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FOREIGN INVESTMENT PROMOTION AGENCY

Bosnia and Herzegovina Energy Sector

BOSNIA AND HERZEGOVINA INVESTMENT OPPORTUNITIES

Bosnia and Herzegovina Energy sector

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BOSNIA AND HERZEGOVINA

COMPARATIVE ADVANTAGES



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Energy sector in Bosnia and Herzegovina

GENERAL INFORMATION



Energy sector is one of the most powerful in B&H, with long tradition, huge potentials and opportunities for further development and investment as well as with intentions to become integral part of European energy market and community.

WHY INVEST IN B&H ENERGY SECTOR?

ENERGY RESERVES AND POTENTIALS

Bosnia and Herzegovina is endeavoured with significant and diverse indigenous natural energy resources that are still untouched or only partly exploited, such as:

- The main energy resource of B&H is coal (brown coal and lignite), with estimated reserves of 6 billion tons
- Huge, in this moment partly exploited hydro potential is estimated at over 6000 MW
- According to the extensive researches, there is significant wind energy potential which is estimated at 2000 MW
- Raw material resources for the bio-mass energy are extremely favourable, including approximately 1.5 million m³ of forest / wood industry residues (all wood waste, sawdust, chips, and chipped technical wood), etc.
- Potential for exploitation of geo-thermal and solar energy are available too, but have not been sufficiently explored and exploited
- Preliminary research surveys of oil and gas, had indicated the presence of promising deposits on a number of sites in B&H (off-balance sheet reserves are estimated at about 50 million tons of oil)

ENERGY SUBSECTORS

B&H energy sector encompasses the following main subsectors:

- Coal
- Electric power
- Oil & Natural gas



COAL SUBSECTOR

Coal is one of the most important energy resources in Bosnia and Herzegovina. Major deposits of lignite and brown coal are sited all around Federation of B&H (FB&H) and Republic of Srpska (RS).



Most of the existing coal mines fuel thermal power plants (TPP) in both entities. Coal mines situated in Northeast and Central Bosnia serve two TPPs, Kakanj and Tuzla, operated within the company Elektroprivreda Bosne i Hercegovine (EPB&H), whereas Ugljevik Coal Mine and TPP, and Gacko Coal Mine and TPP are operated within the company Elektroprivreda Republike Srpske (EPRS).

Production of coal in Bosnia and Herzegovina for 2009 is 11.468.906 tons, of which brown coal participates with 5.0% and lignite with 49.0%. The effective demand of thermal power plants is a regulator of coal production to a major degree since it absorbs 88% of total coal production. The remaining balance is supplied to industry and to broad consumption, whereas only negligible quantities are exported.

COAL MINES IN FEDERATION OF B&H

- Banovići (brown coal) surface mines Čubrić, Turija and Grivice; underground mine Omazići
- Durđevik (brown coal) surface mines Višća II and Potočari ; underground mine Durđevik
- Kakanj (brown coal) surface mine Vrtlište and underground mine Haljinići
- Zenica (brown coal) underground mines: Stara jama, Raspotočje and Stranjani
- Breza (brown coal) underground mines: Sretno and Kamenice
- Bila (brown coal) underground mine and surface mine Grahovčići
- Kreka (lignite) surface mines Šikulje and Dubrave; underground mines Mramor and Bukinje
- Livno (lignite) Tušnica surface mine
- Gračanica, G.Vakuf/Uskoplje (lignite): Dimnjače surface mine

POTENTIAL COAL MINES:

- Surface mine Kongora to fuel TPP Duvno
- Surface mine Kotezi to fuel TPP Bugojno
- Surface mine Kamengrad (brown coal) Sanski Most

COAL MINES IN RS

- Ugljevik (brown coal) surface mines Bogutovo Selo and Ugljevik-East; TPP Ugljevik
- Gacko (lignite) surface mines Gračanica and Gacko ;TPP Gacko
- Stanari (lignite) surface mine Raškovac

POTENTIAL COAL MINE:

- Miljevina (brown coal) surface and underground mine



Location of coal mines and thermal power plants in B&H

Reviews of geological coal reserves in B&H are shown in following table:

