

**SECURITY OF ENERGY SUPPLY
IN BOSNIA AND HERZEGOVINA**

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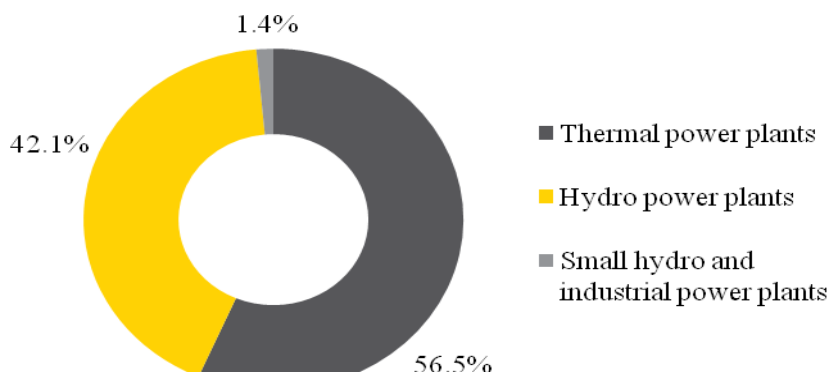
Security of Energy Supply in Bosnia and Herzegovina

1. Background

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 3,665 MW, out of which 2,106 MW in the hydropower plants and 1,559 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.

Notwithstanding negative trends, according to preliminary results, 2009 was even more successful for the power sector than the year before. Electricity generation was increased by 5.7% and amount to 14,575 GWh, which is a historic maximum with a record in electricity export of 3,900 GWh.

According to some estimates, generation of thermal power plants, hydro power plants and small hydro and industrial power plants amounted to 8,230 GWh, 6,135 GWh, and 210 GWh respectively.



Structure of electricity generation in BiH in 2009

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.

2. OVERVIEW OF ENERGY SECTOR OF BOSNIA AND HERZEGOVINA

a. Indigenous energy resources

Coal

- Brown coal and lignite
- Approximately 50% of country's primary energy supply
- Main energy source for electricity production (about 85% of coal is used in the thermal power plants)

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- Production 9.7 million tons in 2007

Hydro

- Big hydro potential – Utilization level is 40%
- Electricity generation from hydro sources is considerable (up to 45% depending on hydrological conditions)

b. Potential energy resources - renewables

Hydro:

- At present, there are about 25 SHPPs with a total capacity of 36 MW
- Utilizable SHPPs potential may be as high as 1000 MW

Wind:

- Currently there are no wind power plants
- Economic potential for developing approximately 600 MW
- 12 locations marked as having good potential

Biomass:

- Most significant source is wood mass from forestry and wood waste from the wood processing industry
- It is used mainly in rural and sub-urban areas as the primary source for heating and cooking purposes

Solar:

- Total potential of solar energy is estimated at 67.2 PWh
- There are no solar and PV power plants
- Use of solar energy for hot water and heating in the residential sector is insignificant

Geothermal:

- Geothermal potential of 9.25 MWt (for heating), and 90.12 MWt (for heating and health centers)
- There are no geothermal power plants
- Temperature at the known locations is too low (<90°C)

c. Imported energy resources

Natural gas

- All natural gas is imported from Russia
- Annual consumption 230 mcm (2009)

Oil

- Oil market is almost fully dependent on import (Croatia, Serbia, Montenegro and Hungary)
- Annual consumption about 1.3 million tonnes (2005)

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3. ELECTRICITY

3.1. Map of the BiH power system



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3.2. Procedures for ensuring security of energy supply

In Bosnia and Herzegovina, the Independent System Operator (ISO) is responsible for development of the Indicative Plan for Generation Development for the next ten years. Every year, ISO prepares the Indicative Plan 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 BiH ISO is also responsible, pursuant to the UCTE (ENTSO-E) 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.

To ensure electricity supply in BiH and stable connections with systems in region, it is necessary to:

- a) adopt urgently Development and Investments Plan for Transmission Grid in BiH
- b) analyse needs and propose, as soon as it is possible, 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

More information about the Indicative Generation Plan for the period 2011-2020 are available at www.nosbih.ba.

3.3. Construction of new generation capacities in Bosnia and Herzegovina

3.3.1. 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 Tuzla and Kakanj was anticipated. The plan also envisages the 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. More information is available at www.fbihvlada.gov.ba.

3.3.2. Planned construction of new generation capacities in Republika Srpska

In accordance with future development plans, plans are to support generation from renewables and effective cogeneration that are not presently in place in Republika Srpska (wind energy, solar energy, biomass, etc). To date, Republika Srpska Government 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 Divič – 2.4 MW, and one is just commissioned for trial operation HE RS1-1.8 MW. The contracts are signed for

