Gradiška. The length of gas pipeline itself is 300 km, and with branches it is about 456 km. This gas pipeline would be connected with transport system in Serbia, in the area of municipalities Bijeljina or Zvornik, and also with transport system of Croatia in the region of municipalities Bosanski Brod and Gradiška. Project has included connection with transport system in Federation BiH with construction of gas pipeline to Zenica and Tuzla. As it has been presented, the advantages of the construction of gas pipeline Sava are in the fact that it would provide economic significance for the development of major settlements in Republika Srpska connected by gas pipeline, potential of consumption, diversification of directions for supply and providing the expansion of gas network in Federation BiH.

In addition to aforesaid, Ministry for Foreign Trade and Economic Relations of BiH has signed “Ministerial Declaration on the Ionian-Adriatic Gas Pipeline Project” that provided political support for the activities on the preparation of this project. With possible realization of this project the new source and new supply direction would be provided, but at the same time the possibility for gasification of the southern part of BiH would be created. In this moment, company BH-Gas is performing activities on the estimation of market potential in the southern part of Federation BiH.

2.6 The consequences of the natural gas supply termination in January 2009

As it is stated in the Chapter 2.2. natural gas market in BiH is completely supplied with imports from Russian Federation. Because of dispute between Russia and Ukraine and the termination of the supply by Russian partner, BIH customers have been confronted with
reduced gas supply in the morning of January 6th, 2009, and by the end of the day they have been left completely without natural gas supply. The first quantities of natural gas in BIH have came in the morning of January 9th, 2009, while during the same day company BH-Gas has provided alternative supplies of natural gas from Germany and Hungary, for the period of seven or fourteen days, respectively.
As the quantity of delivered gas to BIH has been decreasing, there has been first reduction and than total termination of the supply to industrial customers, than to heat plants and at the end to all the customers including households. The mitigating circumstance for the industrial customers and heat plants with alternative energy possibilities was the sufficient quantity of heating oil, or mazut on BIH market. Precisely, some of major industrial customers where replacing part of natural gas with mazut because of price difference between of these two energy products, even before natural gas supply termination occurred. The number of households in BIH that are using natural gas for the heating of their homes is about 76,000, and out of this number only 34,000 had the possibility to use heating oil, wood or coal as replacement energy product. The rest number of about 42,000 households, mostly in urban zones, had the possibility to use only electricity as replacement energy product. As the result of this the increased electricity consumption and load of power system have been recorded. It is important to emphasise that during this period there were no serious disruptions in electricity supply.

Thanks to flexibility of natural gas transport companies the alternative flows and directions of supply with this energy product have been establish that, in any case, has contributed to successful overcoming of this crisis. In the future period it is necessary to intensify the activities and strengthen the cooperation between transport companies and suppliers to shorten the reaction time of these companies, in the case of next disruption in natural gas supply. In case of BIH, almost three days were needed to provide first alternative quantities of natural gas.

When it comes to BIH, all these and all the other issues related to security of supply must be defined more precisely and further considered through primary and secondary legislation.