No.	MINE AND COAL RANK	RESERVES (000 t)					H _d (GJ/t)	Moisture (%)	Ash (%)	sulphur total (%)
		Balance (A+B+C ₁)	Out-of- balance (A+B+C ₁)	Potential (C ₂ +D ₁ +D ₂)	Total geological	Mineable (A+B+C ₁)				
BOSNIA AND HERZEGOVINA										
	Total lignite BIH	1.437.635	412.103	1.386.653	3.236.391	1.004.593				
	Total brown coal BIH	1.187.491	214.991	1.124.320	2.526.802	825.212				
	TOTAL BIH	2.625.126	627.094	2.510.973	5.763.193	1.829.805				



OIL & NATURAL GAS SUBSECTOR

Bosnia and Herzegovina is predominantly dependent on import of the liquid fuel and natural gas. A total of about 150 million USD were invested in oil and gas exploration, and the results indicated that both areas were rather perspective in terms of oil and gas prospecting.

The oil and gas exploration results in Bosnia and Herzegovina justify further explorations and indicate that there are realistic possibilities of finding commercially viable deposits

OIL SUBSECTOR

B&H oil industry encompasses imports and refining of imported crude oil and production of petroleum products.

The B&H oil sector developed significant production capacities, comprising two refineries based on the most up-to-date world technologies, but presently only partly employed, including:

- Refinery Brod, which capacity is 4 million t/year, processes imported crude oil into various products (motor fuels, liquid petroleum gas, bitumen, etc)
- Refinery Modriča, which produces motor oils and various special purpose technical oils for the industry and other commercial purposes.

Recently, both refineries have been privatized and their full capacity production is expected soon. In addition B&H has significant storage and transport capacities.

NATURAL GAS SUBSECTOR

Within B&H energy sector the gas subsector is the least developed and the development of the gas sector in

B&H is unquestionable in terms of strategy. Currently, the gas is procured / imported over only one pipeline, with the length of 191 km and the projected annual capacities of 1 billion m³.

The demand projections until 2020 amount from 1.5 to 3 billion m³ of gas, foreseeing serious gas sector reform and development, which comprises:

- Construction of an alternative supply route
- Distribution network development
- Construction of the underground storages
- Diversification of the gas supply sources, etc.

The option of substituting the imported natural gas with the gas produced by coal gasification is under consideration too.

POWER GENERATION

Electricity is predominantly produced in hydro and thermal power plants. Currently, the production facilities, with total installed capacities of 4000 MW, exceed the domestic demand, and the electricity is exported.

NEW POWER GENERATION PROJECTS DEVELOPMENT

Intending to harness the substantial and diversified energy resource base in B&H, all relevant stakeholders in B&H are adopted development and investment programs for construction of new generation plants, entirely respecting recommendation from EU Directive 2003/54.

Significant investments in new power system facilities and expansion of power generation capacities are foreseen by these programs, in order to meet growing electricity supply deficit within regional and larger European markets.

Investment programs encompass a number of the development projects, based on coal, hydro and renewable energy sources, including both expansion of existing and construction of new power generation capacities.

LARGE THERMAL POWER GENERATION PROJECTS

There are a total of seven new coal-fired thermal power generation projects, with potential incremental electricity production capacity of approximately 3450 MW; including both, rehabilitation and expansion of the existing facilities and construction of entirely new coal mine / power generation plant complexes.

Coalmine / Power Plant	Installed Capacities in MW (estimation)
Kongora - Coalmine/power plant	2x275
Bugojno – Coalmine / power plant	G1 300 ; G2 300
Stanari – power plant	420
Ugljevik 2 - Coalmine / powerplant	2 x 300
Gacko 2 - Coalmine / powerplant	660
Tuzla – G7	370
Kakanj - G8	250



LARGE AND SMALL HYDROPOWER PROJECTS

Development programs identified fifteen potential new large and small hydropower projects, and four rehabilitation and expansion projects, with potential incremental electricity production capacity of



approximately over 2000 MW in total. Rehabilitation and expansion projects are foreseen in hydro-power plants Jablanica, Rama, Jajce and Čapljina.