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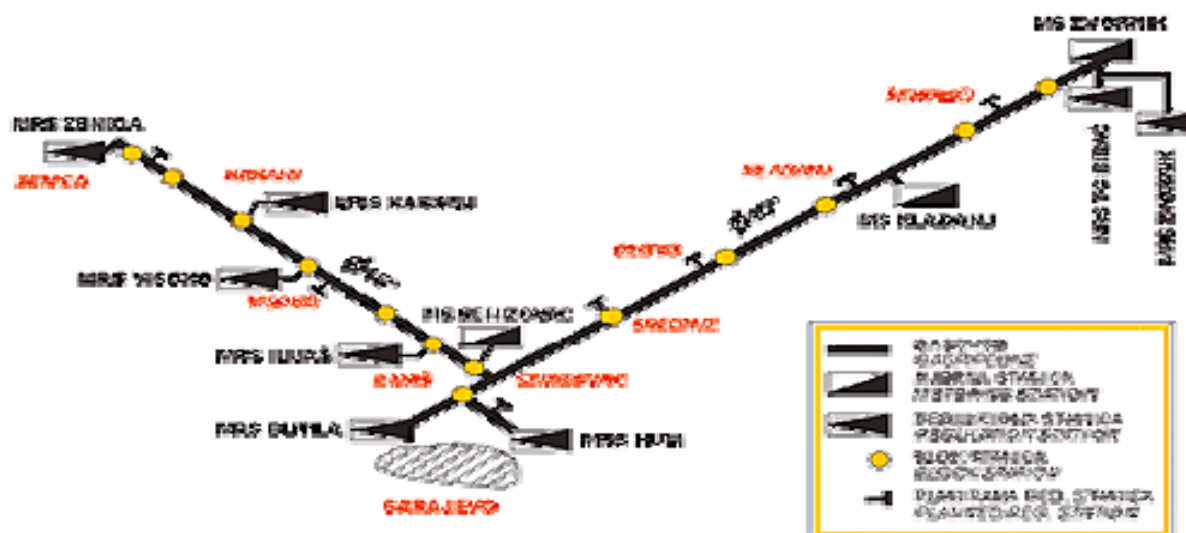
number of hydropower plants of capacity more than 5 MW: three on Bistrica River, of total installed capacity approximately 40 MW and 7 on river Bosna, of total installed capacity approximately 85 MW. Total estimated capacity of power plants to which concessions were awarded is about 240 MW.

The total capacity of the planned large hydropower plants with capacity above 10 MW amounts to approx. 1,400 MW, while the total estimated capacity of the planned thermal power plants in Republika Srpska is about 1,600 MW.

4. NATURAL GAS

4.1. 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 using only one transport direction which is Beregovo - Horgos - Zvornik. All natural gas for Bosnia and Herzegovina is 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:

Length of the gas pipeline	191 km
Gas pipeline diameter	406,4 mm
Designed pressure	50 bars
Designed capacity	1 billion m ³ /year

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.

4.3. 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. The table below shows total natural gas demand in period 2000-2008.

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Gas Demand in BIH bil.m ³	2000	2001	2002	2003	2004	2005	2006	2007	2008
	251.20	164.28	155.53	203.33	320.38	380.46	360.5	314.7	310

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.

Natural Gas Demand Structure by sectors in BIH

4.4. Current available import capacity

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;
- with company Srbijagas for transit of natural gas through transport system in Serbia until 2017.

4.5. Gas system development in BIH

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

In the Federation of BiH, 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, approximately 120 km in length. 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.

In Republika Srpska, a concession contract was signed for the construction of transport gas pipeline Sava, through northern part of Republika Srpska, for about 456 km in total length. 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.

Additionally, the Ministry for Foreign Trade and Economic Relations of BIH, under the implementation of Energy Community Treaty, has signed "Ministerial Declaration on the Ionian-Adriatic Gas Pipeline Project" that provided political support for the activities on the

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preparation of this project. This project would create opportunities to ensure gas supply in the southern part of the country.

4.6. The consequences of the natural gas supply termination in January 2009

As stated above, the natural gas market in BiH is completely supplied with imports from Russian Federation. Because of dispute between Russia and Ukraine, BiH customers were also among those confronted with reduced gas supply in the morning of 6 January 2009. The company BH-Gas provided alternative supplies of natural gas from Germany and Hungary, for the period of seven or fourteen days, respectively. Industrial customers and heating plants used alternative energy sources, such as heating oil, or mazut on the BiH market. Naturally, increased electricity consumption was recorded during that time.

Thanks to flexibility of natural gas transport companies, alternatives were found to contribute to the successful overcoming of this crisis. In the future, 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.

5. OIL

In the area of oil and oil products, BiH is in the early stages of drafting the necessary legislation to comply with requirements contained in the Energy Community Treaty. At the moment, BiH does not have oil stocks therefore the level of security of oil supply is not satisfactory. However, it is positive that operation was restored at the Bosanski Brod refinery.

CONCLUSIONS

The security of electricity supply is not an issue in BiH at present because of available surplus in generation. It is, however, urgently needed to explore alternative sources as well as options for natural gas supply. As mentioned above, Bosnia and Herzegovina is yet to establish its oil stocks. In addition, legislative framework must be strengthened through the adoption of the energy law at state level as well as the Energy Sector Development Strategy of Bosnia and Herzegovina. In institutional terms, Bosnia and Herzegovina is yet to establish a technical body - agency, institute, directorate – tasked with providing expert support services to the energy sector.

Energy security is, at the same time, an area where intra-state and regional cooperation is a must. As discussed above, Bosnia and Herzegovina has committed itself to supporting regional cooperation initiatives that seek to improve energy supply and security in the region.