MINI HYDROPOWER PROJECTS (CAPACITY OF 5 MW OR LESS)

In the river basins of B & H there were identified over 400 potential micro locations for construction of the mini hydro power plants, enabling cumulative increase of the electricity production capacity of approximately 1000 MW.

Location / Municipality area /	Installed Capacities in MW (estimation)	Location / Municipality area /	Installed Capacities in MW (estimation)
Ustikolina	3x22	Dabar	160
Vranduk	21	Bileca	36
Rmanj Monastir	2x36	Paunci	42.3
Vrilo 2x26 MW		Krupa & Banja Luka	48.5 + 37.2
Glavaticevo	3x9,5	Mrsovo	43.8
Bjelimici 2x50 MW + PH	2x300	Ulog	30
Dubrovnik 2	2x152	Ugar	40
Buk Bijela & Foca	250		

WIND ENERGY POTENTIALS

Measurement results for sites in Herzegovina in the period of 2004-2005 give wind speed in the range of 7 to 9 m/s. The application of extrapolation models and the use of long-term scaled data sets on these locations result in expected average annual wind speed in the range of 6 to 8 m/s 50m a.g.l. However, model data can be more reliably used for regional wind resource assessment and for the wind climate comparison of different regions of Bosnia and Herzegovina. Thus, the southern part of Bosnia and Herzegovina can be considered as the most perspective for wind power plant development.

Currently there are many macro and micro locations for wind power plant construction that are evaluated as advantageous for wind power plant construction as it is shown at the table below:

Location / Municipality area /	Installed Capacities in MW (estimation)	Location / Municipality area /	Installed Capacities in MW (estimation)
• Mostar		• Duvno	
- Velika Vljajna	42	- Ugrovaca	40
- Jastrebnika	20	- Duvanjsko polje	50 – 90
- Raška Gora	20	• Livno municipality area	
- Krešića Gaj	20	- Borova glava	30
- Jasenjani	20-30	- Cincar	30-40
- Podveležje	160-180	• B&Hac	
- Pločno	20	-2 locations	40-60
- Bahtijevica	30	• Čvrsnica mountain	
• Stolac		- Pločno	20
-Hrgud	20	• Čapljina	
-Dabarsko polje	20	-Hrasno	20 – 30
• Kupres		• Nevesinje	
- Debelo brdo	20-30	- Morine	150
- Zlo selo	20-30	- Kruševljani	20-30
- Šuica	20-30	- Grebak 20-30	
- Ravanska vrata	20-30	• Berkovići	
- Filipovića polje	20	- Gornja trusina	20
• Glamoč	20-30	• Trebinje	
• Bosansko Grahovo		- Popovo Polje	50– 60
- Medeno polje	20-30	• Bjelašnica Mountain	20 – 50

According to the actual findings, the total wind power potential of eighteen sites under development was estimated to about 1030 – 1180 MW. It is estimated that possible total production of electrical energy at these locations could amount to 2.4 TWh/year, with the average utilization factor of



about 30%, which represents the top level of productivity, even in European terms. It is important to emphasize here the figure stated above is in the domain of assumption and it is necessary to have it confirmed by detailed analyses.

However, the total wind potential in Bosnia and Herzegovina is probably much higher, in the order of 2000 MW. This estimate results from the analyses of available space, but doesn't take into account possible limitations (like grid integration possibilities, environmental protection, etc).

All above mentioned requires significant capital investments, as well as reliable strategic partners.

PROJECTION OF INVESTMENT PLAN

Basic structure of economic and financial analysis of investment projects, in preparation of long term development of the energy sector of Bosnia and Herzegovina from 2010 to 2020 presumes creation of an information the basis of which is, inter alia, made of investments in construction of new and rehabilitation of the existing plants and installations of the energy sector.

Input data for investment proposals are collected from the Energy Companies and private investors from Bosnia and Herzegovina. The investors' estimates are given separately for each project or group of projects in the framework of the proposed development plan of the B&H energy sector for development-investment cycle 2010 to 2020.

A review of total investments by energy sector within the framework of the B&H energy sector development until 2020 is shown at the following table:

Energy sectors	Amounts in million €				
	Investment period				
	until 2010.	2011.- 2015.	2016.- 2020.	Total investments	%
Power sector	1.477	1.535	1.044	4.057	65,8%
EP BiH	539	495	414	1.449	23,5%
EP HZHB	507	423	155	1.085	17,6%
EP RS	337	511	396	1.244	20,2%
Elektroprijenos BiH	89	105	78	271	4,4%
NOS BiH	6	2	0	8	0,1%
Coal mines	239	329	177	745	12,1%
Federation BiH	130	125	85	340	5,5%
Republic of Srpska	108	205	92	405	6,6%
District heating sector	179	162	167	508	8,2%
Zone 2	42	41	43	126	2,0%
Zone 3	72	66	68	206	3,3%
Zone 8	50	40	41	131	2,1%
Zone 9	15	15	15	46	0,7%
Gas sector	141	241	13	394	6,4%
Gas transmission systems	106	99	0	205	3,3%
Underground storage	13	27	0	40	0,6%
Gas distribution systems	21	115	13	149	2,4%
Oil sector	323	142	0	465	7,5%
Modernization and construction	279	0	0	279	4,5%
Storage facilities	44	142	0	186	3,0%
Total investments	2.358	2.410	1.401	6.169	100,0%

Source: B&H Energy Sector Study-World bank -Energy Institute H. Požar-Croatia, 2008

INSTITUTIONAL FRAMEWORK

The key actors in the electric power sector in B&H are:

- Council of Ministers of B&H (energy sector development strategy on the state level, international relations, drafting energy law on state level) www.vijeceministara.gov.ba
- Government of FB&H (energy sector development strategy and energy policy on entity level) www.fB&Hvlada.gov.ba
- Government of RS (energy sector development strategy and energy policy on entity level) www.vladars.net
- Ministry of Foreign Trade and Economic Relations of B&H - responsible for coordination of energy policy and international relations at the level of B&H, www.mvteo.gov.ba
- Ministry of Energy, Mining and Industry of the Federation B&H -Implementation of state policy, energy policy of Federation B&H and coordination of entity's activities, www.fmeri.gov.ba
- Ministry of Economy, Energy and Development of the Republic of Srpska - Implementation of state policy, energy policy of RS and coordination of entity's activities, www.vladars.net/Vlada/Ministarstva/mper
- State Electricity Regulatory Commission (DERK) - Regulation of electricity transmission activity and international trade investment electricity (started in 2003), www.derk.ba
- Regulatory Commission for Electricity of Federation of Bosnia and Herzegovina (FERK) - Regulation of production, distribution and supply of electricity in the Federation B&H (started in 2002), www.ferk.ba
- Regulatory Commission for Energy of Republic of Srpska (RERS) - Regulation of production, distribution and supply of electricity in RS (started its activity in 2002), www.reers.ba
- Independent system operator B&H (NOS) (started its activity in 2005), www.nosB&H.ba
- Electricity transmission company Elektroprenos – Elektroprijenos B&H (started in 2006), www.elprenosB&H.ba
- Company Elektroprivreda B&H (EPB&H) – Directorate for distribution in the frame of vertically integrated company Elektroprivreda B&H (ongoing procedure of founding a separate company, legally independent of other activities of the vertically integrated company), www.elektroprivreda.ba
- Company Elektroprivreda Hrvatske zajednice Herceg Bosne (EPHZHB) – Directorate for distribution in the frame of vertically integrated company EPHZHB (ongoing procedure of founding a separate company, legally independent of other activities of the vertically integrated company), www.ephzhb.ba
- Combined holding Elektroprivreda Republike Srpske (EPRS) – Five dependent electricity distribution companies in the frame of mixed holding Elektroprivreda Republike Srpske (established in 2006). www.ers.ba



LEGAL FRAMEWORK

LEGAL FRAMEWORK FOR B&H POWER SECTOR

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

- Law on transmission, regulator and system operator of electricity in B&H
- Law on electricity in the Federation B & H
- Law on electricity in the Republika Srpska
- Law on establishment Transmission Company in B & H
- Law on establishment Independent System Operator in B & H
- Law on Energetics in the Republika Srpska (adopted in May 2009)
- Act on Renewable Energy Sources and Cogeneration in Federation B&H (adopted in December 2010)

THE EU DOCUMENTS RELEVANT FOR POWER SECTOR POLICY OF B&H

The EU documents relevant for the electric energy policy of B&H include the following:

- White Paper – preparation of Central and East European associate states for integration in to internal market ,
- Directive 2003/54/EC concerning common rules for the internal market in electricity and repealing of Directive 96/02 EC
- Regulation 1228/2003/EC on conditions for access to the network for cross-border exchanges in electricity,
- Directive 2005/89/EC concerning measures to safeguard security of electricity supply and infrastructure investments,
- Directive 2001/77/EC on the promotion of the electricity produced from renewable energy sources in the international electricity market,
- Directive 2003/30/EC on the promotion of the use of bio fuels for transport,
- New set of legislation on liberalization of the energy market.

EU legislation on energy efficiency includes:

- White Book on Energy Policy,
- Green Book Towards a European Strategy for the Security of Energy Supply,
- Directive 2003/54/EC on Common Rules for the Internal Market in Electricity,
- Directive 92/75/EEC and its implementation directives on the obligatory labeling and standard product information on the consumption of energy and other resources by household appliances,
- Regulation on Cross-border Trade in Electricity (1228/2003/EC),
- Directive 2002/91/EC on the Energy Performance of Buildings,
- Directive 2006/32/EC on Energy End-use Efficiency and Energy Services,
- Action Plan on Energy Efficiency: "Saving 20% by 2002".

EU legislation on renewable energy sources includes:

- White Book on Renewable Energy Sources,
- Communication on alternative fuels for road transportation and on a set of measures to promote the use of Bio-fuels,
- Directive 2003/30/EC on the Promotion of the Use of Bio-fuels for Transport,
- Directive 2001/77/EC on the Promotion of the Electricity Produced from Renewable Energy Sources,
- Directive 2004/8/EC on Promotion of Cogeneration.

ENERGY COMMUNITY

Bosnia and Herzegovina is a member of the Energy Charter Conference and signatory of two Athens Memorandums of Understanding on the Regional Energy Market in South East Europe and its integration into the European Community Internal Energy Market.

ENERGY RELATED INTERNATIONAL OBLIGATIONS

Bosnia and Herzegovina ratified the following Agreements, Protocols and Conventions:

1. Agreement on the Energy Charter Treaty (ECT) and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), which main issue areas include investments; trade, transit; and energy efficiency (2000)
2. UN Framework Conventions on Climate Changes (2000)
3. Convention on Cross boarder Traffic Control of dangerous waste and its disposal (2000)
4. Convention on Adriatic Sea Pollution Protection (1998)
5. Kyoto Protocol (2008)
6. Agreement on Energy Community Establishment (2006)



SUCCESS STORY

Top 5 foreign investments in BiH energy sector, where the foreign companies invested more than 15 million €, are shown at the following table:

Country	B&H Company	Foreign Company	Subsector
Russia	Rafinerija nafte Brod Rafinerija ulja Modriča Petrol	NefteGauinKor (Zarubežnjak)	Oil
Slovenia	„Petrol BH Oil Company“ doo Sarajevo	Petrol Ljubljana	Oil
Croatia & Hungary	Energopetrol dd Sarajevo	Consortium MOL/INA	Oil
Denmark	„EFT Group Rudnik lignita Stanari“ doo Stanari „European Energy Group“ doo Trebinje	EFT (Holdings) ApS Kopenhagen. EFT (Holdings) ApS Kopenhagen	Oil
Germany	„Messer Sarajevo-Plin“ doo Sarajevo ----- „Messer Mostar –Plin“ doo Mostar	Messer Griesheim H. ----- Messer Griesheim Funfee V.	Oil

Source: Ministry of Foreign Trade and Economic relations of B&H

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